PSYCHOSOCIAL JOB DIMENSIONS AND DISTRESS/WELL-BEING: ISSUES AND CHALLENGES IN OCCUPATIONAL HEALTH PSYCHOLOGY

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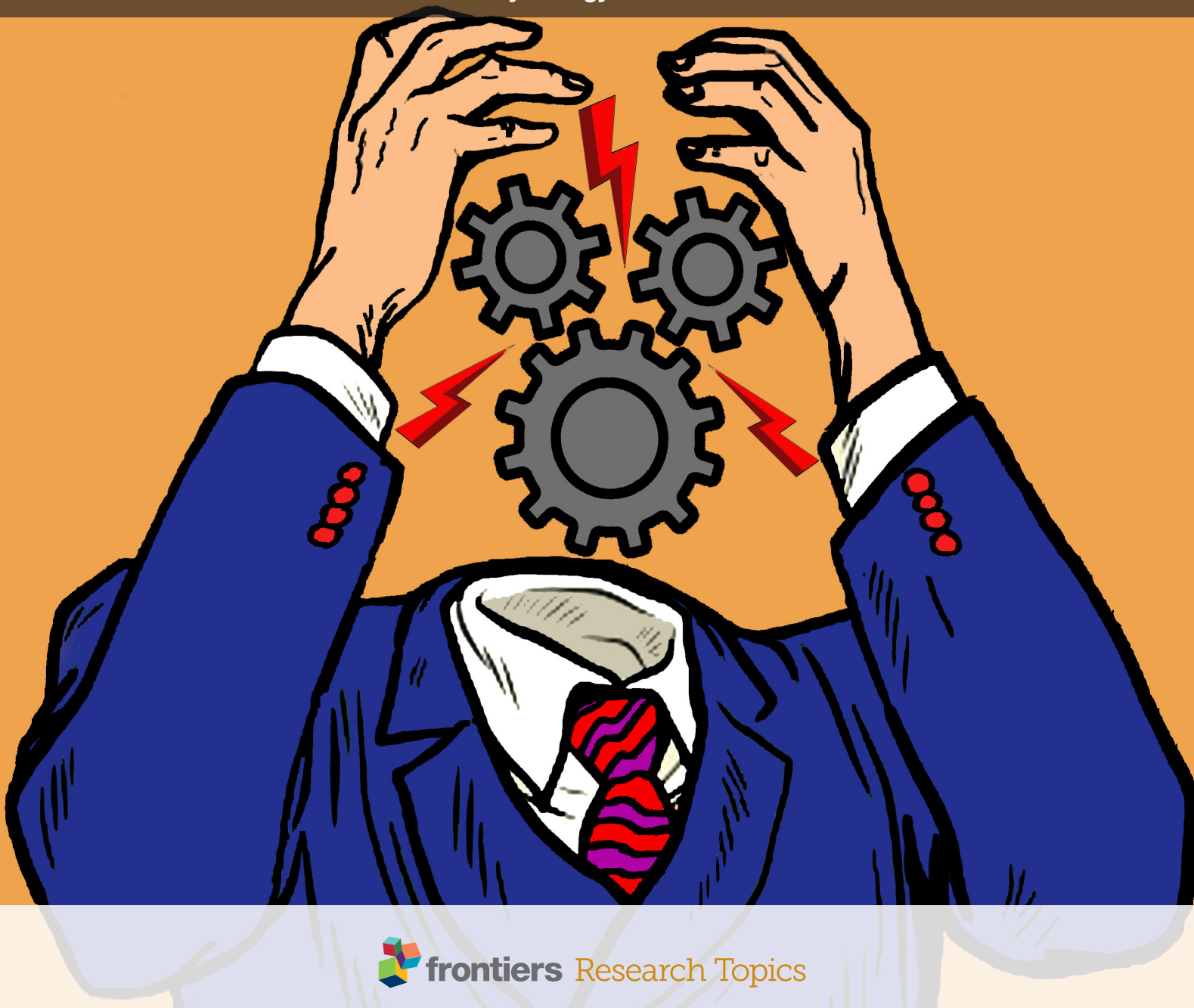

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PSYCHOSOCIAL JOB DIMENSIONS AND DISTRESS/WELL-BEING: ISSUES AND CHALLENGES IN OCCUPATIONAL HEALTH PSYCHOLOGY

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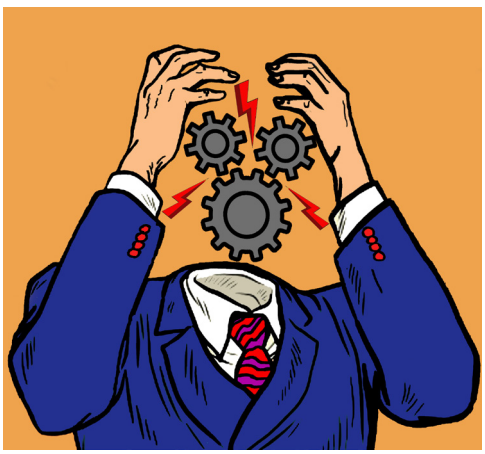

Image by Luciano Mercurio (lucio.hg@hotmail.it)

Over the last three decades a large body of research has showed that psychosocial job dimensions such as time pressure, decision authority and social support, could have significant implications for psychological distress and well-being.

Theoretical models, such as the job demand-control-social support model (JDCS model), the effort-reward imbalance model (ERI model), the job demands-resources model (JDR model) and the vitamin model suggest that distress and positive dimensions at work (well being and motivation) can be considered as two sides of the same coin.

If the job is designed to provide the right mix of psychosocial job dimensions (e.g., optimal time pressure, decision authority and social support), work can boost job engagement and well-being as well as productive behaviors at work. When the job is not designed in an optimal way (e.g., too much time pressure and too little decision authority) work can trigger stress reactions and burnout.

Although some insight has been gained on how job dimensions could predict distress and well-being, and also into the dimensions that might moderate and mediate these associations; research still faces several challenges.

Firstly, most of this research has been cross-sectional in nature, thus making it difficult to conclude on the long-term effects of psychosocial job dimensions.

Another challenge concerns how the contextual dimensions can be incorporated into micro-levels models on employee stress and well-being. Nowadays, work is carried out in the context of a

wider environment that includes organizational variables. So far the role of the organizational variables in the theoretical frameworks for explaining the relationships between psychosocial job dimensions, employee distress and well-being, has often been underplayed.

The main aim of this research topic is to bring together international research from different theoretical and methodological perspectives in order to advance knowledge and practice in the field of work stress.

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EDITORIAL
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Editorial: Psychosocial Job Dimensions and Distress/Well-Being: Issues and Challenges in Occupational Health Psychology

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Editorial on the Research Topic

Psychosocial Job Dimensions and Distress/Well-Being: Issues and Challenges in Occupational Health Psychology

Over the past 40 years, few topics in the organizational psychology have attracted as much attention as the impact of psychosocial job dimensions on psychological distress and well-being. Theoretical models, such as the effort-reward imbalance (ERI) model and the job demands-resources (JD-R) model suggest that distress and positive dimensions at work (well-being and motivation) can be considered as two sides of the same coin. If the job is designed to provide the right mix of psychosocial job dimensions (e.g., optimal time pressure and decision authority), work can boost job engagement and well-being as well as productive behaviors at work. When the job is not designed in an optimal way (e.g., too much time pressure and too little decision authority) work can trigger stress reactions and burnout.

The aim of this research topic was to bring together international research from different theoretical and methodological perspectives in order to advance knowledge and practice in the field of occupational stress. This e-book presents twenty papers that cover a range of topics, from burnout to illegimate tasks, and a range of methodologies from diary studies to meta-analysis. The papers provide new insights into the JD-R and ERI models, the Conservation of Resources theory, recovery from work, detachment and job satisfaction.

The e-book starts with a review paper written by Zacher and Schmitt, in which the authors review research on the role of age in the relationship between psychosocial job dimensions and occupational well-being. Their review considers the following theoretical frameworks: the lifespan perspective on work design, person-environment interaction and fit theories, as well as models of successful aging at work, to explain the interaction effects of psychosocial job dimensions and age on occupational well-being. Furthermore, role theory has been adopted primarily to clarify why psychosocial job dimensions may mediate associations between age and occupational well-being indicators. The authors conclude that relationship of age with specific work characteristics and occupational well-being indicators can be linear or non-linear. A series of original studies present promising extensions to the JD-R model (Bakker and Demerouti, 2017). The JDR model assumes that job demands and resources trigger two processes; namely a health-impairment process and a motivational process. In the first paper Molino et al. examine, among call center employees, the mediational role of emotional dissonance between job demands (workload and customer verbal aggression) and job resources (supervisor support, colleague support, and job autonomy) on the

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one hand, and, on the other, affective discomfort. Emotional dissonance derives when employees should express emotions considered acceptable by the organization, but do not represent the true feelings of the individual. Their results illustrate that only for the subgroup of agents who had to provide technical and specific customer service, emotional dissonance fully mediated the relationship between workload and affective discomfort, and it partially mediated the relationships between customer verbal aggression and job autonomy on the one hand, and affective discomfort on the other. Ceschi et al. examine whether job demands and job resources can moderate the relationships between two decision making dimensions (decision making competency and decision environment management) and job performance (in-role and extra-role performance). Results show that among employees who perceive low levels of job demands, decision making competency is positively related to in-role performance; whereas such an interaction disappears for high levels of job demands and decision making competency. Furthermore, employees who perceive high levels of decision environment management and high levels of job resources are more prone to perceive high levels of extra-role performance than their counterparts who perceive high (or) low decision environment management and low job resources. Baeriswyl et al. examines the role of work family conflict as an intervening variable in the JD-R model among airport security officers employed at a European airport. Work family conflict occurs when job demands interfere with family domain such as irregular work hours, work overload, etc. Work family conflict partially mediated the impact of supervisor support and workload on job satisfaction and emotional exhaustion. Finally, two longitudinal studies examine both the direct and moderating effects between job demands and resources variables on burnout dimensions (emotional exhaustion, depersonalization/cynicism, and personal accomplishment). Pisanti et al. found, in a sample of nurses, that unfavorable changes in psychosocial job dimensions are associated with increases of burnout variables over time. Also, Jimenez and Dunkl, in a sample of workers employed in different industrial sectors (e.g., manufacturing), found cross lagged effects of job characteristics on burnout dimensions. In both studies the moderating effects of job resources were found for the dimension personal accomplishment. All five papers further extend the theoretical and practical knowledge base concerning the JD-R model.

Three further articles focus on the Conservation Of Resources (COR) theory (Hobfòll, 2001). The main assumption of the COR theory is that a loss or the potential loss of resources are psychologically threatening. In the Lee et al. paper, the direct associations of negative and positive work-to-family spillover on emotional exhaustion and job satisfaction are analyzed at the individual and organizational level in a group of hotel managers', beyond the effects of job demands and supervisors' leadership style. Moreover, the authors examine the cross-level (individual vs. organizational) interactive effect of negative work-to-family spillover and positive work-to-family spillover. The authors found that beyond the effects of psychological job demands and supervisor's transformational leadership, at the individual level, hotel managers who perceive higher negative work-to-family spillover report more exhaustion and lower job satisfaction, whereas those with higher positive work-to-family spillover perceive less exhaustion and higher satisfaction. The negative link between individual-level negative work-to-family spillover and job satisfaction is moderated when organization-level positive work-to-family spillover is higher, compared to when it is lower. The issue of work and family, as interconnected spheres of life that play a vital role in employee well-being, is also examined in the paper of Dåderman and Basinska. In a group of female nurses, the authors examine direct effects between job demands and engagement on the one hand, and, on the other, turnover intentions. Furthermore, the authors analyze whether levels of work family conflict and family work conflict moderate the associations between job demands and engagement with turnover intention. They found that only high job demands and low vigor were significantly associated with turnover intentions. Rogala et al. in two longitudinal studies, highlight the role of self-efficacy beliefs as personal resources that mediate the association between emotional exhaustion and disengagement. In both studies these associations were mediated by self-efficacy: higher exhaustion may trigger a spiral loss of self-efficacy which in turn may lead to higher disengagement at follow-up.

A series of studies on the role of detachment and recovery come next. The first is a meta-analysis by Wendsche and Lohmann-Haislah, in which the authors examine the antecedents and outcomes of detachment from work. The meta-analysis indicated that average relationships between detachment and physiological stress indicators and work motivation were not significant while associations with contextual performance and creativity were significant, but negative. Moreover, results indicated that psychological detachment was negatively related with individual dimensions such as negative affectivity and heavy work investment. Germeys and De Gieter present the results of a daily diary study conducted among 136 employees during 10 consecutive working days. The main focus of their research concerns the positive effects on the well-being of the daily psychological detachment from work. Psychological detachment fully mediated the daily relationship between workload and marital satisfaction. In the paper of Cropley et al. the authors present three original studies focused on the relationships between work-related rumination and cognitive processes (such as planning and working memory) centered on the construct of executive functioning. Previous studies (i.e., Cropley and Zijlstra, 2011) have defined rumination as the process of perseverative thinking or dwelling about problems and issues relating to work. Overall, the three studies demonstrate significant associations between work-related rumination and measures of executive functioning such as cognitive failures, cognitive flexibility, and situational awareness at work. Moreover, "High ruminators" showed greater difficulties with "lapses of attention," "lack of focus of attention," and "absent mindedness"; rather than "Low ruminators." Finally, high work-related rumination was associated with other central dimensions of executive functioning such as deficits in starting and finishing projects, memory, and feeling compelled to do things. The authors conclude their paper by arguing that work-related rumination may not be related to work demands *per se*, but appears to be

an executive functioning/control issue. Overall, the papers provide interesting insights regarding recovery strategies and psychological detachment from work.

Two further papers focus on illegitimate tasks. Tasks may be viewed as illegitimate to the extent that they are perceived to be unnecessary or unreasonable. They imply a threat to one's professional identity. These tasks arouse feelings of injustice because they are perceived as infringing the norms about what can be expected from an employee (Semmer et al., 2015). Faupel et al. present the results of a study conducted on the basis of qualitative content analysis. They present typical illegitimate tasks in the context of teacher training. Unnecessary tasks could be categorized as sub-challenging (e.g., "We all studied and learned these things at university."), inefficient and lacking in organization. Unreasonable tasks relate to ones that overextend us, fall outside our area of responsibility, and lack appropriate supervisory support. Omansky et al. among a sample of 213 employees in various predominantly junior-level positions, demonstrate that illegitimate tasks are significantly and negatively associated with job satisfaction and intrinsic motivation. Moreover, a moderated-mediation effect was found such that male workers reacted more than female workers to illegitimate tasks through the mechanism of perceived ERI. Overall, these two papers highlight the importance of including illegitimate tasks as new forms of occupational stressors in future studies.

Schulz et al. provide an original perspective by examining a multilevel model where team health climate is hypothesized to be associated with health-related outcomes (i.e., subjective general health, psychosomatic complaints, mental health, and presenteeism). Team health climate is defined as "employees' shared perceptions of the extent to which their team is concerned, cares, and communicates about health issues" (Schulz et al.). Team health climate was associated with all health outcomes (except psychosomatic complaints), above and beyond the effects of other dimensions (e.g., team size, job demands, job control, and employees' individual perceptions of health climate). Furthermore, analyses reveal that a positive team health climate may buffer the negative relationship between employee age and work ability. The authors describe interesting implications for occupational health interventions in teams.

San-Martín et al. in a sample of healthcare workers, describe the relationships between professionalism (a comprehensive construct composed of empathy, teamwork, and lifelong learning) and distress dimensions (somatization, exhaustion, and work alienation). The authors describe important differences in the pattern of correlations between subgroups of physicians and nurses. Furthermore, the research reveals interesting findings concerning gender (higher somatization in female physicians and nurses than in male groups), and professional status (higher exhaustion and alienation in physicians than in nurses).

Two papers focus their attention on a central construct in occupational health psychology: job satisfaction. In the first paper Sola-Carmona et al. describe the associations between job satisfaction, family satisfaction, and material well-being in a group of parents with blind children. Results highlight a positive correlation between job satisfaction and material well-being, and between material well-being and family satisfaction. However, no statistically significant correlation is found between job satisfaction and family satisfaction. The authors argue that it is necessary to provide families with more economic resources, which would have a positive impact on their subjective psychological well-being, decreasing their state-anxiety, and increasing their satisfaction with life. In the second paper; Unanue et al. present the results of three studies which describe the association between job satisfaction and life satisfaction. A first series of results regards the positive association between job satisfaction and life satisfaction both contemporaneously and longitudinally, and vice-versa, above and beyond several key control demographic variables. Furthermore, the cross-sectional and longitudinal links between job satisfaction and life satisfaction are spurious, and instead they are rooted in basic psychological needs (as stated by self-determination theory) such as: need for satisfaction at work and need for satisfaction in general life.

Two final papers are focused on interventions. Keeman et al. combine the results from two studies carried out to evaluate a free online game aimed at encouraging wellbeing enhancing activities (Wellbeing Game). The game design is informed by the Five Ways to Wellbeing framework. The results showed that after playing the Wellbeing Game, employees reported lower stress levels, and higher well-being levels for those who felt that it had helped them connect more with colleagues. The authors conclude that the studies present preliminary evidence for this type of positive gain spiral but more longitudinal data are needed to examine this further. Finally, Abildgaard et al. focus on the methods to improve the assessment of the intervention process. They use the quantitative and qualitative date from an organizational intervention conducted in a national postal service. The authors describe what information about the intervention process is to be gained from quantitative and qualitative process evaluation and examine strengths and weaknesses as well as potentials for mixed methods evaluation methodologies.

The 20 papers, included in the present e-book, provide new avenues for future research and further refine our understanding of the theoretical and practical issues involved in understanding how psychosocial job dimensions and well-being are linked.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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MINI REVIEW
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Work Characteristics and Occupational Well-Being: The Role of Age

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Based on a lifespan perspective on work design, person-environment interaction and fit theories, models of successful aging at work, and role theory, we review research on the role of worker age in relationships between work characteristics and occupational well-being. We first focus on interaction effects of work characteristics and age on occupational well-being. Research has found that age can moderate associations between work characteristics and occupational well-being indicators, and that work characteristics can moderate associations between age and occupational well-being indicators. Next, we describe research showing that work characteristics can mediate associations between age and occupational well-being indicators. The relationships of age with specific work characteristics and occupational well-being indicators can be linear or non-linear. We conclude our literature review by discussing implications for future research.

Keywords: age, aging, lifespan, work characteristics, well-being

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INTRODUCTION

Due to rapid population and workforce aging in many countries, organizational researchers and practitioners have become increasingly interested in the role of age in the work context (Finkelstein et al., 2015; Truxillo et al., 2015). In this article, we review research in one particular area within the growing field of work and aging: the role of age in relationships between work characteristics and occupational well-being. Research in this area is important because work characteristics and work (re)design can have differential effects on younger and older workers' well-being (Griffiths, 1999; Truxillo and Zaniboni, 2015) and may influence how workers' well-being develops across their careers (Matthews, 2015; Schmitt and Bathen, in press).

The vast majority of studies on work characteristics and occupational well-being has not adopted a lifespan perspective or considered age as a substantial variable. However, the number of studies on work characteristics and occupational well-being that have considered the role of age has increased over the past decade (Hertel and Zacher, in press). Consistent with the lifespan developmental literature (Baltes, 1987), we conceive age as a continuous variable and use the labels "older workers" and "younger workers" for descriptive purposes to refer to relatively higher and lower values of age, respectively. As our focus is on workers, the typical age range in studies on age, work characteristics, and occupational well-being is 18–65 years, with some variation at each end of the age continuum. While no generally accepted cut-off exists, for practical purposes, most organizations define "older workers" as those individuals either 40, 45, or 50 years and older (Kooij et al., 2008). With regard to occupational well-being, we adopt a broad definition that includes both

subjective and objective indicators of physical, mental, and social well-being in the work context (World Health Organization, 2004; Schmitt, in press). This definition also includes both positive (e.g., good physical health, job satisfaction) and negative (e.g., ill-health, strain, emotional exhaustion) aspects of occupational well-being.

In the following sections, we first review four important theoretical frameworks (i.e., a lifespan perspective on work design, person-environment interaction and fit theories, models of successful aging at work, and role theory) that can help explain the role of age in relationships between work characteristics and occupational well-being. Second, we report the methods and results of our literature review on age, work characteristics, and occupational well-being. This literature review is structured based on the conceptual framework shown in **Figure 1**. On the one hand, we review research on interaction effects of work characteristics and age on occupational well-being (Pathway A in **Figure 1**). Interaction effects indicate that the relationship between two variables depends on the level of a third or moderator variable (Fairchild and MacKinnon, 2009). The moderator variable may affect the direction and/or strength of the relationship between the other two variables. We focus on work characteristics as moderators of associations between age and occupational well-being indicators, and on age as a moderator of associations between work characteristics and occupational well-being indicators. On the other hand, we review research on work characteristics as mediators of associations between age and occupational well-being indicators (Pathway B in **Figure 1**). A mediator variable connects a predictor with an outcome variable and may explain why the predictor is related to the outcome variable (Fairchild and MacKinnon, 2009). We conclude our review by outlining implications for future research.

THEORETICAL BACKGROUND

The theoretical frameworks outlined in this section are useful to explain the possible relationships among age, work characteristics, and occupational well-being depicted in **Figure 1**.

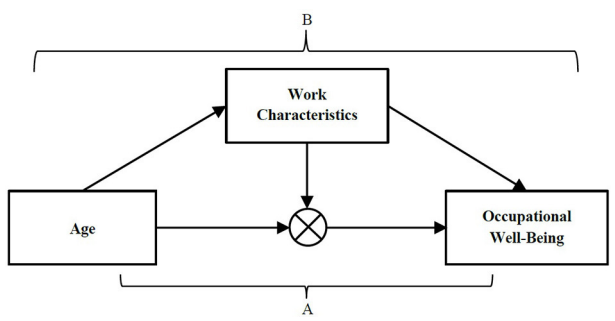

FIGURE 1 | Conceptual Framework of Relationships among Age, Work Characteristics, and Occupational Well-Being. Pathway A represents the interaction effect of age and work characteristics on occupational well-being. Pathway B illustrates the role of work characteristics as mediators of the association between age and occupational well-being.

The lifespan perspective on work design, person-environment interaction and fit theories, as well as models of successful aging at work are primarily used to develop theoretical rationales for hypotheses on interaction effects of work characteristics and age on occupational well-being. More specifically, differential associations of work characteristics with occupational well-being among younger and older workers can be explained by the lifespan perspective on work design and person-environment interaction models. In contrast, work characteristics as moderators of associations between age and occupational well-being can be explained by person-environment fit models and models of successful aging at work. Finally, role theory has been used primarily to explain why work characteristics may mediate associations between age and occupational well-being indicators.

Lifespan Perspective on Work Design

Truxillo et al. (2012) combined lifespan and work design theories, such as socioemotional selectivity theory (Carstensen et al., 1999), the model of selection, optimization, and compensation (Baltes and Baltes, 1990), and job characteristics theory (Hackman and Oldham, 1976) into a comprehensive lifespan perspective on work design. They proposed that six task, knowledge, and social work characteristics (i.e., job autonomy, task significance, skill variety, specialization, social support, and interdependence; see Morgeson and Humphrey, 2006) are more strongly positively related to indicators of occupational well-being (i.e., job satisfaction, engagement) among older workers. In contrast, they suggested that task variety, feedback, interaction outside the organization, and receiving and providing feedback are more strongly positively related to occupational well-being among younger workers. For job complexity, information-processing demands, and problem-solving demands, Truxillo et al. (2012) suggested that the effects of these work characteristics among younger and older workers depend on their specific nature, that is, whether they primarily require fast information processing abilities (which tend to decrease with age) or experiential knowledge (which tends to be stable or increase with age; Kanfer and Ackerman, 2004). The authors further argued that the interaction effects of age, age-related person characteristics (e.g., cognition, personality, time perspective, experience), and work characteristics on occupational well-being are mediated by experienced meaningfulness of work, responsibility, and knowledge of results (cf. Hackman and Oldham, 1976), perceived person-environment fit, and motivation.

Person-Environment Interaction and Fit Theories

In their lifespan perspective on emotion regulation, stress, and well-being, Scheibe and Zacher (2013) integrated the transactional model of stress (Lazarus and Folkman, 1984) and affective events theory (Weiss and Cropanzano, 1996) with the emotional aging literature (Charles and Carstensen, 2010). They proposed that age and age-related factors (e.g., emotional competencies, appraisal processes, changes in life contexts) interact with work characteristics and stressful work

events in predicting occupational well-being. In a subsequent paper, Zacher et al. (2014a) integrated the person-environment fit approach to occupational well-being (Edwards et al., 1998) with the lifespan developmental literature (Baltes, 1987) to explain how interactions between age-related changes in person factor (i.e., traits, abilities, and needs) and age-related changes in contextual factors (i.e., other people, work demands, and supplies) can influence occupational well-being (see also Feldman and Vogel, 2009; Perry et al., 2012). They argued that these effects are mediated by the objective and perceived demands-abilities and needs-supplies fit between a worker and his or her job, team, organizational, and occupational characteristics.

Models of Successful Aging at Work

Successful aging at work involves a process during which workers maintain or improve favorable work outcomes, such as motivation, performance, and well-being with increasing age (Kooij, 2015; Zacher, 2015). Based on the principle of "differential preservation" from the lifespan developmental literature (Salthouse, 2006), Zacher (2015) proposed that empirical research on successful aging at work needs to demonstrate evidence for interaction effects between age and individual resources (e.g., action regulation strategies) and/or contextual resources (e.g., work characteristics), such that resources explain more variance in work outcomes among older compared to younger workers. Older workers who experience relatively higher levels of job satisfaction and engagement compared to the average older worker can be said to have aged successfully in terms of occupational well-being.

Role Theory

While research in the lifespan developmental psychology tradition has focused on age-related changes in individual difference characteristics such as cognitive and physical abilities, personality, and motives (Baltes et al., 2006), age may also be associated with certain work characteristics which, in turn, relate to occupational well-being. A useful explanation for this mediating role of work characteristics in associations between age and occupational well-being is provided by role theory, which suggests that workers occupy multiple roles within and outside the work context (e.g., worker, colleague, family member), and that the perception and perceived importance of these roles, and more specific tasks, expectations, and available resources within these roles, change over time and with age (Biddle, 1986; Ashforth, 2001). For instance, researchers suggested that workers in mid-career experience greater work and family demands, more work-family conflict, and less social support at work than their younger and older colleagues (Huffman et al., 2013; Zacher et al., 2014b).

LITERATURE REVIEW

We first describe our literature search strategy, followed by reviews of studies on interaction effects of work characteristics and age on occupational well-being, and of studies on work characteristics as mediators of associations between age and occupational well-being. **Table 1** summarizes findings on age, work characteristics, and occupational well-being.

Literature Search Strategy

We searched the comprehensive Google Scholar database from 1900 to July 2016 for research on age, work characteristics, and occupational well-being, using combinations and variations of the following keywords: job/work characteristics, health, well-being, age, aging, younger/older workers, moderation, moderator, interaction, mediation, mediator.

Interaction Effects of Work Characteristics and Age on Occupational Well-Being

We identified 16 studies that examined interaction effects of work characteristics and age on occupational well-being (see **Figure 1**, Pathway A). These studies examined both work characteristics and age as moderators of the respective other variable's relationships with occupational well-being indicators (for an overview of findings and specific patterns of interaction effects found, see **Table 1**). Seven studies focused on job satisfaction as outcome variable (Riordan et al., 2003; Besen et al., 2013; Bos et al., 2013; Krumm et al., 2013; Mauno et al., 2013; Taylor et al., 2013; Zaniboni et al., 2016), or on outcome variables that have been shown to be positively related to job satisfaction (cf. Zacher and Yang, 2016), including perceptions of future work opportunities (Zacher and Frese, 2009, 2011; Zacher et al., 2010) and work engagement (Ramos et al., 2016). In addition to job satisfaction, six studies found interaction effects of work characteristics and age on indicators of perceived job stress and strain (Matthews et al., 2010; Shultz et al., 2010; Zaniboni et al., 2013; Besen et al., 2015; Hertel et al., 2015; Ramos et al., 2016). As can be seen in **Table 1**, the patterns of interaction effects of work characteristics and age on occupational well-being are diverse and complex; it appears that the interaction patterns depend not only on the specific work characteristics, but also on the specific occupational well-being indicators under consideration.

In addition to the primary studies, a recent meta-analysis examined age as a moderator of relationships between job autonomy and different positive and negative indicators of occupational well-being (Ng and Feldman, 2015). Findings differed for the specific indicators of occupational well-being under consideration. The negative relationship between job autonomy and emotional exhaustion was stronger among older compared to younger workers, whereas the negative relationships of job autonomy with poor mental health and perceived job stress were weaker among older compared to younger workers. The positive relationships of job autonomy with job satisfaction, affective organizational commitment, and work engagement were also weaker among older compared to younger workers.

Work Characteristics as Mediators of Associations between Age and Occupational Well-Being

We identified only two studies that investigated work characteristics as mediators of associations between age and occupational well-being (Pathway B in **Figure 1**; White

TABLE 1 | Summary of Findings on Age, Work Characteristics, and Occupational Well-Being.

Role of work characteristics and age	Indicator of occupational well-being	Main findings and associated empirical studies
WORK CHARACTERISTICS AS MODERATORS		
• Work arrangements	Job satisfaction	• Stronger positive relationship between age and job satisfaction among full-time workers compared to workers in other work arrangements (Riordan et al., 2003).
• Job autonomy	Strain	• Age-differential effects of avoidance coping strategies on job strain are moderated by job autonomy, such that younger workers use more avoidance coping strategies than older workers when job autonomy is low (Hertel et al., 2015).
• Job autonomy and job complexity	Future work opportunities	• Job autonomy and job complexity buffer the negative relationship between age and favorable perceptions of future work opportunities (Zacher and Frese, 2009, 2011; Zacher et al., 2010).
AGE AS MODERATOR		
	Job satisfaction	• Job autonomy and feedback are more strongly positively related to job satisfaction among older compared to younger workers (Bos et al., 2013; Zaniboni et al., 2016). • Older workers report lower job satisfaction than younger workers when experiencing a misfit between personal needs and work-related supplies (Krumm et al., 2013). • Older workers' job satisfaction is more negatively affected than that of younger workers when they experience high levels of job insecurity (Mauno et al., 2013). • Younger workers' job satisfaction is more negatively affected than that of older workers by high workload and perceived work-family conflict (Mauno et al., 2013). • Positive relationships of job autonomy, skill variety, and social support with job satisfaction are weaker among older compared to younger workers (Besen et al., 2013). • Positive relationship of job autonomy with job satisfaction is weaker among older compared to younger workers (Ng and Feldman, 2015). • Perceived discrimination at work impacts on older workers' job satisfaction more negatively than on younger workers' job satisfaction (Taylor et al., 2013).
	Other positive aspects of work attachment	• Relationships between job characteristics and work engagement are more influenced by the interaction between chronological age and its work-related covariates (i.e., job tenure, position type) than by chronological age *per se*. High-tenure workers (regardless of age) display a stronger drop in engagement than low-tenure workers when demands are high. Older workers seem to value job control more than younger workers (Ramos et al., 2016). • Positive relationships of job autonomy with affective organizational commitment and work engagement are weaker among older compared to younger workers (Ng and Feldman, 2015).
	Perceived job stress and other job strain indicators	• Demand-control model applies differently to older and younger workers. Specifically, the interaction effects of demand and control variables on perceived work stress are more prevalent and numerous for older workers than for younger workers. Among older workers, the availability of sufficient time to complete tasks and job autonomy buffer the positive relationship between deadlines and strain, and scheduling flexibility buffers the positive relationship between problem solving demands and strain (Shultz et al., 2010). • Job stressors are more strongly positively, and social support is more strongly negatively related to perceptions of work-family conflict among older workers than among younger workers (Matthews et al., 2010). • Negative relationship between task variety and burnout is stronger for younger compared to older workers, whereas the negative relationship between skill variety and turnover intentions is stronger for older compared to younger workers (Zaniboni et al., 2013). • Negative relationship between job autonomy and emotional exhaustion is stronger among older compared to younger workers, whereas the negative relationships between job autonomy, poor mental health, and job stress are weaker among older compared to younger workers (Ng and Feldman, 2015). • Interactions among job characteristics, age, and age covariates and their relationship with work-related health outcomes. High-tenure workers (regardless of age) display a stronger rise in burnout than low-tenure workers when demands are high (Ramos et al., 2016).

(Continued)

TABLE 1 | Continued

Role of work characteristics and age	Indicator of occupational well-being	Main findings and associated empirical studies
		• Among older workers, the availability of sufficient time to complete tasks and job autonomy buffers the positive relationship between deadlines and strain, and scheduling flexibility buffers the positive relationship between problem solving demands and strain (Besen et al., 2015).
WORK CHARACTERISTICS AS MEDIATORS		
• Job congruence	Job satisfaction	• Job congruence (i.e., match between workers' job-related needs and supplies) and work-related locus of control mediate the age-job satisfaction relationship; older workers are more satisfied with their work characteristics because their jobs better meet their age-related needs and because they feel that they can determine what happens to them in their job (White and Spector, 1987).
• Perceived time pressure and coworker support	Job satisfaction	• Perceived time pressure and coworker support mediate the curvilinear relationship between age and job satisfaction. Time pressure and coworker support are higher among workers in mid-career (Zacher et al., 2014b).
	Emotional exhaustion	• Perceived time pressure and coworker support mediate the curvilinear relationship between age and emotional exhaustion. Time pressure and coworker support are higher among workers in mid-career (Zacher et al., 2014b).

and Spector, 1987; Zacher et al., 2014b; see **Table 1**). While White and Spector (1987) examined work characteristics as mediators of the linear and positive relationship between age and job satisfaction, Zacher et al. (2014b) found that two work characteristics, time pressure and coworker support, mediated the curvilinear relationships of age with job satisfaction and emotional exhaustion. The latter findings are consistent with research suggesting that the bivariate relationship between age and occupational well-being is better characterized by a U-shaped pattern, with younger, and older workers experiencing greater well-being than workers in mid-career (Birdi et al., 1995; Clark et al., 1996; Hochwarter et al., 2001).

The lack of studies on work characteristics as mediators of the age-occupational well-being relationship is surprising, given that much evidence exists for significant bivariate relationships between age and occupational well-being indicators. More specifically, a number of meta-analyses found that age is negatively related to objective indicators of physical health, and positively related to subjective measures of occupational well-being. Regarding physical health, a meta-analysis by Ng and Feldman (2013) showed that age was positively related to indicators of ill-health such as blood pressure, cholesterol level, body mass index, insomnia, and muscle pain, but not meaningfully related to self-reported physical health, somatic and psychosomatic complaints, depression, and anxiety. Moreover, age was weakly negatively related to indicators of psychological strain, including fatigue, negative mood, anger, and irritation. In contrast, another meta-analysis found no relationship between age and irritation (Rauschenbach et al., 2013). Finally, a meta-analysis by Ng and Feldman (2010) showed higher levels of job satisfaction, organizational commitment, intrinsic work motivation, and perceived person-job fit, as well as lower levels of role ambiguity, role conflict, role overload, and emotional exhaustion among older workers compared to younger workers.

IMPLICATIONS FOR FUTURE RESEARCH

The majority of relevant theoretical frameworks, including the lifespan perspective on work design, person-environment interaction and fit theories, and models of successful aging at work, focus on interaction effects of work characteristics and age on occupational well-being, whereas only role theory has been used to explain the role of work characteristics as mediators of associations between age and occupational well-being indicators. Accordingly, our review showed that more empirical research has been conducted to date on interaction effects between work characteristics and age, whereas very few studies exist on work characteristics as mediators. Future work could combine role theory (Biddle, 1986) and research on different layers of context surrounding younger, mid-career, and older workers (Farr and Ringseis, 2002), to gain a better understanding of how work characteristics may change across the working life span and predict occupational well-being. Researchers could also examine a broader range of potentially age-related work characteristics, such as problem solving and information processing demands (Sparks et al., 2001; Kanfer and Ackerman, 2004; Morgeson and Humphrey, 2006). Importantly, both streams of research (i.e., interaction effects of work characteristics and age, work characteristics as mediators) should examine potential curvilinear relationships of age with work characteristics and occupational well-being, as research based on role theory suggests that mid-career workers have higher job demands, lower levels of coworker support, and subsequently, lower occupational well-being than younger and older workers (Zacher et al., 2014b). This research is important to inform theory and organizational practice regarding workers in the mid-career stage, which are often neglected in research on work and aging.

Future research on age, work characteristics, and occupational well-being also needs to overcome a number of methodological challenges. First, most research in this area is based on cross-sectional designs, which do not allow conclusions about

age-related changes (i.e., aging), disentangling aging from cohort effects, or drawing conclusions about causal effects of work characteristics on occupational well-being. Future research should increasingly use longitudinal, cohort-sequential, as well as experimental and intervention designs. These designs can show how work characteristics and occupational well-being change over time and across workers' careers, and they can provide more rigorous evidence regarding the effects of work characteristics on younger and older workers' occupational well-being. Second, researchers in this area of research have relied heavily on subjective assessments of work characteristics. This raises the questions whether there are differences between age-related changes in actual work characteristics and age-related changes in perceptions of work characteristics, how these differences can be explained and, more generally, what drives these age-related changes. The subjective assessment of work characteristics will continue to be important, as workers' perceptions of their work characteristics are important proximal predictors of occupational well-being. In addition to perceived work characteristics, however, researchers could assess more objective work characteristics, for instance by obtaining expert ratings or archival data based on job analysis, to examine how age is related to these more distal predictors of occupational well-being.

Third, most research has focused on investigating two-way interactions between work characteristics and age or a few selected mediators of associations between age and occupational well-being. As relationships between age and occupational well-being outcomes are complex, future research should propose and test more comprehensive mediated moderation models based on the theoretical frameworks described in this article. Specifically, these models could propose mediators of the moderating effects of age on associations between work characteristics and occupational well-being. For instance, age-related differences in work experience and occupational future time perspective may explain why age interacts with work characteristics in predicting occupational well-being indicators. Moreover, more complex theoretical models could also include the mechanisms that may explain why some objective and perceived work characteristics change with age, and also why work characteristics result in occupational well-being outcomes (e.g., increase in motivation, goal striving). Finally, more complex theoretical models could include hypotheses on three-way interaction effects of worker age, person characteristics, and work characteristics on occupational well-being indicators. For instance, Zacher and Frese (2011) showed that the use of self-management strategies (selection, optimization, and compensation; Baltes and Baltes, 1990) was particularly important for older workers' perceptions of future work opportunities when job complexity was low.

CONCLUSION

There is an increasing awareness in the organizational psychology literature that temporal factors such as worker age (Truxillo and Zaniboni, 2015) and career development (Fried et al., 2007) play a role in relationships between work characteristics and occupational well-being. In this article, we reviewed this emerging line of research. Several studies found that work characteristics interact with worker age in predicting indicators of occupational well-being, including important outcomes such as job satisfaction, work engagement, and emotional exhaustion. In contrast, only few studies found that work characteristics mediate linear and curvilinear relationships between age and occupational well-being indicators, despite evidence for significant bivariate associations between age and occupational well-being indicators. Further, research should use more sophisticated research designs to gain a better understanding of the role of age in associations between work characteristics and occupational well-being.

AUTHOR CONTRIBUTIONS

HZ wrote the first version of the manuscript and AS edited and provided feedback on subsequent versions of the manuscript.

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Inbound Call Centers and Emotional Dissonance in the Job Demands – Resources Model

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Background: Emotional labor, defined as the process of regulating feelings and expressions as part of the work role, is a major characteristic in call centers. In particular, interacting with customers, agents are required to show certain emotions that are considered acceptable by the organization, even though these emotions may be different from their true feelings. This kind of experience is defined as emotional dissonance and represents a feature of the job especially for call center inbound activities.

Aim: The present study was aimed at investigating whether emotional dissonance mediates the relationship between job demands (workload and customer verbal aggression) and job resources (supervisor support, colleague support, and job autonomy) on the one hand, and, on the other, affective discomfort, using the job demands-resources model as a framework. The study also observed differences between two different types of inbound activities: customer assistance service (CA) and information service.

Method: The study involved agents of an Italian Telecommunication Company, 352 of whom worked in the CA and 179 in the information service. The hypothesized model was tested across the two groups through multi-group structural equation modeling.

Results: Analyses showed that CA agents experience greater customer verbal aggression and emotional dissonance than information service agents. Results also showed, only for the CA group, a full mediation of emotional dissonance between workload and affective discomfort, and a partial mediation of customer verbal aggression and job autonomy, and affective discomfort.

Conclusion: This study's findings contributed both to the emotional labor literature, investigating the mediational role of emotional dissonance in the job demands-resources model, and to call center literature, considering differences between two specific kinds of inbound activities. Suggestions for organizations and practitioners emerged in order to identify practical implications useful both to support employees in coping with emotional labor and to promote well-being in inbound call centers. In detail, results showed the need to improve training programs in order to enhance employees' emotion regulation skills, and to introduce human resource practices aimed at clarifying emotional requirements of the job.

Keywords: call center work, job demands-resources model, emotional labor, emotional dissonance, customer verbal aggression

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INTRODUCTION

Call center organizations have rapidly increased in the last few decades, attracting considerable attention from different fields including *Work and Organizational Psychology* (Lewig and Dollard, 2003; De Cuyper et al., 2014). The working conditions that can affect call center agents performance and well-being have received particular attention, owing to their influence on organizational success in terms of profit, customer satisfaction and lower costs of absenteeism and turnover (Das, 2012; Rod and Ashill, 2013; De Cuyper et al., 2014). During the last few years, call center operations management has become more focused on staff empowerment and less on a traditional production-line orientation (Gilmore, 2001).

Literature highlighted that call center agents often suffer from burnout and emotional exhaustion (Ashill and Rod, 2011; Choi et al., 2012), and reported emotional dissonance (the discrepancy between expressed and felt emotions, Zapf et al., 1999) as the principal strain phenomenon in call center work (Zapf et al., 1999; Holman et al., 2002; Grebner et al., 2003; Holman, 2003; Lewig and Dollard, 2003; Zapf et al., 2003; Grandey et al., 2004; Ghislieri et al., 2012; Emanuel et al., 2014b). Indeed, in this kind of work there are strong requirements to suppress negative emotions, caused by unfriendly or angry customers, but also by repetitive job activities, cognitive demands, increased time pressure, workload, decreased autonomy and performance monitoring (Holman, 2003; Grandey et al., 2004; Wegge et al., 2006a; Andela et al., 2015).

The present study investigated the role of emotional dissonance within the job demands-resources (JD-R) model (Bakker et al., 2003; Bakker and Demerouti, 2007, 2014) in a sample of call center agents. In particular, the aim of the study was to explore how two job demands (workload and customer verbal aggression) and three job resources (supervisor support, colleague support and job autonomy), typical of the call center context, are related to affective discomfort, a well-being dimension (Warr, 1990), and whether these relationships are mediated by emotional dissonance.

Call Center Work

Today, many different kinds of companies, in the developed information economies, use call centers as a core way to produce and deliver to the public and customers information services (Russell, 2008). Call centers can be defined as work environments where service agents interact with customers primarily over the phone, or via other communication channels, with the support of computer systems (Van Jaarsveld and Poster, 2013). Since their appearance in the early 1990s, call centers have become an important part of the business world, serving as primary a customer-facing channel for companies with decreased costs of both information technologies and non-specialized personnel, and expectations of high service quality (Grebner et al., 2003; Aksin et al., 2007).

Call centers are generally characterized by structural divisions of labor and extensive use of technology designed to both maximize efficiency and limit worker autonomy and control (task control, timing control and participation) (Knights and McCabe, 1998; Isic et al., 1999; Callaghan and Thompson, 2001). Moreover, there is low complexity and low variability, because the activity consists of routine interactions with customers, controlled mostly by automatic call distribution systems (Holman, 2003). Finally, performance monitoring is a pervasive practice in most call centers, where electronic systems supervise agents controlling quantitative indicators (numbers and length of calls, type of calls taken). Furthermore, the quality of conversations (content, style, adherence to policies) is assessed by recording them and/or listening to them (Holman et al., 2002; Aksin et al., 2007; Moradi et al., 2014).

For these reasons, call center work is demanding, repetitive and often stressful, which can lead to high levels of turnover and absenteeism, and the inability to meet quantitative targets (Taylor and Bain, 1999; Lewig and Dollard, 2003; Workman and Bommer, 2004).

Among the different types of call center activities, previous studies identified that inbound and outbound call center agents perceive stress differently (Zapf et al., 2003; Wegge et al., 2006b; Lewin and Sager, 2007; Lin et al., 2010; Rod and Ashill, 2013). Inbound work is generally focused on helping customers who contact the call center agent, whereas the primary activities of the outbound agent are selling and providing telemarketing with the support of standardized scripts (Lewin and Sager, 2007; Rod and Ashill, 2013). Therefore, inbound call center agents often have to deal with complaints, inquiries and verbal aggression from customers, experiencing greater emotional labor (Aksin et al., 2007; Rod and Ashill, 2013). They are asked to be more customer-oriented and to show abilities such as remaining calm, actively listening, being patient and empathic (Lloyd and Payne, 2009). Moreover, inbound work typically relates to more complex and varied calls than outbound work (Rod and Ashill, 2013).

This study focused on inbound call center work and investigated the differences between two specific kinds of inbound activities, contributing to literature that generally considers only inbound/outbound differences. The first activity considered was the customer assistance service (CA) and consisted in receiving calls from customers who needed to solve some specific technical problems and/or make a complaint; the second was the information service (INFO), aimed at providing phone numbers that customers required.

Emotional Labor

According to Hochschild (1983), emotional labor can be defined as the process of regulating feelings and expressions as part of the work role (Grandey, 2000). Emotions play an important function in the relationship between employees and customers: companies and managers highlight the importance of this relationship and employees are encouraged formally (or informally) by their organizations to display emotions that conform to certain organizational norms or standards (Zapf et al., 1999; Zapf and Holz, 2006). Thus, expressing appropriate emotions during face-to-face or voice-to-voice interactions has become a job demand for many employees, who are not only required to complete their tasks, but also to conform with specific display rules defined by the corporate culture of an organization (Hochschild, 1983; Grandey, 2000; Schaubroeck and Jones, 2000; Diefendorff

and Richard, 2003). Customer service employees are typically encouraged to display a cheerful, friendly manner and behavior while interacting with clients and to express certain emotions (Heuven and Bakker, 2003; Bakker and Heuven, 2006; Humphrey et al., 2015): for example, cabin attendants are expected to display courtesy, police officers firmness, nurses compassion, call center agents willingness.

Therefore, service occupations are considered emotionally demanding for the workers because they must also express certain emotions that may not be felt or may even be opposed to those internally perceived in the situation. Emotional dissonance arises when employees' expressed emotions are considered acceptable by the organization, but do not represent the true feelings of the individual (Rafaeli and Sutton, 1987; Zapf, 2002; Hülsheger and Schewe, 2011; Grandey and Gabriel, 2015).

In call center work, even though there is no direct face-to-face contact with customers, there are typically strong demands to be friendly with them (Zapf et al., 2003), as type of customer service activities. Moreover, the performance of agents is often monitored by the organization (e.g., test calls or recording calls) and nonconformities from emotional norms can be easily detected (Holman, 2003). In many cases, customers call with problems and call center agents frequently interact with difficult and aggressive people during the workday (Deery et al., 2002; Totterdell and Holman, 2003; Grandey et al., 2004). In particular, customer verbal aggression is descripted as customers' intentions to damage employees intentionally through words, voice and tone or demeanor such as bad language, shouting and sarcasm (Harris and Reynolds, 2003; Dormann and Zapf, 2004; Grandey et al., 2004). Several studies show that this can undermine employee compliance to regulate emotions: employees, who feel mistreated by customers in both laboratory and field research, seem to force themselves to manage their emotions (Grandey et al., 2004; Rupp and Spencer, 2006; Rohrmann et al., 2011).

Hochschild (1983) was the first scholar to describe the possible negative consequences of emotional labor, for both individuals and organizations. Emotional labor may have potential positive consequences such as the facilitation of interpersonal encounters with customers, task effectiveness, increased service quality or higher income for service providers (Grandey and Gabriel, 2015). However, several scholars have clarified that the regulation of emotions may be especially stressful and detrimental to health: consistent relations have been found between emotional dissonance and burnout complaints across different human service professions (Hülsheger and Schewe, 2011; Kammeyer-Mueller et al., 2013; Kenworthy et al., 2014). Emotional dissonance can have negative consequences for employees. Some scholars underline a positive association with psychological strain, emotional exhaustion, psychosomatic complaints, work-family conflict and lower job satisfaction (e.g., Zapf et al., 1999, 2001; Schaubroeck and Jones, 2000; Zapf, 2002; Grebner et al., 2003; Heuven and Bakker, 2003; Totterdell and Holman, 2003; Wilk and Moynihan, 2005; Cheung and Cheung, 2013; Kenworthy et al., 2014; Scheibe et al., 2015).

Referring to customer relations, Dormann and Zapf (2004) found in three samples of service workers that verbal customer aggression is a strong stressor that is positively correlated with burnout and emotional dissonance. Verbally aggressive customers are a source of strain in the work of call center agents (e.g., Grandey et al., 2004) and the customers' verbal aggressiveness is an antecedent of emotional dissonance (Wegge et al., 2010). In fact, aggressive customers express and, in turn, foster in agents emotions that employees cannot show according to common emotional rules in call centers (Grandey et al., 2002; Grandey et al., 2004). Therefore, studies in different service jobs found detrimental effects of negative customer behavior on service providers' well-being (e.g., Dormann and Zapf, 2004; Rupp and Spencer, 2006; Wegge et al., 2007; Wang et al., 2011; Molino et al., 2015).

In this study, a difference was expected between the two types of inbound call center activities in both customer verbal aggression and emotional dissonance. In the CA service, agents have to solve specific and complex technical problems that customers meet with, whereas INFO service agents provide phone numbers that customers require. Customers who call the CA service could be particularly angry and aggressive because of the waste of time and the disappointment about the product or service. Therefore, the first study hypothesis was:

> *Hypothesis 1:* (a) CA service agents perceive higher levels of customer verbal aggression than INFO service agents, and (b) CA service agents perceive higher levels of emotional dissonance than INFO service agents.

JD-R Model and Emotional Dissonance in Call Centers

The JD-R theory (Bakker and Demerouti, 2014) refers to a heuristic model able to specify how two different sets of working conditions may produce both health impairment and motivation (Bakker and Demerouti, 2007). Flexibility of the model permits the theory to be applied to all work environments and occupations, identifying specific job demands and job resources. "Job demands refer to those physical, psychological, social, or organizational aspects of the job that require sustained physical and/or psychological (cognitive and emotional) effort or skills and are therefore associated with certain physiological and/or psychological costs" (Bakker and Demerouti, 2007, p. 312). Job demands are not negative by definition; they become job stressors when meeting those demands requires high effort from which the person cannot adequately recover (Meijman and Mulder, 1998). This study considered two job demands that were identified in call center work. The first one is workload, a general demand investigated in many studies that used the JD-R model (Bakker and Demerouti, 2007; Schaufeli and Taris, 2014); it represents the amount of tasks and activities agents have to manage quickly, handling calls as fast as possible (Wegge et al., 2007). The second one is verbal aggression from unfriendly, rude and/or unsatisfied customers, shown through shouting at service agents and using negative verbal expressions (Dormann and Zapf, 2004; Grandey et al., 2004); customer verbal aggression is a specific demand in inbound call center work.

Job resources represent the second set of job characteristics and "refer to those physical, psychological, social, or organizational aspects of the job that are either/or: functional

in achieving work goals; reduce job demands and the associated physiological and psychological costs; stimulate personal growth, learning, and development" (Bakker and Demerouti, 2007, p. 312). Job resources considered in this study were general resources explored in the JD-R model (Bakker and Demerouti, 2007; Schaufeli and Taris, 2014): supervisor support, which indicated the existence of positive and supportive relations between supervisors and agents (Garcia and Archer, 2012; Jansen and Callaghan, 2014); colleague support, which refers to the presence of a collaborative environment among call center agents (Aksin et al., 2007; Garcia et al., 2014); job autonomy, which represents the degree of control over one's own tasks and behavior at work (Morris and Feldman, 1996).

High levels of job-related stressors and a lack of job resources may negatively affect employees' well-being (Demerouti et al., 2001). This study examined their relationship with affective discomfort, which refers to the intensity of emotions experienced at work: specifically, high levels of negative emotions are associated with low levels of well-being (Warr, 1990; Van Katwyk et al., 2000; Quaglino et al., 2010; Biggio and Cortese, 2013; Emanuel et al., 2014a).

Moreover, the study examined the mediational role of emotional dissonance in the JD-R model. Several studies have focused on emotional dissonance as mediator in the relationship between job characteristics and employees' well-being (Bakker and Heuven, 2006; Cheung and Tang, 2007; Karatepe and Choubtarash, 2014; Andela et al., 2015), but few of them referred to call center work. For example, Cheung and Tang (2010), in their study among Chinese call center and retail-shop employees, showed that work characteristics, as manifested by perceived display rules, perceived performance monitoring and perceived service culture, positively influenced strain only through emotional dissonance. Lewig and Dollard (2003), in a study conducted on inbound and outbound call center agents, found that emotional dissonance fully mediated the relationship between emotional demands, expressed by the requirement to display positive emotions, and emotional exhaustion. Our study explored the role of job demands, job resources and emotional dissonance in relation to affective discomfort, a well-being dimension (Warr, 1990); this is important and useful for literature and organizations because our theoretical model was tested in an ever-growing occupational sector in Italy, in which a great many people are employed (Istat, 2014[1]). Furthermore, few studies about call center work in our country have investigated these aspects and the differences among different inbound activities.

The present study considers emotional dissonance as a mediator between job demands and job resources on the one hand, and affective discomfort on the other one. With regard to job demands (workload and customer verbal aggression), they may generate negative emotions that agents cannot show, increasing the experience of emotional dissonance (Hülsheger and Schewe, 2011; Kenworthy et al., 2014; Andela et al., 2015).

Among job resources, supervisor and colleague support may play an important role since they foster a positive working environment in which it is easier for employees to feel positive emotions (Totterdell and Holman, 2003). In customer service work, where the expression of positive emotions is expected, less emotional labor is necessary if the interpersonal relationships are positive and supportive, and positive emotions are genuinely felt (Grandey, 2000). Moreover, support and opportunities to learn from each other may provide agents with those tools and indications helpful to deal with difficult working situations (Moradi et al., 2014), decreasing the likelihood to feel negative emotions. For these reasons, supervisor and colleague support might have a negative relationship with the experience of emotional dissonance.

As for job autonomy, scholars showed that this resource is negatively related to emotional dissonance (Morris and Feldman, 1996). Having autonomy means that agents have more chances to decide how to handle customer calls by thus adapting their answers and behavior to the specificities of both the situation and the customer. In this way, they have more control over the situation, decreasing the likelihood to feel unpleasant emotions that cannot be expressed and, in turn, emotional dissonance perceived.

In conclusion, the aim of the study was to investigate a conceptual model in which two job demands (workload and customer verbal aggression) and three job resources (supervisor support, colleague support and job autonomy) were directly and indirectly, through the mediation of emotional dissonance, related to affective discomfort in inbound call center work. More specifically, the hypotheses were (see **Figure 1**):

Hypothesis 2: (a) job demands are positively associated with affective discomfort, and (b) job resources are negatively associated with affective discomfort.
Hypothesis 3: (a) job demands are positively associated with emotional dissonance, and (b) job resources are negatively associated with emotional dissonance.
Hypothesis 4: emotional dissonance is positively related to affective discomfort, thus playing a mediating role between job demands and resources on the one hand, and affective discomfort on the other.

Since different categories of tasks can generate different emotional and psychological dynamics, and thus different management challenges (Wallace et al., 2000; Jansen and Callaghan, 2014), the hypotheses were tested across the two types of inbound call center activities: the first was the CA service, where customers receive support for specific requests regarding technical problems; the second was the INFO service, which provides customers with phone numbers they need.

MATERIALS AND METHODS

Ethical Statement

The study was conducted in line with the Helsinki Declaration (World Medical Association, 2001), as well as the data protection regulation of Italy. The research project was shared with the trade unions and approved by the Company Board of Directors. Since there was no medical treatment or other procedures that

[1] http://www.istat.it/it/archivio/125372

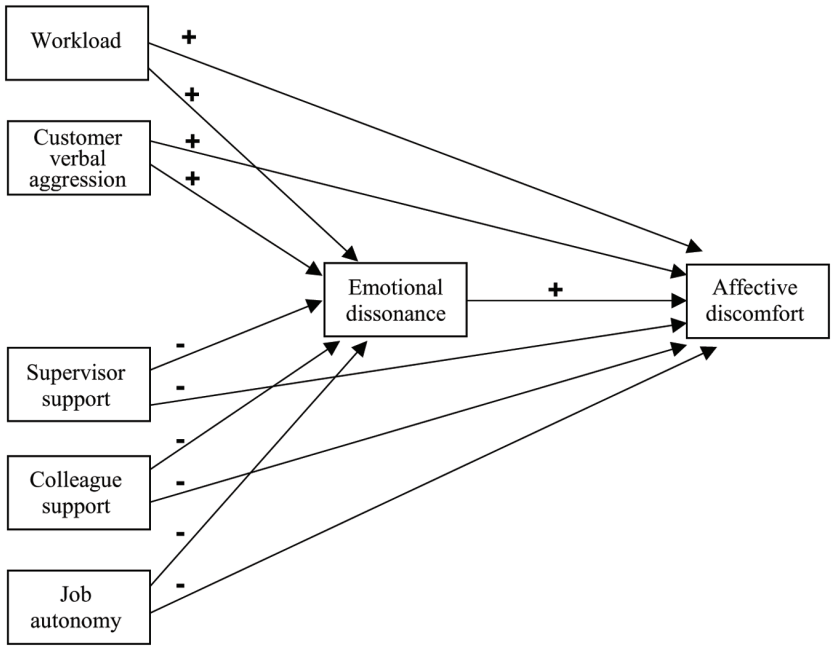

FIGURE 1 | The theoretical model.

could cause psychological or social discomfort to participants, additional ethical approval was not required. An agreement between the Company and Turin University's Department of Psychology was signed in order to ensure anonymity and confidentiality in collecting, analyzing and publishing data. Participation in the research was voluntary, without receiving any reward.

Samples and Procedures

The study was carried out among a national sample of call center agents from an important Italian Telecommunication Company, which provides different ICT services with branches located throughout the country. The aim of the study was explained by sending an e-mail from management and a communication published in the intranet magazine. Anonymity, confidentiality of the data and the voluntary nature of participation in the study were emphasized. A total of 531 call center agents (41.36% of employees involved) filled out the on-line self-report questionnaire.

Participants were from two different kinds of call center activities: 352 of them (66%) worked in the CA, and 179 (34%) worked in the INFO, all of whom worked with an open-ended contract.

The CA sample included 183 females (52%) and 169 males (48%). Their average age was 43.67 years ($SD = 6.42$; min = 25; max = 59). Mean organizational tenure was 19.57 years ($SD = 7.00$; min = 0; max = 37). Most of the participants (63%) worked on a full-time basis. A high percentage of participants (79%) were high school graduates.

The INFO sample included 118 females (66%) and 61 males (34%). Their average age was 38.07 years ($SD = 7.06$; min = 24; max = 56). Mean organizational tenure was 13.81 years ($SD = 6.95$; min = 2; max = 34). Most of the participants (87%) worked on a full-time basis. A high percentage of participants (83%) were high school graduates.

Measures

Affective discomfort was assessed with six items of scale Warr's, (1990). All items were scored on a 6-point scale, ranging from 1 = *never* to 6 = *all of the time*. Respondents were asked, thinking of the preceding few weeks, how much of the time their job had made them feel, e.g., *"depressed"* or *"gloomy"*. Cronbach's alpha for the scale in this study was 0.88.

Emotional dissonance was assessed with 4 items developed by Zapf et al. (1999). All items were scored on a 6-point scale, ranging from 1 = *never* to 6 = *always*. Respondents were asked, e.g., how often during their work, they had to *"Display emotions which do not correspond to inner feelings"*. Cronbach's alpha was 0.90.

Workload was assessed with six items developed by Karasek and Theorell (1990). All items were scored on a 4-point scale, ranging from 1 = *disagree* to 4 = *agree*. An example item is: "*My job requires working very fast*". Cronbach's alpha was 0.82. *Customer verbal aggression* was assessed with 4 items by Dormann and Zapf (2004). All items were scored on a 6-point scale, ranging from 1 = *strongly disagree* to 6 = *strongly agree*. An example item is *"Customers personally attack us verbally"*. Cronbach's alpha was 0.89.

Supervisor support was assessed with 4 items developed by Caplan et al. (1975). All items were scored on a 6-point scale, ranging from 1 = *disagree* to 4 = *agree*. An example item is *"How much was your supervisor willing to listen to your personal*

problems?". Cronbach's alpha was 0.93. *Colleague support* was assessed with four items (Caplan et al., 1975). All items were scored on a 6-point scale, ranging from 1 = *disagree* to 4 = *agree*. An example item is *"How much was your colleague willing to listen to your personal problems?"*. Cronbach's alpha was 0.91. *Job autonomy* was assessed with seven items developed by Karasek and Theorell (1990). All items were scored on a 4-point scale, ranging from 1 = *none* to 4 = *a lot*. An example item is *"I can determine the way in which I work"*. Cronbach's alpha was 0.86.

Data Analysis

First, descriptive data analysis was carried out in each sample separately (CA and INFO), using the statistics software SPSS 22. Pearson correlations were used to examine the interrelationships between variables. Cronbach's alpha coefficient was calculated to test the reliability of each scale. Differences in the means of some variables between the two call center services considered were examined by using the analysis of variance (*t*-test for independent samples).

The multi-group structural equation model (SEM) was performed using Mplus 7 (Muthén and Muthén, 1998–2012) in order to assess differences across both samples in the hypothesized model. By running a multi-group model simultaneously for the CA service and INFO service, we tested whether path coefficients differed across the two groups.

The method of estimation was maximum likelihood (ML). According to the literature (Bollen and Long, 1993), the model was assessed by several goodness-of-fit criteria: the χ^2 goodness-of-fit statistic; the Root Mean Square Error of Approximation (RMSEA); the Comparative Fit Index (CFI); the Tucker Lewis Index (TLI); and the Standardized Root Mean Square Residual (SRMR). Non-significant values of χ^2 indicate that the hypothesized model fits the data. Values of RMSEA smaller than 0.05 indicate a good fit, values smaller than 0.08 indicate an acceptable fit and values greater than 1 should lead to model rejection. CFI and TLI values greater than 0.95 indicate a good fit. The SRMR has a range from 0 to 1, with a cut-off criterion of 0.08, with higher values indicating poorer fit to the empirical data, and values lower than 0.05 indicating an excellent fit. Finally, bootstrapping was used to test the significance of the mediation hypotheses. The procedure extracted, from the original sample, 2,000 bootstrap samples of the same size as the original one and calculated all direct and indirect parameters of the model (Shrout and Bolger, 2002). When the confidence interval does not include zero it means that there is a significant mediation. The bootstrapping was preferred to other procedures since it was considered a powerful test and was suggested as the best option to test mediation and indirect effects (Shrout and Bolger, 2002).

RESULTS

Table 1 shows the means, standard deviations, correlations among the study variables and internal consistency of each scale, separately for CA and INFO samples. All α values meet the criterion of 0.70 (Nunnally and Bernstein, 1994) as they ranged between 0.82 and 0.94.

All the significant correlations between the variables were in the expected directions. Affective discomfort was positively correlated with job demands (workload and customer verbal aggression) and negatively associated with two job resources (supervisor support and job autonomy), across samples. In both samples, affective discomfort was positively associated with customer verbal aggression (CA: $r = 0.25$, $p < 0.01$; INFO: $r = 0.39$, $p < 0.01$) and workload (CA: $r = 0.22$, $p < 0.01$; INFO: $r = 0.28$, $p < 0.01$), negatively associated with job autonomy (CA: $r = -0.35$, $p < 0.01$; INFO: $r = -0.28$, $p < 0.01$) and supervisor support (CA: $r = -0.29$, $p < 0.01$; INFO: $r = -0.32$, $p < 0.01$). Only in the CA sample, affective discomfort was positively associated with colleague support (CA: $r = -0.14$, $p < 0.01$). Emotional dissonance related positively to affective discomfort across both samples but with a stronger relationship in the CA one (CA: $r = 0.42$, $p < 0.01$; INFO: $r = 0.21$, $p < 0.01$). Furthermore, emotional dissonance was positively associated with job demands, and negatively associated with job autonomy, across samples. Among job demands, workload (CA: $r = 0.41$, $p < 0.01$; INFO: $r = 0.28$, $p < 0.01$) and customer verbal aggression (CA: $r = 0.31$, $p < 0.01$; INFO: $r = 0.39$, $p < 0.01$) showed a significant positive correlation with emotional dissonance, in both samples. Among the other job resources, job autonomy (CA: $r = -0.37$, $p < 0.01$; INFO: $r = -0.25$, $p < 0.01$) showed a significant negative correlation with emotional dissonance, in both samples; supervisor support showed a significant negative correlation with emotional dissonance only in the CA sample (CA: $r = -0.16$, $p < 0.01$) and colleague support was not correlated with emotional dissonance in both samples.

Hypothesis *1a* stated that the CA sample perceived higher levels of customer verbal aggression than the INFO sample. Analysis of variance between the two samples showed a difference in the customer verbal aggression: individuals working in the CA call center perceived more customer verbal aggression ($M = 4.23$, $SD = 1.20$) than individuals working in the INFO call center ($M = 3.63$, $SD = 1.36$) [$t\ (321) = 4.99$, $p < 0.01$]. Hypothesis *1b* stated that the CA sample perceived higher levels of emotional dissonance than INFO sample. Individuals working in the CA call center experienced more emotional dissonance ($M = 3.94$, $SD = 1.33$) than individuals working in the INFO call center ($M = 3.58$, $SD = 1.35$) [$t\ (529) = 2.94$, $p < 0.01$]. Hypothesis *1* was therefore fully confirmed. Furthermore, possible differences in the affective discomfort were investigated: no differences between the CA and INFO samples were found for the mean levels of affective discomfort.

The multi-group SEM of the hypothesized model (**Figure 1**) was first evaluated by constraining all the path coefficients to be equal across the two groups. Subsequently, the model was re-tested relaxing the constraints that significantly increased the fit if they were estimated freely across the two groups, consistent with the theory (Bollen, 1989). The final model fitted to the data well: $\chi^2\ (9, N_{CA} = 352, N_{INFO} = 179) = 10.51$, $p = 0.31$, CFI = 0.99, TLI = 0.99, RMSEA = 0.03 (90% CI 0.00, 0.08), SRMR = 0.02. A significant chi-square difference between the

TABLE 1 | Item means, item standard deviation, Cronbach's alphas, and correlations among the study variables for CA ($n = 352$) and INFO ($n = 179$).

	CA		INFO								
	M	*SD*	*M*	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*
1. Affective discomfort	2.98	1.12	3.13	1.31	*0.86/0.90*	0.21**	0.28**	0.39**	−0.32**	−0.13	−0.28**
2. Emotional dissonance	3.94	1.33	3.58	1.35	0.42**	*0.90/0.91*	0.31**	0.31**	−0.12	−0.11	−0.25**
3. Workload	2.93	0.61	2.82	0.66	0.22**	0.41**	*0.82/0.83*	0.16*	−0.14	−0.04	−0.16*
4. Customer verbal aggression	4.23	1.20	3.63	1.36	0.25**	0.31**	0.27**	*0.88/0.90*	−0.24**	−0.06	−0.33**
5. Supervisor support	4.70	1.31	4.25	1.33	−0.29**	−0.16**	−0.08	−0.05	*0.94/0.91*	0.29**	0.27**
6. Colleague support	4.75	1.16	4.63	1.01	−0.14**	−0.06	0.10	−0.01	0.46**	*0.92/0.88*	0.12
7. Job autonomy	2.07	0.64	2.52	0.64	−0.35**	−0.37**	−0.39**	−0.20**	0.22**	0.05	*0.86/0.84*

*Correlations for the CA are below the diagonal; correlations for the INFO are above the diagonal. Italic values on the diagonal are Cronbach's α for CA/INFO sample. *$p < 0.05$; **$p < 0.01$.*

two models suggested this final model fitted the data better than the fully constrained model, $\Delta\chi^2$ (2) = 6.49; $p < 0.05$ (Satorra and Bentler, 1999).

Figure 2 shows standardized parameters derived from the re-specified model. In this model, the differences in standardized parameter estimates of the constrained paths between the groups reflected group specific differences in variances of variables. Hypothesis *2a* stated that job demands are positively associated with affective discomfort. Customer verbal aggression showed a significantly stronger positive relationship with affective discomfort in the INFO sample than the CA sample. Workload did not show a direct relationship with affective discomfort in both samples. With regard to job demands, Hypothesis *2a* was partially confirmed. Hypothesis *2b* stated that job resources were negatively associated with affective discomfort. Supervisor support and, with a weaker loading, job autonomy, were negatively related to affective discomfort, across the two groups. Colleague support did not show direct relationships with affective discomfort across the two samples. With regard to job resources, Hypothesis *2b* was partially confirmed. Hypothesis *3a* stated that job demands were positively associated with emotional dissonance. Workload and customer verbal aggression showed significant positive relationships with emotional dissonance, across the two samples: Hypothesis *3a* was fully confirmed. Hypothesis *3b* stated that job demands were negatively associated with emotional dissonance. Among job resources, only job autonomy had a significant negative relationship with emotional dissonance, in both samples, supervisor support and colleague support did not show significant relationships with emotional dissonance. With regard to job resources, Hypothesis *3b* was partially confirmed.

Hypothesis *4* stated that emotional dissonance was positively related to affective discomfort, playing a meditational role between job demands and resources on the one hand, and affective discomfort on the other. Emotional dissonance showed a significant positive relationship with affective discomfort only in the CA sample. The mediating paths in the CA sample were evaluated using a bootstrapping procedure, **Table 2** presents these results and shows that all the mediated effects, in the CA sample, were statistically significant. Particularly, the bootstrapping procedure confirmed that in the CA sample, emotional dissonance fully mediated the relationship between workload and affective discomfort. Moreover, emotional dissonance was a partial mediator between customer verbal aggression and affective discomfort, and between job autonomy and affective discomfort. In the INFO sample, emotional dissonance did not show a mediational role and, therefore, the bootstrapping procedure was not applied. Therefore, Hypothesis *4* was confirmed only in the CA sample. Variance of dependent variables explained by the models was 25% for affective discomfort and 24% for emotional dissonance in the CA sample; 23% for affective discomfort and 22% for emotional dissonance in the INFO sample.

DISCUSSION

This study examined the role of emotional dissonance in the JD-R model, investigating whether it mediated the relationship between job demands and resources, and affective discomfort, referring to the Italian call center context. As such, the study contributed to the emotional labor literature, focusing on specific antecedents of emotional dissonance and confirming its mediational role. The study also addressed a gap in the call center literature, as it was one of the first that considered differences between two specific kinds of inbound services, despite many that studies focused mainly on inbound/outbound differences (Lin et al., 2010; Rod and Ashill, 2013).

Among the job demands considered, customer verbal aggression showed a direct positive relationship with both emotional dissonance and affective discomfort. As for workload, the relationship with affective discomfort was fully mediated by emotional dissonance. These results confirmed that not only aggression from customers, which generated negative emotions the agent cannot display, was an antecedent of emotional dissonance (Hülsheger and Schewe, 2011), but also the amount and pressure of work could generate negative feelings, which employees cannot express during the job. Managing these opposite emotional experiences might be more difficult when there is a high level of requests and tasks to do. Therefore, in this context, workload was a demand strongly associated with emotional dissonance and, indirectly through the mediation of emotional dissonance, to affective discomfort.

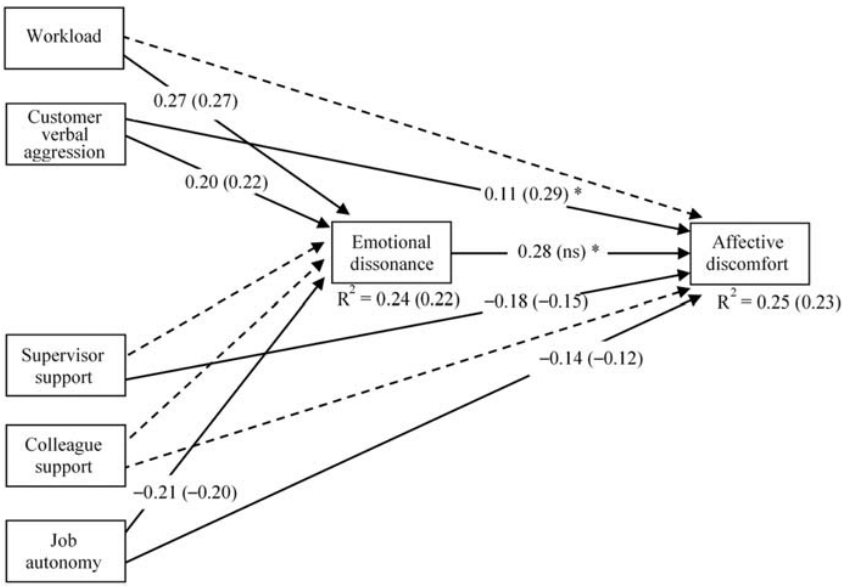

FIGURE 2 | The final model (standardized path coefficients, $p < 0.05$). Results of the multi-group analysis: CA (INFO). Coefficients with asterisk are significantly different. Discontinuous lines indicate non-significant relationships.

TABLE 2 | Significant indirect effects using bootstrapping ($N_{CA} = 352$).

Indirect effects	Bootstrap			
	Est.	S.E	*p*	CI 95%
Workload → Emo. Diss. → Aff. Disc.	0.10	0.02	0.000	(0.04, 0.11)
Cust. Verbal Aggr. → Emo. Diss. → Aff. Disc.	0.06	0.02	0.000	(0.03, 0.09)
Job Aut. → Emo. Diss. → Aff. Disc.	−0.06	0.02	0.001	(−0.09, −0.02)

Emo. Diss., emotional dissonance; Aff. Disc., affective discomfort; Cust. Verbal Aggr., customer verbal aggression; Job Aut., job autonomy; CI, confidence interval. All parameter estimates are presented as standardized coefficients.

Regarding job resources, supervisor support and job autonomy had a direct negative relationship with affective discomfort in both call center activities, confirming previous studies that demonstrated that a supportive climate, and having autonomy in the job, contributed to employees well-being (Grandey, 2000; Emanuel et al., 2014a). Moreover, the study confirmed a negative relationship between job autonomy and emotional dissonance (Morris and Feldman, 1996). Particularly, results confirmed that employees who perceived more autonomy in the job were able to deal better with emotional dissonance, likely because of greater discretion in choosing how to manage calls with customers and how to deal with difficult situations, preventing negative reactions from the customers and bad feelings. Colleague support did not show any of the expected relationships with emotional dissonance or with affective discomfort. In the two call center contexts, despite colleagues being perceived as supportive, the activities were typically carried out at individual level (Moradi et al., 2014). Moreover, the opportunities to interact with each other and give advices might not have been sufficient and adequate to work as factors able to protect agents from experiencing affective discomfort and helping in dealing with emotional dissonance. Similarly, regarding supervisors, results indicated that their support was not functional to decrease the experience of emotional dissonance.

Finally, the study tested the meditational role of emotional dissonance among job demands and job resources and affective discomfort. First, emotional dissonance was related to affective discomfort only in the case of the CA sample, where agents had to provide technical and specific customer service. In this sample, it fully mediated the relationship between workload and affective discomfort, and partially mediated the relationship between customer verbal aggression and job autonomy on the one hand, and affective discomfort on the other. Call center inbound services aimed at providing support, as in the CA one, were characterized by more aggressive behavior from customers, who are generally angry, frustrated or unsatisfied, and vent their discontent on agents (Dormann and Zapf, 2004; Grandey et al., 2004). Moreover, the activity was particularly difficult and problematic, and requests were rarely predictable (Rod and Ashill, 2013). The specific features of this kind of job might increase the possibility to experience emotions that could not be shown. Consequently, agents in this service perceived more emotional dissonance (Lewig and Dollard, 2003; Zapf et al.,

2003). In the case of the INFO sample, emotional dissonance did not have a mediational role between job demands and job resources, and affective discomfort. In fact, emotional dissonance was not related to affective discomfort. The analysis of variance showed that in the INFO service, agents perceived less emotional dissonance, compared with colleagues in the CA service. INFO service agents provided phone numbers that customers required and were less exposed to customer verbal aggression. Therefore, starting from these features of work, emotional dissonance in INFO services seemed to be a less critical variable, which did not relate to affective discomfort.

Limitations and Future Studies

The present study used a cross-sectional research design that did not permit establishing causality relations between variables (Podsakoff et al., 2012). Further studies should examine the longitudinal effects of emotional dissonance on negative outcomes, such as burnout and exhaustion, thus supporting our hypotheses even more. Additionally, future research will benefit from adding physiological measures of occupational stress (Quaglino et al., 2010) and well-being, such as blood pressure and heart rate (Ilies et al., 2010), and other objective organizational measures, such as the absenteeism rate.

A second limitation is the exclusive use of self-reported questionnaires that can potentially contaminate results, because observed relationships may be artificially inflated because of the respondents' tendency to answer in a consistent manner. Nevertheless, self-reported data seemed to be the most appropriate approach in our study as it evaluated workers' subjective perceptions of job demands, job resources, emotional dissonance and affective discomfort.

Another limitation was that data was collected from one organization only, which restricted the generalization of our findings. However, it is important to note that participants were employees from two different call centers of the same organization, with different kinds of inbound activities. Results from a relatively heterogeneous sample of employees supported previous findings that showed that emotional labor and emotional dissonance at work applied to a wide array of occupational contexts (Kenworthy et al., 2014). Replication of the current findings in future studies conducted in various (service and non-service) organizations is essential and important.

Finally, in our study, supervisor support and colleague support did not show the expected relationships with the other variables, although theory and research underlined that social support was a relevant job resource for well-being in emotionally laden jobs (Grandey, 2000; Totterdell and Holman, 2003). Future studies should consider social support as a possible moderator variable (Grandey, 2000; Grandey and Gabriel, 2015) in order to verify its buffer effect in these dynamics.

CONCLUSION AND PRACTICAL IMPLICATIONS

The results of the current study contribute to the existing literature on emotional labor and affective discomfort in service occupations, especially in call center work. Useful implications for both researchers and practitioners emerged, in order to understand better which job demands and job resources, typical for call center work, were more related to well-being and discomfort at work. In addition, the study, which dealt with two inbound services, allowed us to identify not only common implications for two kind of activities but also different implications based on their distinctive features (Wallace et al., 2000; Jansen and Callaghan, 2014).

First, the results were important to understand better the role of job demands and job resources, typical for this occupation. In line with previous studies, the possibilities to promote well-being in these call center services (CA and INFO services) were, for example, improving the control and autonomy of agents (Zapf, 2002; Johnson and Spector, 2007) or promoting a positive and supportive work climate (Garcia and Archer, 2012; Jansen and Callaghan, 2014), and reducing or redistributing the workload (Wegge et al., 2006b).

An important practical path for organizations and management to take would be the development of training programs to enhance employees' emotion regulation skills in order to cope with customer mistreatment (Grandey et al., 2004; Groth, 2005; Rupp et al., 2008) and to improve emotion regulation strategies. However, generally, training in organizations has not been directly applied to emotional labor, and training is often invested only for managers and leaders, not service workers. Results suggest that it is important to develop training programs for all service workers, as well as call center agents. Training could help employees to understand the negative consequences of emotional labor and to identify what kind of strategy is useful to cope with daily demands, in particular for CA service agents that receive calls from customers who need to solve technical problems and/or make a complaint. In fact, enhancing emotional competency could help CA service workers to handle their emotional work better, reduce stress and increase the level of well-being (Giardini and Frese, 2006; Gabriel et al., 2016; Zito et al., 2016), as shown in nursing employment (McQueen, 2004). Moreover, recent studies underlined the importance to improve emotional intelligence (Boyatzis et al., 2002; Gabriel et al., 2016), emotional self-efficacy (Pugh et al., 2011), and peer-rated emotional competence (Giardini and Frese, 2006) through training programs, to help employees effectively engage in emotional labor. In fact, several scholars showed that emotional competency could reduce emotional demands and sustain well-being at work (Pugh et al., 2011; Gabriel et al., 2016). In this organizational context, training programs about emotional competency could be useful and beneficial for the two inbound services considered in this study (CA and INFO services).

Another practical path for call center companies would be to enhance the presence of human resource practices for emotional labor, which can increase commitment to emotional goals (Gosserand and Diefendorff, 2005; Diefendorff and Croyle, 2008; Gabriel et al., 2016). Companies could also engage training programs for supervisors in order to recognize and support the effort required by emotional labor to call center agents. In fact, it would be important to create an employee-supportive

(rather than managerial-controlling) climate (Bono et al., 2007; Nishii et al., 2008). Training programs for supervisors would be particularly useful for the CA service in order to sustain call center agents that perceive more emotional dissonance and customer verbal aggression. Some studies also found that management tactics, such as monitoring and reward, did not make emotional labor more controlled and distressing (Hochschild, 1983). Performance monitoring in call centers did not increase emotional labor and strain if the perceived purpose of monitoring was supportive (Holman et al., 2002), and financial incentives enhanced satisfaction from emotional labor (Grandey et al., 2013). Moreover, socialization could also be used to increase identification with organization goals, which would buffer strain from emotional labor (Schaubroeck and Jones, 2000; Grandey and Gabriel, 2015). Moreover, mentors who provide vocational and psychosocial support and serve as role models, could help ground staff members to manage their emotions, mitigate emotional dissonance and experience lower emotional exhaustion (Karatepe, 2013; Kim et al., 2013), in order to reduce potential undesirable outcomes, such as turnover intentions and absenteeism. Referring to this organizational context, socialization and mentoring programs could be advantageous for the two inbound services, because these actions could increase awareness in relation to job role and work-related activities, and useful for CA and INFO services agents.

Referring to recruitment, it has been suggested that by clarifying the emotional labor requirements during the selection process, individuals may have a well-defined idea of what is expected (Wanous, 1992) and, in this specific organizational context, it might be advantageous for the two inbound services (CA and INFO services). Making emotional requirements explicit during recruitment should create expectations about emotional performance (Rafaeli and Sutton, 1987). However, many organizations lack explicit policies regarding emotional displays and norms to guide customer service behavior, with some referring to them only vaguely in their mission declarations (Zapf, 2002; Constanti and Gibbs, 2005). Many studies (Chen and Lin, 2009; Bartram et al., 2012) showed that when employees are selected to perform emotional labor, burnout is reduced. Other scholars (Callaghan and Thompson, 2002; Grandey and Gabriel, 2015; Gabriel et al., 2016) highlighted that competencies embedded in personality (positive attitude, sense of humor, enthusiasm, extraversion), technical skills (typing, navigation), and communication (energy, fluency, warmth, tone) should be used for selection in emotionally laden jobs. Moreover, scholars have suggested recruiting and selecting individuals whose skills match the emotional display rules for a specific organization and/or role (Glomb et al., 2004; Constanti and Gibbs, 2005).

Finally, the results of this study provided a contribution to current literature on emotional labor and affective discomfort in service occupations, especially in call center work, and identified differences between two different types of inbound activities. In particular, emotional dissonance mediates the relationship between workload and customer verbal aggression and affective discomfort for CA agents. These results suggested the importance of monitoring the experiences of emotional dissonance and emotional labor in call center work and the negative consequences for employees, in order to sustain workers and promote well-being in inbound call centers and in general in service jobs.

AUTHOR CONTRIBUTIONS

All authors (MM, FE, MZ, CG, LC, CC) contributed to this work. MM and FE developed and designed the study, wrote the manuscript and received substantial input from co-authors. CG and LC collected the data. CG supervised the research team and contributed to introduction and discussion sections of the manuscript. LC and MZ contributed to methods and data analysis. CC contributed to conclusion and practical implications section of the manuscript. All authors approved the final version of the manuscript for submission.

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Decision-Making Processes in the Workplace: How Exhaustion, Lack of Resources and Job Demands Impair Them and Affect Performance

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The present study aims to connect more the I/O and the decision-making psychological domains, by showing how some common components across jobs interfere with decision-making and affecting performance. Two distinct constructs that can contribute to positive workplace performance have been considered: decision-making competency (DMCy) and decision environment management (DEM). Both factors are presumed to involve self-regulatory mechanisms connected to decision processes by influencing performance in relation to work environment conditions. In the framework of the job demands-resources (JD-R) model, the present study tested how such components as job demands, job resources and exhaustion can moderate decision-making processes and performance, where high resources are advantageous for decision-making processes and performance at work, while the same effect happens with low job demands and/or low exhaustion. In line with the formulated hypotheses, results confirm the relations between both the decision-making competences, performance (i.e., in-role and extra-role) and moderators considered. In particular, employees with low levels of DMCy show to be more sensitive to job demands toward in-role performance, whereas high DEM levels increase the sensitivity of employees toward job resources and exhaustion in relation to extra-role performance. These findings indicate that decision-making processes, as well as work environment conditions, are jointly related to employee functioning.

Keywords: decision-making competency, decision environment management, self-regulation, job demands, job resources, exhaustion

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INTRODUCTION

In complex social environments such as workplace organizations, decision-making has been considered an important factor (along with commitment, work engagement, etc.) contributing to organizational efficiency and workplace satisfaction. For this reason, such approaches as the model of organizational choice (Cohen et al., 1972), strategic decision-making (Eisenhardt and Zbaracki, 1992) and naturalistic decision-making (Pliske and Klein, 2003) have been formulated based on the investigation of the role of the organizations on decision makers. Indeed, classical studies in the decision-making domain usually have focused on the internal validity of the research and are

therefore frequently carried out in experimental settings. The focus of organizational studies is mostly based on psychometric instruments exploring individual differences by using within-person studies, while decision-making research makes extensive use of experiments (Dalal et al., 2010). However, research has been gaining increasing appreciation for individual differences in decision-making processes and decision-making styles, the antecedent factors that may predict sound decision-making, and the predictive validity of rational responding (e.g., Parker and Fischhoff, 2005; Bruine de Bruin et al., 2007; Appelt et al., 2011; Weller and Tikir, 2011; Weller et al., 2015). For instance, Miller and Byrnes (2001) developed a self-report measure to assess individual differences in "*decision-making competency*," which can be characterized as the tendency to be self-regulated and use metacognitive processes to examine choice options and master decisions. This definition has been supported by studies involving objective measures of decision-making competence[1] (Parker and Fischhoff, 2005; Bruine de Bruin et al., 2007; Stanovich et al., 2008).

Although prior work has supported the notion that individual differences in decision-making competency (DMCy) exist and possess considerable predictive validity (e.g., Miller and Byrnes, 2001; Bruine de Bruin, 2005; Parker and Fischhoff, 2005), no empirical research, to our knowledge, has directly explored its associations with workplace and psychological variables such as job performance, job demands, job resources, exhaustion, etc. This contribution presents a bridge between research advances in decision-making and I/O research, in relation of variables of one of the most comprehensive psychological model: the JD-R one (Demerouti et al., 2001). The aim is to enlighten the role of such decision-making differences and some organizational (i.e., job demands, job resources) and psychological variables (i.e., exhaustion) which can positively or negatively affect performance. For instance, studying the relationships between the DMCy and variables abovementioned, provide new insights about how the work environment and connected psychological variables interfere with decision-making processes (e.g., is the presence of job resources helpful for the decision maker? Do low job demands link to better quality of choices made at work? How can exhaustion alter decision-making?). The role of work environment and its management are considered in this study as a key skill, namely decision environment management (DEM), defined as the sensitivity to the work environment capable of having an effect on complex decision-making processes (Wood and Bandura, 1989). In relation to the aim of this study, these two decisional competences (i.e., DMCy; DEM) are supposed to be related to performance and moderated by components enclosed in the JD-R model.

[1]Decision-Making Competence (Parker and Fischhoff, 2005) is an objective measure of the competence which assesses whether individuals reach satisfactory outcomes in decision-making. Questions are based on seven assorted tasks groups for a combined total of 87 items. The decision-making competency measure (Miller and Byrnes, 2001) instead is based on a self-report instrument to assess self-regulation and the use of metacognitive processes to examine choice options and master decisions.

Decision-making Competency as a Predictor of Task Accomplishment at Work

Evidence of the predictive validity has showed that lower decision-competence is related to greater risk-taking and potentially maladaptive behaviors (Parker and Fischhoff, 2005; Del Missier et al., 2011; Weller et al., 2012, 2015). If decision-making competence reflects the tendency to approach decisions from a perspective that stresses quality of the decision process rather than solely focusing on immediate outcomes, one might expect that greater decision-making competence also will be associated with lower incidence of behaviors that may bear adverse long-term consequences. For instance, being reflective and gathering enough information before making decisions, relying on sense of self-determination when critically evaluating options and being mindful in relation to choice consequences, all these skills should be able to address toward long-term outcomes. Such components have been selected by Miller and Byrnes (2001) as fundaments of the DMCy conceptualization which relies on the *"self-regulation model of decision-making"* in which a self-regulated decision maker is an individual who sets adaptive targets and takes proper measures to achieve such tasks (Byrnes et al., 1999; Byrnes, 2013).

In complex environments such as organizations, a competent decision-maker requires a variety of cognitive skills to continuously search for information to improve work performance (Bandura and Jourden, 1991). This process involves developing, comparing, and mastering choices while at the same time dealing with cognitive limitations, heuristics and biases and individual inclinations that can impair the accomplishment of task targets (Byrnes et al., 1999). In this sense, a higher level of DMCy could represent an explicative antecedent of task accomplishment at work. This is in accordance with the self-regulation theory, where people cannot successfully adapt to the work environment until they develop a sense of control over behavioral processes (Zimmerman and Bandura, 1994; Schunk and Zimmerman, 2003). These adjustments stimulate the development of strategies to overpower decision-making deficiencies given by harsh work conditions (Miller and Byrnes, 2001).

Decision-making Impairment Due to Exhaustion

The study of the regulation processes in relation to decisions has been addressed in the organizational domain because it has been recognized to be at the root of many problems of underachievement at work (Lord et al., 2010). In some professions, such as the medicine, law, and finance, fatigue due to an excessive number of choices can impair the self-regulation mechanisms (Vohs et al., 2005; Baumeister and Vohs, 2007; Demerouti and Bakker, 2008). The effort required in decision-making processes rapidly depletes personal resources, thus leaving the executive function less efficient when performing other tasks. As information processing increases, greater cognitive resources are required for a competent functioning (Wood et al., 1990). When individuals reach the limits of

the cognitive capabilities, performance can be undermined because attention is diverted to self-evaluative concerns about the consequences of failure (Humphreys and Revelle, 1984). Considering the individual differences studies reported above, this effect could be more pronounced in less competent self-regulated decision-makers. At support of this speculation, decades of I/O psychology studies have widely analyzed performance impairment due to exhaustion as a consequence of intense physical, affective, and cognitive strain (Demerouti et al., 2001; Brotheridge and Grandey, 2002; Goldberg and Grandey, 2007; Deligkaris et al., 2014). Literature has deeply documented how the exhaustion induced by depletion of energy can long-term decrease performance, and how individuals use performance-protection strategies (Bakker et al., 2004; Schaufeli and Taris, 2014). The more the cognitive activation and/or effort at work and the more the physiological costs for the individual are demanding, performance protection is achieved by means of active control of cognitive information processing (Robert and Hockey, 1997). The long-term effects of such process may be emptying the individual's stamina and personal resources, resulting in a burnout condition and ultimately affecting performance (Demerouti et al., 2001).

Aside from psychophysical individual strategies, organizations can deal with employee's exhaustion by leveraging job resources, which are work aspects important for goal achievement, personal growth and for minimizing labor costs, such as: supervisor feedbacks, opportunity for development, social support and rewards, etc. (Bakker et al., 2003). Developing decision rules for an optimal adjustment level of instructive feedback to goal attainments or the use of social rewards revealed to have a positive effect on work outcomes (Wood et al., 1990), in particular on extra-role performance (i.e., behaviors that support the environment in which task are performed; Demerouti et al., 2015). Similarly, Bakker et al. (2004) found job resources (e.g., increasing work autonomy and social support) to be the strongest predictors of extra-role performance, whereas the absence of them can negatively affect engagement and performance too. Organizational resources have a different impact on employees' performance, depending on the subject's attitudes and on perception of utility that individuals have of them (e.g., some employees could find in social support a valuable job resource, for others autonomy is more important than feedbacks from the supervisor, etc.). To maintain satisfactory performance levels, organizations have to master a complex set of decision rules on how to best match employee attributes and sensitivity toward the resources implemented (Wood et al., 1990).

The Work Environment Role for a Comprehensive Understanding and Mastering of Decision-making Processes

Until now, the DMCy has been the only decision-making construct here provided to explain the mastering of self-regulation processes in setting choices and achieving targets. Explicability limits related to such a construct belong to the paradigm of decision-making research, traditionally based on laboratory studies and focused on the internal validity of such constructs. In general, these decision-making approaches adapted to workplace studies lack an adequate consideration of the work environment role, especially in relation to the effects of the last economic crisis, the business downsizing and consequently higher job demands for leftovers, increasing job insecurity and uncertain professional paths (Ceschi et al., 2016). Organizational jobs that traditionally occurred within a single context are nowadays replaced by boundaryless, self-managed individual work stories, where people are constantly asked to shift roles, enhance capabilities, and re-adapt to new work environments (Leana and Barry, 2000). About the individual, it means that new psychological issues related to uncertain professional paths give evidence of new patterns of outcomes, such as a lack of motivation at work, low job performance and more burnout incidence. On the other side, in order to cope with that, HR are introducing new organizational models and interventions to foster workplace adaptation (e.g., empowerment policies, participative decision-making, innovation workplace interventions, job crafting) (see Men and Stacks, 2013; Sartori et al., 2013; Demerouti and Bakker, 2014).

In light of these recent consequences, work environment has assumed more and more relevance as determinant of the decision processes made at work by every member of the organization. The effects of environmental factors on the decision-making processes assume particular importance in relation to the organizational aims. As seen, feedback and social rewards can positively affect employee's co-working, but the impact of these variables is intrinsically related to the sensitivity toward them. In this context, participative decision-making is a good example of how some individuals, inclined to use a collaborative work approach, can perform well in presence of a positive environment (Lowin, 1968). For example, good relations with collaborators promote a participative decision-making style, which in turn can elicit prosocial behavior at work (i.e., extra-role performance; De Dreu and Weingart, 2003; Kozlowski and Ilgen, 2006; Ceschi et al., 2014). Instead, negative environmental variables, such as career breakdowns, lack of job opportunities, absence of colleague support can weaken the efficiency of decision-making processes by impacting the self-regulatory mechanisms that regulate enthusiasm and accomplishment satisfaction (Wood and Bandura, 1989; Wood et al., 1990; Bandura, 1997). In such settings, self-regulatory mechanisms may be hindered by the lack of such resources, resulting in lower performance and motivation, especially in relation to the prosocial behavior in the workplace (Baruch et al., 2004).

With these points in mind, we can state that the capacity to manage negative environmental conditions and take advantage of positive environments is nowadays an essential workplace competence for consistency in decision-making and, ultimately, for better performance. It is a skill intrinsically related to awareness, intrinsic management, and self-regulation in relation to organizational variables, rather than actual decisions at hand (Wood et al., 1990). Although the effective management of environmental conditions can provide a clearer space in which decisions may be made, these should be considered distinct concepts. We referred to this composite skill as decisional environment management (DEM), firstly conceptualized by

Bandura and Jourden (1991) as operational causal structures examined within context of managerial decision-making in dynamic environments. Their research position was directed to examine decisions in dynamic organizations while the individual is coping with ongoing activities, because already at the time: "*much of the research on human decision-making examines discrete judgments in static environments under no taxing conditions*" (p. 941). Such interactional causal structures were defined through a triadic model of the antecedes of the mastery of the decisional environment, namely: the cognitive determinants and the quality of analytic thinking, the behavioral mechanisms of the choice management and the properties of the organizational environment. Applied results of such a model confirmed that several factors might account for differential impact on decision processes, in which cognitive regulatory mechanisms firstly alter the systematic exploratory strategies, and the organizational management at second stage (Cervone et al., 1991).

Because of the primary importance given to the decision environment model regarding managerial decisions (like most of the research of the last century has focused on decision-making applied to organizations), a revised version of DEM with the intent of extending this model to different job categories, even subordinates, has introduced the role of colleagues and of supervisor and as interpersonal behavioral determinants of choice in the workplace (Ceschi et al., submitted). Considering the renewed role of work environment on decision-making due to unsure professional pathways, with the emerging of new boundaryless organizational structures and empowerment policies (Men and Stacks, 2013; Cummings and Worley, 2014; Laschinger et al., 2014; Di Fabio et al., 2016), relevant decisions are often made at several levels not only by the top management. This research emergence has brought several scholars of the I/O domain to extend again decision research inside organizations at several roles.

Linking Advances in Decision-making with the I/O Research Domain: the State of Art

The organizational research in decision-making is strictly connected to models used to diagnose the environment of study. Recent explorative studies have started to implement decision-making constructs within organizational models and the I/O variables related. For instance, the recent job demands-resources decision-making model (JD-R-DM, see Gordon et al., 2015), a version of the JD-R model (Demerouti et al., 2001), has proposed how the decision-making styles (Epstein et al., 1996) mediate contextual factors (i.e., job demands, job resources, work-engagement, job performance, etc.). In one of the confirmed hypothesis of the model, it shows the mediator role of the analytical decision-making in relation to job demands and in-role performance, in which: "*regulation of job demands is important to positively influence performance.*" (Gordon et al., 2015), which is also what we can expect from self-regulation mechanisms involved in decision-making considering the perspective of Bandura and Jourden (1991). On the other hand, the JD-R-DM model does not include an interaction between the analytical decision-making and job demands, but it is presumable that different levels of demands in relation to a decision-making construct such as the DMCy could affect job performance. This because of two reasons: first, DMCy has an impact on the self-regulation processes and then on the accomplishment of task targets (Byrnes et al., 1999; Byrnes, 2013); second, cognitive analytical style shows to be a convergence measure of the decisional competence (Finucane and Gullion, 2010). On the other hand, the decision-making styles assess the ways in which individuals approach decision-making, the competence instead measures how well individuals make decisions and it is usually considered as a construct trait-like[2]. For this reason, it is plausible that a competence such as the DMCy, instead of being a mediator of the process determined by the work environment (as for cognitive analytical style), is more likely to be a reliable antecedent of job performance by interacting with job demands.

Another consideration concerning the JD-R-DM model regards the absence of the classical JD-R exhaustion component, whereas work engagement and its relation with decision-making processes, for theoretical reasons concerning the role of positive affects in cognitive styles (Fredrickson, 2003), have been widely explored in the model. For evident methodological research limits, for what concerns new extensions of the JD-R model and in line with the research purpose, it is reasonable to consider only some components or relationships of the original model. In relation to the theoretical constructs so far presented, no study yet has analyzed the role of exhaustion on performance together with DMCy, DEM in the JD-R framework. To the best of our knowledge, we can assume that, if DMCy is related to task accomplishment (Byrnes et al., 1999; Byrnes, 2013), a relationship with in-role performance, actually defined as outcome of processes that directly serve organizational targets (Motowidlo and Van Scotter, 1994), is expected. Whereas, as seen, higher DEM in combination to a resourceful work environment should be positively related to the extra role performance. As well, in fact job resources are the most important predictors of extra-role performance, where job demands (if not particularly high) are associated to in-role performance (Bakker et al., 2004). For what concerns relationships with decision-making processes, we can presume that experienced exhaustion can alter choice processes by impairing the self-regulation mechanism of DMCy, which in turn can affect the performance in carrying out tasks (Humphreys and Revelle, 1984). Exhaustion also may drain perceived personal resources, leaving the executive function less capable of carrying out activities (Demerouti et al., 2001; Brotheridge and Grandey, 2002; Goldberg and Grandey, 2007). As well, the absence of some job resources has social consequences that can affect the good use of those decision competences related to the environment and ultimately working with others (Peterson et al., 2008). Job demands instead have been revealed to be an important regulator capable of influencing

[2]For more information concerning instruments used to asses styles and competence in decision-making we invite to see the decision making individual differences inventory section hosted in the website of the Society for Judgment and Decision Making (www.sjdm.org).

task performance (Gordon et al., 2015), probably in relation to a construct such as the DMCy.

Thus, we make the following hypotheses: Job resources and DEM are positively related to extra-role performance (H1a: DEM, job resources→extra-role performance). In addition, job resources moderate the effect of DEM on extra-role performance, so that extra role performance is positively influenced by the combination of high levels of job resources and DEM because such employees are able to better manage the presence of resources at work (H1b: DEM × job resources→extra-role performance). Job demands and DMCy are positively related to in-role performance (H2a: DMCy, job demands→in-role performance). Additionally, high levels of job demands can impair decision processes by negatively interacting with employees low in DMCy. Demands' information overload is frequent in bad decision makers, resulting in scarce performance in carrying out their task targets (H2b: DMCy × job demands→in-role performance). Exhaustion is negatively associated with both kinds of performance (H3a: exhaustion→extra-role performance; H4a: exhaustion→in-role performance). Moreover, low levels of exhaustion have a positive moderation effect on the relationships between decision making competences (i.e., DEM, DMCy) and performance. Energetic individuals are usually successful in decision-making processes and report higher performance standards than their exhausted counterparts (H3b: DEM × exhaustion→extra-role performance; H4b: DMCy × exhaustion→in-role performance). A graphical representation of all the combined hypotheses mentioned is presented in Model 1 of **Figure 1**.

MATERIALS AND METHODS

The Ethical Review Committee at the University of Verona approved the study. We administered via mail 258 paper-and-pencil questionnaires to three Italian companies operating in the private service sector (i.e., administrative office sector, general service assistance, company support services). A total of 208 employees filled and returned the questionnaire (response

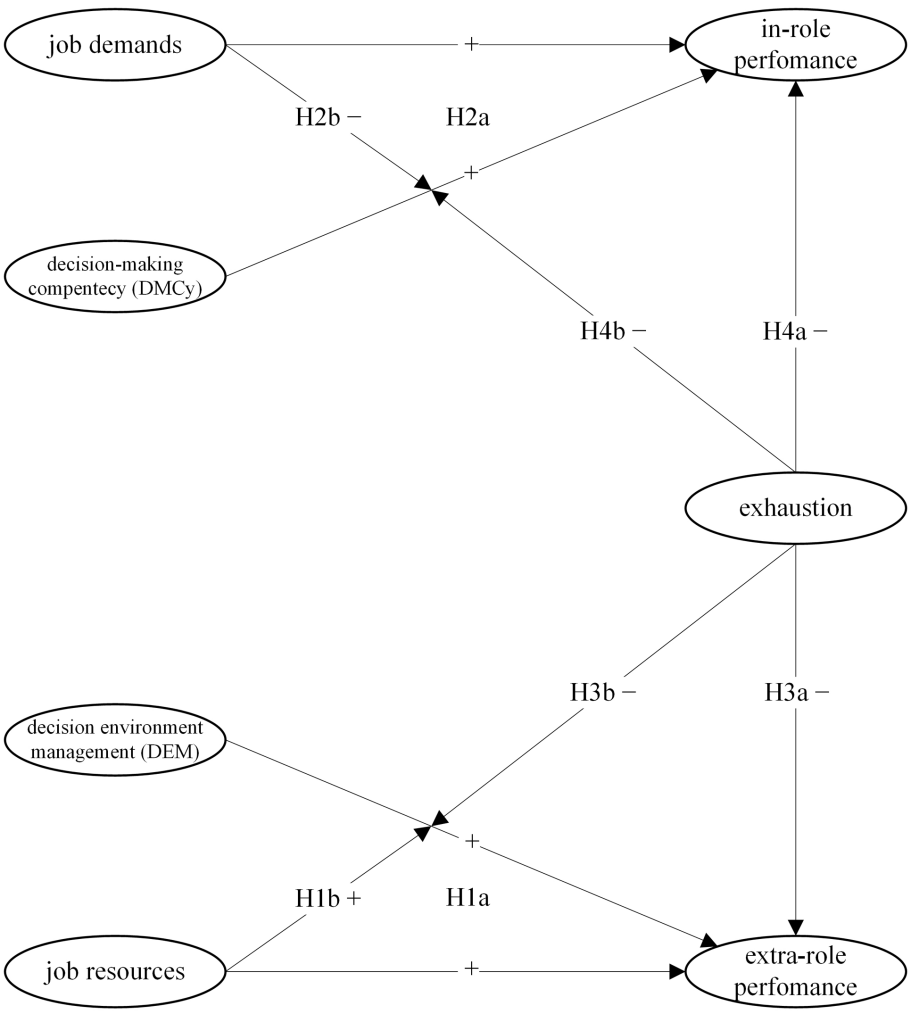

FIGURE 1 | Hypothesized Model 1 with interactions between decision competences and performance dimensions.

rate 80%). The sample includes 132 females (63%). Their ages range between 20 and 60 years with an average of 41 years (SD = 9.65). The majority of the sample has higher general secondary education or vocational training (24%) or a high school degree (51%), 11% a bachelor degree and 7% a master degree. Most participants work as clerks (63%) or general workers (33%), only 4% are company managers or executives. Regarding supervision roles, 80% of the samples do not have supervising roles, 17.5% of the samples supervise between 1–5 persons, only five participants supervise more than five people.

Instruments

Decision-making Competency: to assess this emergent construct, three components of the Decision-Making-Competency Inventory scale (DMCI) have been used (Miller and Byrnes, 2001). The DMCI scale has been created to assess some key aspects of decision-making skills by asking participants to report on their way of making decisions when they face important choices. Because we applied this measure to the organizational domain, each item began with the stem, "*When I have a big decision to make in the workplace. . .*" In relation to the present research, our interest focuses on the self-regulation process and consequently to the following three components: The person's sense of self-determination in critically evaluating options (reversed scored, e.g., *"When I have a big decision to make about doing something that requires my skill, I often make a bad decision because I either underestimate or overestimate how good I am at something"*), self-appraisal (reversed scored, e.g., *"I just go with a decision that all my colleagues are going with"*), and the adequate self-confidence level in decisions (e.g., *"I usually believe that I will make a good decision"*). Respondents are asked to indicate on a five-point scale how much like them each statement is, with choices ranging from 1 (not at all like me) to 5 (very much like me).

Decision Environment Management (DEM)

To assess this construct, we used the Decision Environment Management Inventory (DEMI; Ceschi et al., submitted). The instrument is meant to ask participants to recall hypothetical decision scenarios usually present in the workplace (e.g., cost management choice, multiple job task situations, events organization, personnel relations, etc.), in which the quality of decisions can be differently affected or supported by the presence of some aspects of the work environment, such as the relation with the supervisor, with colleagues, the workload, some specific work activities, etc. Specifically, the instrument is composed of 17 items and assesses the three following components*: interpersonal behavioral determinants, properties of the organizational environment, cognitive and analytical aspects*. All items start with the following sentence: "*How the following interpersonal/ cognitive activities/ organizational and work aspects would affect or support your decision-making at work?* Examples of items are: "*relaxed relations between you and colleagues*" *"working overtime" "having to deal with some activities that need logical skills" "bureaucracy annoyances of your organization."* The respondent has to first think about his\her current job experience, and, by using the scale reported, answer the items. Because the items present positive or negative aspects which can affect the goodness of decision-making at work, the respondents has the possibility to answer them by using a seven point Likert scale, ranging from 1 = in a very bad way, to 7 = in a very good way. For more information regarding the scale, see the Appendix, in Supplementary Materials.

Job Resources

Three job resources were included in the questionnaire: feedback, opportunities for professional development, and social perceived support from colleagues. Feedback was measured with a three-item scale. Example items are "*I receive sufficient information about my work objectives*" and "*My job offers me opportunities to find out how well I do my work*" (1 = never, 5 = always). Opportunities for professional development were measured with the three-item scale of Bakker et al. (2003), including: "*My work offers me the opportunity to learn new things*" and "*I have sufficient possibilities to develop myself at work*" (1 = totally disagree, 5 = totally agree). Social support was measured with three items from the scale developed by Van Veldhoven and Meijman (1994). Example items are "*Can you ask your colleagues for help if necessary*?" and "*Can you count on your colleagues when you face difficulties at work?*" (1 = never, 5 = always).

Job Demands

Three job demands were included in the questionnaire: cognitive demands, emotional demands, and hassles. Cognitive demands were evaluated with a four-item scale (Bakker et al., 2003). A typical item of this scale is "*Does your work demand enhanced care or precision*?" (from 1 = never to 5 = always). Emotional demands were based on a scale developed by Van Veldhoven and Meijman (1994) and included four items. An example is "*Does your work put you in emotional situations*?" (1 = never, 5 = always). The Hassles scale (Bakker, 2014) was used to detect the level of perceived administrative hassles. It is composed of six items. Examples are: "*I have to deal with administrative hassles"; "I have many hassles to go through to get projects/assignments done";* (1 = never, 5 = always).

Exhaustion

Three exhaustion items of the Oldenburg Burnout Inventory (Demerouti and Bakker, 2008) were used. Example items are "*There are days when I feel tired before I arrive at work*" and "*After my work, I usually feel worn out and weary*" (1 = totally disagree, 4 = totally agree).

Performance

Two types of job performance were assessed: in-role and extra-role performance. In-role performance relates to officially needed outcomes and behaviors that straight serve the organization aims (Borman and Motowidlo, 1997). Other labels sometimes used are job-specific task proficiency or simply task performance (Koopmans et al., 2012). General in-role performance was measured with three items, an example is: "*I achieve the objectives of my job*" (0 = Not at all characteristic, 6 = Totally characteristic). Extra-role performance (i.e., contextual performance) is defined as work behaviors and activities that are not necessarily related to work tasks but

that contribute to the social and psychological aspects of the organization (Borman and Motowidlo, 1993). It was measured with other three items, such as: *"I managed to plan my work so that it was done on time"* (same previous respond scale). Both scales were derived from the questionnaire by Goodman and Svyantek (1999). In addition, a second instrument: the Individual Work Performance Questionnaire (IWPQ, Koopmans et al., 2012) was used to measure the two types of performance. It is structured in three dimensions: the task performance (i.e., in-role performance), the contextual performance (i.e., extra performance) and the counterproductive work behavior (not considered in the present study). Compared to the previous scale, the questionnaire is composed of more items: five for the task performance, seven for contextual performance; the rate is expressed on a five-point rating scale (0 = never, 4 = very often). A task performance example item is: *"I managed to plan my work so that it was done on time,"* whereas a contextual performance one is: "*I actively participated in work meeting.*"

RESULTS

Descriptive Statistics

Table 1 shows the means, standard deviations, correlations, and the internal consistency indexes of the scales. All scales present acceptable reliability indexes. Both decision making measures showed not to be correlated, confirming an interdependence in measuring two distinct decision-making competences. In relation to socio-demographic variables, DMCy shows positive correlations with length in service and job position ($r = 0.21$, $p < 0.01$); DEM presents a positive correlation with the number of supervised staff ($r = 0.20$, $p < 0.01$). Consistent with our hypotheses, we found positive correlations between DMCy and in-role performance, and between DEM scores and extra-role performance on the other hand, partially confirming hypotheses H1a and H2a. DEM in addition shows a positive correlation with some job resources (feedback = 0.19, $p < 0.05$; professional development = 0.33, $p < 0.01$), instead no relationship between DMCy and job demands emerged. Both decision-making measures revealed negative correlations with exhaustion (DEM = −0.20, $p < 0.05$; DMCy = −0.27, $p < 0.01$) partially confirming H3a and H4a. Next analyses will test the direction of such relationships in order to fully confirm hypotheses.

Structural Equation Modeling (SEM) Testing

Given the intercorrelations of job demands, job resources and the two performance dimensions, standardized composite scores were computed prior to hypotheses and model testing (see Model 1 in **Figure 1**). All variables including the moderation terms have been patterned as latent factors with a single indicator. All latent factors were adjusted for random measurement error by establishing the random error variance of each construct corresponding to the product of its variance and the quantity minus its original internal consistency. Variables that considered moderator effects were constrained in accordance with Cortina et al. (2001), and standardized in order to estimate the reliability of the interaction terms. Such procedure is based on the original reliability of both variables used to form a product term and the correlation amongst the two latent variables as value for the path from the latent interaction factor to its indicator. As for all model variables, the error variance of the indicator of the latent interaction factor was set equal to the product of its variance minus its reliability. Finally, for DMCy, DEM, job demands, job resources, exhaustion, and two performance dimensions, the path from the latent variables to their corresponding observed variable was equal to the square root of reliability of the observed score. In testing the hypothetical Model 1 with all the interactions considered and performed with the maximum likelihood estimation method, fit indices suggested an acceptable model [$x^2(36.31, df\ 25, p > 0.06)$; GFI = 0.97; RMSEA = 0.047; CFI = 0.94] (**Table 2**).

Consistent with our hypotheses, most of the main and moderation effects have been found significant and in the expected direction. Hypotheses 3 and 4 have been just partially confirmed: the relationship between exhaustion and extra-role performance (H3a) has been found not significant in the model, together with the expected interaction between DMCy and exhaustion toward in-role performance (H4b). Therefore, a second model (Model 2) was tested without the moderating effect of exhaustion in the DMCy in-role performance relationship. The elimination of the interaction path resulted in an increment to an acceptable CFI value (Hu and Bentler, 1999) and in an acceptable small increment of RMSEA value [$x^2(27.41, df\ 17, p > 0.05)$; GFI = 0.98; RMSEA = 0.054; CFI = 0.95].

Model 2 showed the same significant relations compared to model 1 in terms of main effects. Decision Making Competency ($\beta = 0.45$, $p < 0.01$), job demands ($\beta = 0.67$, $p < 0.01$) and exhaustion ($\beta = -0.50$, $p < 0.01$) were significantly related to in-role performance confirming H2a and H4a. Confirming hypothesis H1a, DEM ($\beta = 0.76$, $p < 0.01$) and job resources ($\beta = 0.43$, $p < 0.01$) were significantly related to extra-role performance. In addition, the structural equation modeling (SEM) confirmed three supposed interactions out of four involving different performance dimensions, as stated in hypotheses H1b (DEM × job resources → extra-role performance: $\beta = 0.25$, $p < 0.05$), H2b (DMCy × job demands → in-role performance: $\beta = -0.58$, $p < 0.01$) and H3b (DEM × exhaustion → extra-role performance: $\beta = -0.46$, $p < 0.01$). All the resulting relationships of Model 2 are graphically displayed in **Figure 2**.

Simple Slope Analyses

Simple slope analyses were performed to explore interactions emerged in the SEM. In relation to DEM, job resources and estimated H1b moderator (DEM × job resources → extra-role performance), results showed that for higher levels of job resources (+1 SD above the mean) there was a stronger positive relationship between DEM and extra-role performance ($B = 0.425$, $t = 3.96$, $p < 0.001$), whereas this relationships was less strong for lower levels of job resources (−1 SD below the mean: $B = 0.180$, $t = 2.03$, $p < 0.05$). A graphical representation of the moderation effect is presented in **Figure 3**, which shows how participants high in DEM benefit more from job resources

TABLE 1 | Means, standard deviations (SD), internal consistencies (on the diagonal) and correlations among socio-demographics and study's variables.

	M (*SD*)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Gender	0.37 (0.48)	–																		
2. Age	40.73 (9.65)	−0.18*	–																	
3. Education	3.25 (1.36)	0.06	−0.12	–																
4. Length in service	10.70 (7.12)	0.11	0.42**	−0.14	–															
5. Number of staff supervised	1.56 (1.28)	−0.14*	0.06	0.26**	0.00	–														
6. Job position	1.75 (0.59)	0.04	0.03	0.36**	0.25**	0.23*	–													
7. Cognitive demands	3.67 (0.87)	−0.15*	−0.06	0.13	−0.03	0.16*	0.21**	(0.87)												
8. Emotional demands	2.42 (0.86)	−0.27**	0.07	0.18**	−0.15*	0.17*	0.14*	0.41**	(0.84)											
9. Hassle	2.62 (0.85)	0.11	−0.20**	0.17*	0.10	0.30**	0.11	0.15*	0.02	(0.85)										
10. Social support	3.24 (0.84)	0.04	−0.21**	−0.05	−0.15*	−0.03	0.00	0.19**	0.15*	−0.09	(0.71)									
11. Feedback	2.86 (0.82)	0.01	−0.01	0.00	−0.21**	0.08	−0.04	0.23**	0.12	−0.04	0.29**	(0.80)								
12. Professional development	3.40 (0.80)	0.00	0.02	0.12	−0.01	0.25**	0.07	0.23**	0.01	0.17*	0.26**	0.47**	(0.85)							
13. Exhaustion	2.39 (0.58)	−0.03	−0.21**	−0.12	−0.09	−0.03	−0.14*	−0.13	0.17*	0.11	0.02	−0.04	−0.18**	(0.75)						
14. Decision-making competency (DMCy)	2.15 (0.44)	0.03	0.11	0.04	0.19**	0.02	0.21**	0.03	−0.08	0.02	−0.03	−0.04	−0.09	−0.27**	(0.79)					
15. Decision environment management (DEM)	2.65 (0.60)	0.07	−0.01	0.17*	0.08	0.20**	0.10	0.14*	−0.05	0.14*	0.10	0.19**	0.33**	−0.20*	0.03	(0.82)				
16. General in-role performance	3.21 (1.05)	−0.03	0.12	0.00	0.00	0.03	0.18**	0.12	0.02	−0.02	0.06	0.18*	0.09	−0.24**	0.33**	0.17*	(0.85)			
17. General extra-role performance	3.21 (1.23)	0.11	−0.18*	0.10	0.14	0.18*	0.14*	0.05	−0.07	0.24**	0.06	−0.01	0.16*	−0.06	0.09	0.34**	0.29**	(0.82)		
18. Task performance	2.66 (0.68)	0.01	0.08	0.00	0.00	0.03	0.09	0.28**	0.13	−0.09	0.10	−0.16*	0.09	−0.20**	0.20*	0.24**	0.49**	0.18*	(0.82)	
19. Contextual performance	1.85 (0.86)	−0.06	−0.08	0.24**	−0.17*	0.41**	0.18**	0.34**	0.17*	0.25**	0.10	0.35**	0.37**	−0.13	0.04	0.24**	0.17*	0.22**	0.22**	(0.84)

*Note. Gender: 0 = woman; 1 = men; Education: 1 = Elementary school; 2 = Lower general secondary education; 3 = Higher general secondary education; 4 = Preparatory vocational education; 5 = Higher professional education; 6 = Bachelors' degree; 7 = Masters' degree; 8 = Ph.D. Length of service: Tenure expressed in years; Employees managed: 1 = Up to 2 supervised co-workers; 2 = 3 to 5 supervised co-workers; 3 = 6 to 10 supervised co-workers; 4 = 11 to 25 supervised co-workers; 5 = More than 25 supervised co-workers; Job position: 1 = Worker; 2 = Senior clerk; 3 = Manager; 4 = Executive; *p < 0.05; **p < 0.01.*

TABLE 2 | Goodness-of-Fit Indices (Maximum-Likelihood Estimates) for the Structural Equation Models proposed.

		x^2	*df*	*p*	GFI	RMSEA	CFI
1.	Model 1	36.31	25	0.06	0.97	0.047	0.94
2.	Model 2	27.41	17	0.05	0.98	0.054	0.95

GFI, goodness of fit index; RMSEA, root mean square error of approximation; CFI, comparative fit index.

when these are high, eventually resulting in higher extra-role performance.

Considering moderation related to hypothesis H2b (DMCy × job demands → in-role performance), the simple slope revealed that for low levels of job demands, DMCy is strongly and positively related to in-role performance (−1 SD under the mean: $B = 0.551$, $t = 4.06$, $p < 0.001$) and it becomes non-significant for higher levels of them (+1 SD above the mean: $B = 0.184$, $t = 1.11$, $p = 0.268$). **Figure 4** shows that high levels of in-role performance of participants high in DMCy do not coincide with in-role performance levels of subject low in DMCy when job demands are low.

A graphical representation of the moderation effect of Hypothesis H3b (DEM × exhaustion → extra-role performance) is presented in **Figure 5**. It shows that extra-role performance is higher when DEM is high (versus low) for low exhaustion condition, whereas for subjects low in DEM the trend inverts. The interaction effect is significant for all the levels of the moderator (+\− 1 SD), but, contrary to the first moderation pattern, the interaction effect follows a decremental trend: For low levels of exhaustion (−1 SD below the mean), DEM has a stronger positive relationship with extra-role performance, ($B = 0.538$, $t = 5.11$, $p < 0.001$), whereas the strength of this relationship is halved for higher levels of exhaustion (+1 SD above the mean: $B = 0.246$, $t = 2.47$, $p < 0.05$).

DISCUSSION

The present research links advances in decision-making and in organizational psychology, by presenting how self-regulation processes of decisions are related to performance, and how such relationship can be affected by the presence of exhaustion, job demands, and job resources. Novelties present in the current study are several. First, the methodological aspects here considered present a solution for an antithetical issue which sees decision-making studies mostly experimental and between-subject conceived, and I/O research based on psychometric instruments (Dalal et al., 2010). Newborn approaches in decision-making originated from studies of self-regulation competency dimension (Byrnes et al., 1999) and of environmental decision-making model by Bandura and Wood (1989) allow to overcome to this limit by using psychometric instruments developed on purpose for measuring decision-making competences at work. Second, the study extends decision making research applied to the I/O domain in the framework of the JD-R model. The model here proposed explores the role of the exhaustion component, decision-making competences (i.e., DMCy and DEM) and their interactions which have not been tested in the recent decision-making JD-R extension (Gordon et al., 2015). Third, we have extended studies on decision-making applied to the workplace, frequently confined to some privileged subjects, such as managers or specific professionals, to general workers. This in light of a research emergence which has brought several scholars to reconsider the new role assumed by the work environment and its effect on decision-making processes. Results of the present study reveal the importance of the sensitivity to environmental aspects in decision-making (DEM) as well the role of the competence of making good choices at work (DMCy) in relation to organizational variables. The importance of these characteristics illuminates how decision-making processes in the workplace improve different job performance types and how some JD-R variables can positively or negatively affect such processes.

Decision-making Competency (DMCy) and Decision Environment Management (DEM) at Work

This study confirms that in-role performance depends on DMCy as well as job demand levels. In addition, for low levels of job demands, DMCy is strongly and positively related to in-role performance, whereas such interaction disappears for high levels of them. Although research has robustly shown that high chronic job demands and exhaustion adversely affect performance (Demerouti et al., 2001; Bakker et al., 2003, 2004) very few research has focused on its possible effects on decision-making in relation to low job demand levels. A possible explanation comes from the definition of DMCy, in which the self-regulation of people allows an efficiently feeling of control over processes of adaptation to the work environment (Miller and Byrnes, 2001). The self-regulation processes for people with high DMCy could allow the development of strategies able to overcome to frustrations due to changes in job demands. Additionally, it is important to mention that job demands need not to be necessarily negative (if not particularly high), and they still are an indirect index of productivity and performance related to the task (Bakker and Demerouti, 2007). For example, after crisis periods which some Italian companies in the private service sector are now facing, employees with high DMCy can better adapt to new job conditions by developing strategies (e.g., finding new clients, developing international networks, restructuring the organization, introducing new technologies) to overcome environmental conditions and maintaining high performance. This is in line with the DMCy definition which sees a good decision maker as able to promote the implementation of strategies to establish a sense of control to adapt to unpredictable environments (Miller and Byrnes, 2001).

On the other hand, the DEM is conceptualized as the sensitivity toward environmental aspects relevant for decision processes, which, in turn, may be associated with extra-role performance. As seen, the impact of these environment variables on decision-making processes is relevant and already known, especially in relation to job resources

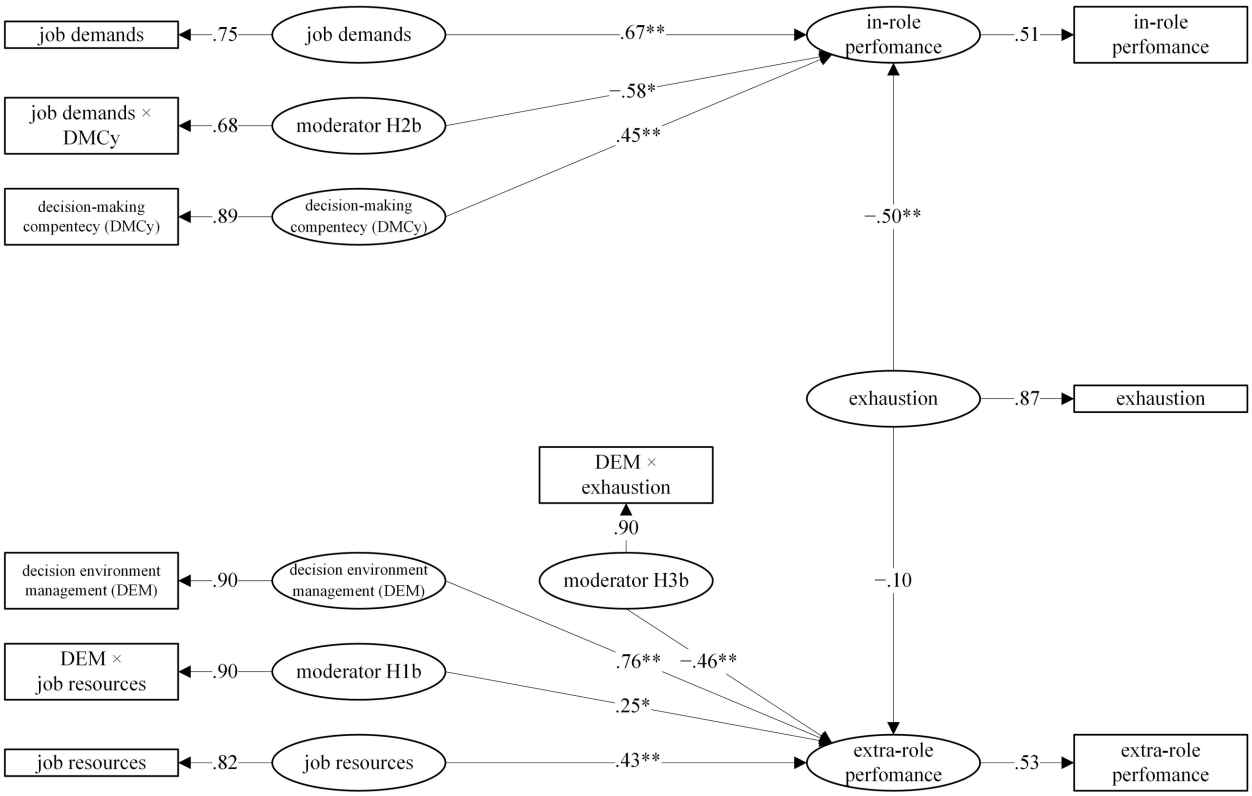

FIGURE 2 | Tested Model 2 with interactions between decision competences and performance dimensions (*$p < 0.05$; **$p < 0.01$).

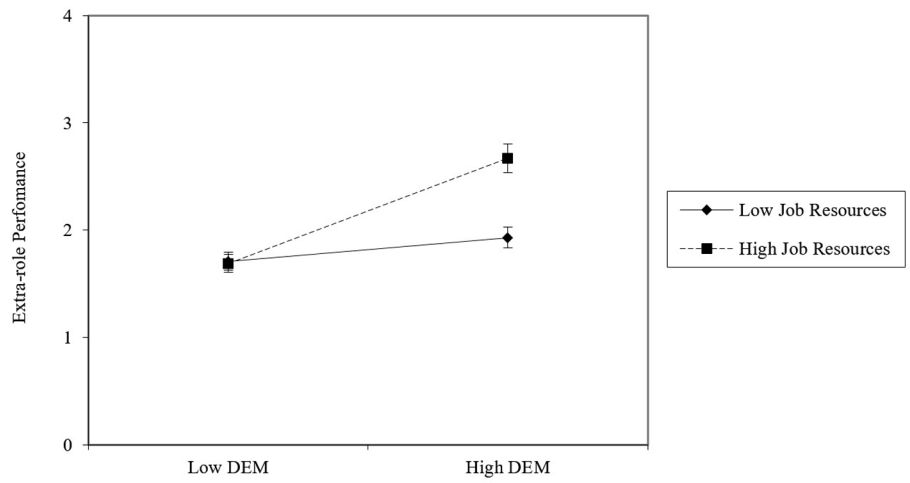

FIGURE 3 | Relationship between job resources and extra-role performance for low versus high decision environment management (DEM) employees.

(De Dreu and Weingart, 2003; Kozlowski and Ilgen, 2006; Ceschi et al., 2014). Our study suggests that job resources may especially affect the performance of individuals who are more receptive to environmental conditions which results in an advantage for them. In complex decision-making environments, high DEM decision makers develop better composite rules, making it effortlessly to assess the source of multiply produced effects, and making effective use of insightful outcome feedbacks (Wood and Bandura, 1989; Bandura, 1997). When carrying out these activities, employees have to cope with plenty of limitations and drawbacks that frequently perturb self-evaluative repercussions impairing decision-making processes,

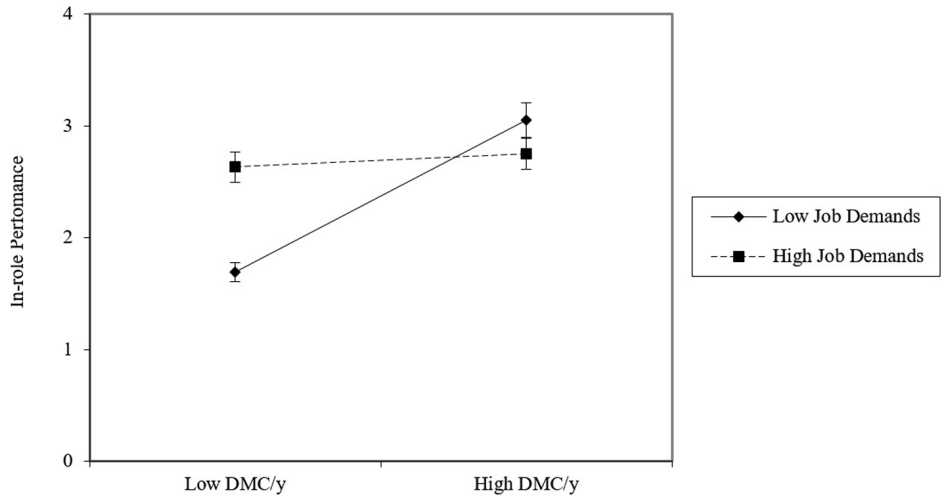

FIGURE 4 | Relationship between job demands and in-role performance for low versus high decision-making competency (DMCy) employees.

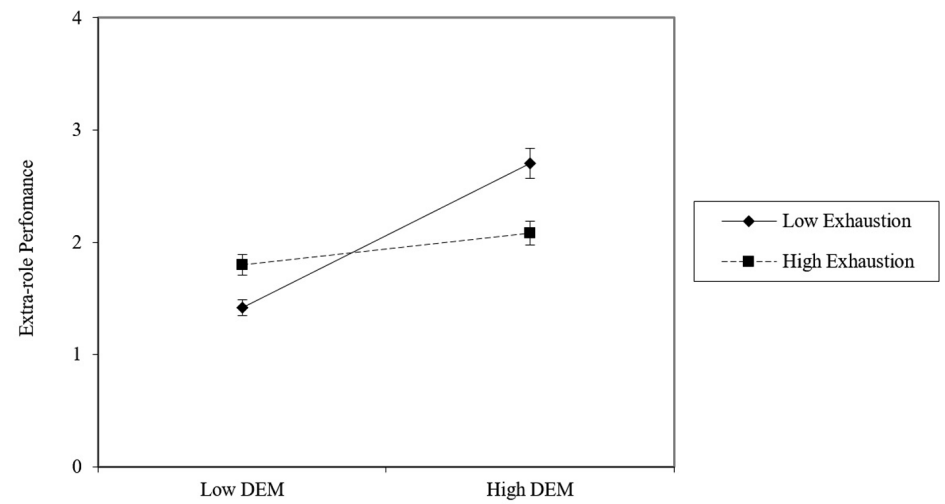

FIGURE 5 | Relationship between exhaustion and extra-role performance for low versus high decision environment management (DEM) employees.

this especially if they are low in DEM. For the same reason, individuals who reported higher levels of DEM also report better with extra-role performance in low exhaustion condition, when their energetic status dispose of the enough cognitive resources for making good decisions.

Two Different Processes, One Common Regulation System?

Relations found among these characteristics suggest the presence of two different constructs related to decision-making processes. It is interesting the fact that both of them show the presence of an insensitivity to moderators, but in an opposite way: where subjects with low levels of DMCy are sensitive to demands, high DEM levels seem to increase the sensitivity toward resources. DMCy seems to be a construct oriented to performance protection versus job demands, activating the regulation at the increasing of subjective effort (Demerouti et al., 2014). On the other side, DEM enhances the sensitivity toward resources in relation to extra-role performance and probably in relation to the motivational process proposed by the JD-R model (Bakker et al., 2003). The motivational process assumes that job resources have motivational potential and lead to high work engagement and extra-role performance, limiting the development of job strain (Bakker et al., 2005). This could explain why employees with high level of DEM perform better in absence of harsh work conditions, because they are more inclined to be negatively affected by exhaustion. On the other hand, only future research could confirm such result interpretation, because the present research lacking of the work engagement indicator did not allow to test such mediated relation.

Considering differences between the two decision-making constructs, a process that can explain their impact

on performance relies on the self-regulatory mechanism. As seen, self-regulatory mechanisms have considerable impact on how well cognitive-processing systems work (Wood et al., 1990). The conception of ability with which employees approach complex activities are likely to have a significant impact on the self-regulatory influences that govern ongoing motivation and personal accomplishments in complex decision-making environments; which is also consistent with the definition of self-regulation of the DMC\y approach (Byrnes et al., 1999). Self-regulation is based on generating, evaluating, selecting, and learning from goal-directed choices while simultaneously managing uncertainty, complications, time pressure, that may otherwise interfere with the goals attainment.

DMCy and DEM as Detectors of Individual Differences among Organizational/Work Variables

Some considerations need to be reported in relation to differences among participants and the relations found with DMCy and DEM. Consistent with literature on individual differences, where people with low decision-making competence are related to greater risk-taking, interpersonal strengths and difficulties, and high levels are considered as predictors of such real-world success (Parker and Fischhoff, 2005; Weller et al., 2012, 2015), DMCy is positively related to job position. Managerial roles are often associated with good decision-making ability, mostly analytical, as evidence has showed (Dane and Pratt, 2007). DMCy is also related to work experience. In the workplace, experienced workers reliance on less cognitively demanding strategies would possibly not always be a disadvantage, as these more straightforward strategies may lead to adaptive behaviors as a result of an equilibrium between individual potential and the demands of a job condition (Mata et al., 2007, 2009, 2011). The study has provided significant results related to the decision-making literature.

Another significant relation detected is between DEM and the number of supervised staff, where individuals which present such higher sensitivity to resources in decision-making are also in position of governing more personnel. This is in line with the theoretical definition of DEM which is expected to interact positively with job-resources such as the supervised staff, to accomplish performance targets (Wood et al., 1990). As for job resources like feedbacks or social rewards, the strength of these variables is intrinsically related to the sensitivity toward them and subsequently on decision-making processes which can positively impact on employee's co-working. Therefore, negative environments can be responsible for exhaustion and work disengagement especially in those individuals sensitive to the choice regulation processes dependent on work context.

Limitations and Future Research

Limitations of this study can be considered basically four. First, in common with several I/O studies, the present research lacks an objective measure of performance (Spector, 2006). In part, this lack has been balanced with the use of more scales to measure the in-role and the extra-role performance, such as the IWPQ (Koopmans et al., 2012) and the performance scale present in the JD-R questionnaire by Bakker (2014). A second limitation is due to the absence of a second self-regulation/dysregulation measures. Partially this limit is overcome by the use of a convergent measure based on the three self-regulation scales of the DMCI (Miller and Byrnes, 2001) which has been developed starting from the "*self-regulation decision-making model*" (Bandura and Wood, 1989; Byrnes, 2013) with the intention of assessing self-regulation in making choices. The third limitation of the study belongs to the decision-making competence construct (Bruine de Bruin et al., 2012), which differs from the competency one because of the use of heuristics and biases tasks to test the decisional ability (Miller and Byrnes, 2001). Future research considering the use of heuristics and biases tasks could bring more evidence able to explain such dynamics. The last limitation regards the cross-sectional design of the present study, which does not allow to observe causality of the relationships between predictors and outcomes by controlling for stabilities. Future studies should examine such relationships over time, in relation to training program for instance. Considering the perspective assumption that is actually considering the decision-making competence as a construct like-trait (Finucane and Gullion, 2010; Bruine de Bruin et al., 2012), scholars should also investigate whether specific training programs (i.e., de-biasing) could possibly improve the de-biased decisions. We suggest the development of longitudinal de-biasing programs (Fischoff, 1982; Larrick, 2004; Gerling, 2009; Soll et al., 2014) combined to job crafting interventions (based on JD-R framework; Tims and Bakker, 2010; Bakker et al., 2012; Petrou et al., 2012; Tims et al., 2012; Demerouti and Bakker, 2014) especially in relation to a qualitative measure based on diaries studies at work, to test decision-making and performance improvements. In relation to DEM, training courses could develop the awareness, the intrinsic management, and the self-regulation in relation to organizational variables and decision-making processes. Training could improve collaborative processes, such as shared decision-making, they would allow the improvement of the management of decisional environments, which in turn will positively increase performance and permit to better deal with environment exhaustion. Ultimately, considering the effects of employee well-being on decision-making research will consider more in the future the psychosocial effects of individuals at work, despite of just focusing on the company performance as the only decision outcome.

AUTHOR CONTRIBUTIONS

All authors listed, have made substantial, direct, and intellectual contribution to the work, and approved it for publication.

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Emotional Exhaustion and Job Satisfaction in Airport Security Officers – Work–Family Conflict as Mediator in the Job Demands–Resources Model

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The growing threat of terrorism has increased the importance of aviation security and the work of airport security officers (screeners). Nonetheless, airport security research has yet to focus on emotional exhaustion and job satisfaction as major determinants of screeners' job performance. The present study bridges this research gap by applying the job demands–resources (JD–R) model and using work–family conflict (WFC) as an intervening variable to study relationships between work characteristics (workload and supervisor support), emotional exhaustion, and job satisfaction in 1,127 screeners at a European airport. Results of structural equation modeling revealed that (a) supervisor support as a major job resource predicted job satisfaction among screeners; (b) workload as a major job demand predicted their emotional exhaustion; and (c) WFC proved to be a promising extension to the JD–R model that partially mediated the impact of supervisor support and workload on job satisfaction and emotional exhaustion. Theoretical and practical implications are discussed.

Keywords: aviation security, JD–R model, supervisor support, work–family conflict, workload

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INTRODUCTION

Since September 11, 2001, security checks at airports have become vitally important, and strict security controls based on advanced technology are implemented to minimize the threat of terrorism. One major aspect in the airport security process is hand luggage and passenger controls with x-ray machines (for a recent review, see Wetter, 2013). Before entering the secure area of an airport, all passengers, airline staff, and airport staff have to pass a security checkpoint at which they and all their belongings are subjected to strict controls. By guaranteeing a smooth procedure at security checkpoints when inspecting passenger luggage with x-ray imaging and by carrying out follow-up checks on passengers and hand luggage, airport security officers (screeners) perform vital security tasks. Studies with screeners have seen an emphasis on visual search in x-ray images, optimizing technology, and using security training programs to improve detection performance (e.g., von Bastian et al., 2008; Koller et al., 2009; Halbherr et al., 2013; Mendes et al., 2013; Wolfe et al., 2013; Biggs and Mitroff, 2014; Mitroff et al., 2015). Up to now, the health and

well-being of screeners have not been the focus of research. This study addresses this research gap by investigating important variables of health and well-being in 1,127 screeners at a European airport.

Burnout and Job Satisfaction

Burnout and job satisfaction rank among the most frequently used indicators of mental health and well-being in work and organizational psychology. Burnout is a tripartite syndrome consisting of emotional exhaustion, feelings of depersonalization (also named cynicism), and awareness of reduced personal accomplishment (Maslach, 1982). Emotional exhaustion is characterized by feelings of mental fatigue or of being emotionally drained. Depersonalization is marked by a detached and emotionally distanced treatment of clients, co-workers, and the organization. And finally, diminished personal accomplishment is characterized by a negative evaluation of one's job competence and effectiveness. Emotional exhaustion is most often seen as the key component of burnout (Cordes and Dougherty, 1993; Lee and Ashforth, 1993; Cropanzano et al., 2003) and it has been associated with diverse negative organizational outcomes and personal dysfunctions such as an increased prevalence of counterproductive work behavior, turnover intentions, and sickness absence as well as mental health problems (Cordes and Dougherty, 1993; Lee and Ashforth, 1996; Borritz et al., 2006; Bolton et al., 2012). Job satisfaction is one of the most broadly studied variables in work and organizational psychology (Dormann and Zapf, 2001) and is commonly defined as a "pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences" (Locke, 1976, p. 1304). It can refer to a global evaluation of one's job situation or to the evaluation of individual facets of everyday work (i.e., satisfaction with work itself, supervision, coworkers, pay, and promotional opportunities) (e.g., Ironson et al., 1989). Job satisfaction has been shown to be associated with various organizational and individual outcomes. For example, high levels of job satisfaction have been associated negatively with intent to leave one's job (Hellman, 1997; Fried et al., 2008) and positively with life satisfaction and happiness (Bowling et al., 2010).

Emotional exhaustion and job satisfaction have also been proven to be highly relevant factors for performance in a wide range of organizational settings: emotional exhaustion in the sense of an inhibitor of good job performance (Parker and Kulik, 1995; Wright and Bonett, 1997; Wright and Cropanzano, 1998; Cropanzano et al., 2003; Bakker et al., 2004) and job satisfaction in the sense of a promoter of good job performance (Judge et al., 2001; Wright et al., 2007). Moreover, empirical studies have discussed burnout and job satisfaction as major determinants of safety performance (Siu et al., 2004; Nahrgang et al., 2011). This most certainly also applies to the performance of screeners and thus to the security concept at airports; and it clearly reveals the importance of identifying the antecedents of emotional exhaustion and job satisfaction in this important occupational group.

The Job Demands–Resources (JD–R) Model

The JD–R model is a well–tested and widely used theoretical framework for describing the relationships between work characteristics and well–being. The model includes aspects from various theories and is thus broader and more comprehensive than older models such as the demand–control model (Karasek, 1979) or the effort–reward-imbalance model (Siegrist, 1996). Moreover, it contains assumptions taken from the job characteristics model (Hackman and Oldham, 1976) and the model of conservation of resources (Hobfoll, 1989) by underlining that job resources are not only necessary to deal with high job demands but also important in their own right (Bakker and Demerouti, 2007). The central proposition of the JD–R model is the assumption of dual processes. Within the first, the *health impairment process*, high job demands exhaust the employees' mental and physical resources and can subsequently lead to ill-health. Job demands refer to "physical, psychological, social, or organizational aspects of the job that require sustained physical and/or psychological (cognitive and emotional) effort or skills" (Bakker and Demerouti, 2007, p. 312). Hence, they can be associated with physiological and/or psychological costs. Typically, emotional exhaustion is used as an indicator of poor mental health in the model. Although numerous job demands have been identified as predictors of emotional exhaustion (Cordes and Dougherty, 1993), meta-analyses have confirmed that the key determinants of emotional exhaustion in various occupational settings are workload and associated phenomena such as time or work pressure (Lee and Ashforth, 1996; Alarcon, 2011; Bowling et al., 2015). In light of current trends in air traffic toward major growth in the quantity of passengers and luggage accompanied by staff cuts due to cost pressure, workload appears to be an important feature of the screeners' working environment that is of potential relevance for their health and well-being (Karimbocus, 2015). And the workload will get even higher, given the estimation of an additional 4 billion passengers flying per year within the next 20 years (Benda, 2015). Nonetheless, to the best of our knowledge, workload and its effect on emotional exhaustion have not yet been examined in security staff in general and in screeners in particular. Based on both the JD–R model and the empirical findings stated above, we expect workload to be positively related to emotional exhaustion in our sample of screeners (Hypothesis 1).

The second process in the JD–R model is *motivational* in nature. Job resources are assumed to be key requirements for internal and external motivation because they support the satisfaction of basic needs and the achievement of work goals. Job resources describe "physical, psychological, social, or organizational aspects of the job that are functional in achieving work goals, reduce job demands and the associated physiological and psychological costs, and/or stimulate personal growth, learning, and development" (Bakker and Demerouti, 2007, p. 312). Job resources are considered to be central determinants of positive motivational states such as high work engagement and organizational commitment (e.g., Schaufeli et al., 2009). Despite

being one of the most important and widely researched variables in industrial and organizational psychology (Dormann and Zapf, 2001), job satisfaction is not a widely acknowledged factor in the JD–R model. Nonetheless, a few studies have considered the relationship between job resources and job satisfaction against a JD–R background (Lewig and Dollard, 2003; Angulo and Osca, 2012; Biggs et al., 2014). Comprehensive research has shown that workplace social support is an important condition conductive to job satisfaction (Locke, 1976). Social support has been defined broadly as "the availability of helping relationships and the quality of those relationships" (Leavy, 1983, p. 5). However, a global definition does not take into account the complexity of social support, because it can stem from different sources (e.g., Baruch-Feldman et al., 2002). One common source of workplace social support is the supervisor. Numerous studies have revealed that the availability of supervisor support is associated with higher job satisfaction (e.g., Lewig and Dollard, 2003; Cortese et al., 2010; Biggs et al., 2014). Supervisor support might be particularly important for a screeners job satisfaction, because other typically discussed job resources (e.g., autonomy) and other sources of support (e.g., coworkers, customers) are typically available to a limited extent in this work field: detailed standard operating procedures result in less flexibility for screeners to use their professional decision-making skills and constrain their scope of action. Moreover, screeners work in varying work teams and perform rather uncomfortable tasks in relation to passengers. This does not help them to gain social support and recognition from coworkers and customers. Accordingly, we expect supervisor support to be particularly important for airport screeners and to be a good predictor of their job satisfaction (Hypothesis 2).

Work–Family Conflict as an Intervening Variable in the JD–R Model

The JD–R model has undergone several extensions in the past few years by integrating, for example, personal resources and the concept of job crafting (Xanthopoulou et al., 2007; Petrou et al., 2012) or by examining the accumulative effect of different job demands (van Woerkom et al., 2016). However, due to the parsimony of the JD–R model, there are still open questions regarding not only the processes leading to health impairment such as emotional exhaustion but also the motivational outcomes such as job satisfaction (Demerouti and Bakker, 2011; Fernet et al., 2013). The increasing number of dual career couples has raised the importance of the (in) compatibility of family and work roles in predicting employees' health and well-being (Frye and Breaugh, 2004). Moreover, the work–family interface can be expected to be of particular importance among screeners, because they work in changing shifts, a working condition that has turned out to be relevant in terms of the compatibility of family and work (Beutell, 2010).

Several models have been advanced to explain the relationship between work and family roles (Guest, 2002; Voydanoff, 2002). The segmentation model hypothesizes that work and family are two distinct domains of life that have no influence on each other. The spillover model, in contrast, hypothesizes that one domain can influence the other in either a positive or negative way. The kind of influence in the context of spillover theory can be considered from three perspectives: (1) domains can influence each other either within (classical spillover perspective) or between (crossover perspective) individuals (Bakker et al., 2008; Pedersen and Minnotte, 2012); (2) effects from one domain to the other can be either positive (enrichment, facilitation) or negative (conflict) (e.g., Carlson et al., 2006; Innstrand et al., 2008; Odle-Dusseau et al., 2012); and (3) effects can take either the direction work → family or family → work (Frone et al., 1992; Innstrand et al., 2008; Odle-Dusseau et al., 2012). In the present study, we focus on negative spillover from work to family within the individual and subsequently name it work–family conflict (WFC). Comprehensive research has demonstrated the effect of WFC on health and well-being (e.g., Allen et al., 2000; Amstad et al., 2011). WFC can, on the one hand, foster emotional exhaustion (Demerouti et al., 2004, 2005; Hall et al., 2010; Karatepe, 2010) and, on the other hand, hamper aspects of overall well-being such as job satisfaction (Frye and Breaugh, 2004; Karatepe and Kilic, 2007; Cortese et al., 2010; Beutell and Schneer, 2014). Although a number of job demands and job resources have been identified as determinants of WFC, workload and social support have emerged as the major antecedents in the sense that greater workload increases WFC and greater supervisor support reduces WFC (Byron, 2005; Michel et al., 2011; Bowling et al., 2015). In the context of supervisor support, both supervisor work–family support (Frye and Breaugh, 2004; Yildirim and Aycan, 2008; Lu et al., 2015) and more global ways of supervisor support (in the sense of emotional and/or instrumental support) (Thompson et al., 2006; Karatepe and Kilic, 2007) have been shown to reduce WFC.

Several theoretical frameworks have been used to guide the study of WFC. Popular theories are the role stress theory (Kahn et al., 1964), the conservation of resources theory (Hobfoll, 1989), and the JD–R model (Bakker and Demerouti, 2007). Nonetheless, WFC has been conceptualized differently and, consequently, has been located in the stressor–strain chain as either an independent (e.g., Schaufeli et al., 2009; Guglielmi et al., 2012), dependent (e.g., Bakker and Geurts, 2004; Boyar et al., 2014), or intervening variable (e.g., Peeters et al., 2004, 2005). Following the recommendation of Peeters et al. (2004) to distinguish the concept clearly from other job demands, we decided to view WFC as an intervening variable and integrate it as such into the JD–R model as our theoretical framework. WFC has been shown to mediate the positive effects of workload on emotional exhaustion (Peeters et al., 2004; Demerouti et al., 2005; Hall et al., 2010). High workload can cause a depletion of resources (Bakker and Demerouti, 2007). If the corresponding resources are no longer available in private life, this can be a reason for WFC (cf. Semmer et al., 2010). WFC, in turn, can amplify the experienced demands and subsequently lead to emotional exhaustion through impaired recovery (Geurts et al., 2003). However, WFC may not be the only mechanism linking workload with emotional exhaustion. For example, coping may be an alternative mediating mechanism: the study of Snow et al. (2003) revealed that work stressors increased avoidance coping

which, in turn, increased strain. Therefore, we expect the effect of workload on emotional exhaustion to be partially mediated by WFC (Hypothesis 3a).

Evidence related to the indirect effect of supervisor support on job satisfaction is inconsistent. A great number of studies have revealed that supervisor support is related negatively to WFC, and that this, in turn, decreases job satisfaction (Frye and Breaugh, 2004; Thompson et al., 2006; Karatepe and Kilic, 2007; Yildirim and Aycan, 2008; Cortese et al., 2010; Lu et al., 2015). However, recent empirical findings have revealed non-significant indirect effects (Ito and Brotheridge, 2012; Odle-Dusseau et al., 2012). The present study contributes to gaining a better understanding of supervisor support by examining it in a sample of screeners. As predicted by the JD–R model, resources available in the work domain may energize the motivational process, and this may then facilitate better adjustment and consequently reduce WFC (Lu et al., 2015). Reduced WFC makes it possible to direct personal resources toward attaining work goals, and this, in turn, promotes job satisfaction. Family-friendly support by supervisors could be particularly important for screeners, because they have to work in changing shifts. Supervisors may support a family-friendly organization of work—either directly through approving family-friendly initiatives (Frye and Breaugh, 2004; Yildirim and Aycan, 2008; Lu et al., 2015) or indirectly through scheduling family-friendly shifts (Beutell, 2010). This, in turn, may well enhance commitment and satisfaction among screeners. We expect the effect of supervisor support on job satisfaction to be partially mediated by WFC in our sample of screeners (Hypothesis 3b), because other mediating mechanisms such as coping may exist (cf. Snow et al., 2003). In addition, it can be expected that job resources such as supervisor support satisfy basic needs and values and, thus, foster job satisfaction also directly (Bakker and Demerouti, 2007).

Figure 1 presents the extended version of the JD–R model and an overview of our hypotheses. Our study of emotional exhaustion, job satisfaction, and WFC goes beyond previous research because we analyze the effects of workload and supervisor support on WFC, emotional exhaustion, and job satisfaction in screeners—a population in which health and motivational variables have not been the focus of research so far, despite their substantial role in aviation security. Preventing emotional exhaustion and promoting job satisfaction among screeners is not just important for its own sake but also in view of the need to protect airports and air travelers, thereby making it a matter of strong public interest. Additionally, our study broadens recent WFC research by simultaneously integrating the concept as an intervening variable into the health impairment and the motivational process of the JD–R model. As a results, it contributes to gaining a better understanding of the indirect effect (mediated via WFC) of supervisor support on job satisfaction.

MATERIALS AND METHODS

Participants and Procedures

We used a cross-sectional analysis to survey screeners employed at a European airport in a German-speaking country. The survey took the form of a paper-and-pencil questionnaire that operative leaders distributed to the screeners in their group during the morning briefing. Screeners absent for longer periods (e.g., due to disability or illness) received the questionnaire by mail. This study was carried out in accordance with the Declaration of Helsinki and data protection regulations of the relevant country. The study was approved by the Work Council of the respective airport and subjects gave written informed consent. From a total of 2,166 distributed questionnaires, 1,329 screeners participated in the survey. In seven cases, the amount of missing data was above 30%. These questionnaires were excluded from further analysis (cf. Hair et al., 1998). This left data from 1,322 screeners that were suitable for statistical analyses–a response rate of 61%. Because the work of screeners inspecting *hold*

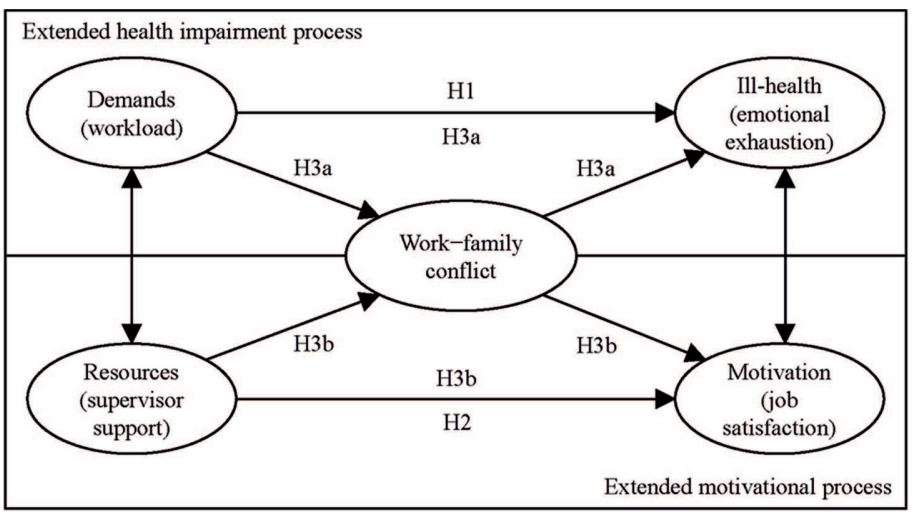

FIGURE 1 | Extended version of the JD–R model. H, Hypothesis.

baggage (check-in luggage) is different[1] to that of screeners at the checkpoints (inspecting *carry-on cabin baggage*), we excluded 153 screeners who partly or predominantly inspected hold baggage and 42 screeners who did not state the kind of work they performed most often. This left a final sample of 1,127 screeners.

We investigated six demographic variables: gender (1 = female; 2 = male), age (1 = 29 years and younger; 2 = 30–39 years; 3 = 40–49 years; 4 = 50 years and older), job tenure (1 = 2 years and less; 2 = 3–6 years; 3 = 7–11 years; 4 = 12 years and more), marital status (1 = in partnership; 2 = not in partnership), children of preschool age, and children of school age (1 = yes; 2 = no). The sample contained 496 (44%) female and 620 (55%) male respondents. Eleven participants (1%) did not state their gender. A total of 1,115 participants (99%) reported their age. Most were aged 40–49 years (359, 32%); 316 (28%) were aged 50 years or older; and 315 (28%) were aged 30–39 years. The remaining 125 respondents (11%) were 29 years old or younger. Most participants reported long job tenure. A total of 372 (33%) had been employed in the company for 7–11 years; 355 (32%), for 12 years or longer; 173 (15%), for 3–6 years; and 207 (18%), for 2 years or less. The remaining 20 participants (2%) did not report job tenure. Most respondents (801, 71%) were in a partnership at the time of the survey, 298 (26%) were single, and 28 (3%) did not state their marital status. Regarding children, 165 respondents (15%) had children of preschool age and 932 (83%) did not; 307 (27%) had children of school age and 796 (71%) did not; and 30 respondents (3%), respectively, 24 respondents (2%) did not answer the respective question about children. In addition to the demographic variables, we assessed the conditions of employment. We asked participants whether they worked full or part time (1 = full time; 2 = part time) and about the type of shift work they usually performed (1 = changing shifts; 2 = fixed shifts or day duty). The majority of respondents (897, 80%) worked full time, 220 (19%) worked part time, and 10 participants (1%) did not report whether they worked full or part time. Just over one-half (606, 54%) worked predominantly in changing shifts; the remaining participants worked either fixed shifts or day duty (475, 42%) or did not state their duty (46, 4%).

Based on operating data from the company, we were able to estimate the representative status of our sample. The sample of screeners was representative (in terms of demographic characteristics and conditions of employment) of the entire group of screeners at the airport with two exceptions: first, older screeners were slightly overrepresented, whereas young screeners were slightly underrepresented. Second, screeners with little work experience in the company (2 years or less) were also slightly underrepresented. These data related to the entire sample of screeners including an occupational group not included in our analyses (i.e., 217 screeners inspecting *hold baggage*). However, we did not expect this occupational group to differ in terms of demographics and employment characteristics from the screeners at the checkpoints.

[1]Most importantly, hold baggage screening takes place at remote locations, in which screeners do not work in teams and are not exposed to passengers and the noise of airport security checkpoints.

Measures

We assessed workload with a single item taken from the German version (Rödel et al., 2004) of Siegrist et al.'s (2004) effort scale ("I have constant time pressure due to a heavy workload.") that was rated on a 4-point scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*).

To assess supervisor support, we used the corresponding scale from the *Salutogenetische Subjektive Arbeitsanalyse* [salutogenetic subjective work analysis] (SALSA; Rimann and Udris, 1997). This scale measures the perceived availability of emotional and instrumental support from the supervisor and contains three items (e.g., "To what extent is your supervisor willing to listen to your problems at work?"). We used the original 5-point scale ranging from 1 (*not at all*) to 5 (*absolutely*). Cronbach's α was 0.85.

Emotional exhaustion was measured with the personal burnout scale (Nübling et al., 2006, based on Borritz and Kristensen, 1999). The scale has six items (e.g., "How often are you emotionally exhausted?") that were rated on the original 5-point response scale ranging from 1 (*never*) to 5 (*always*). Despite the label personal burnout, the corresponding scale measures the emotional exhaustion component of burnout. Cronbach's α was 0.92.

We assessed job satisfaction with five items (e.g., "I enjoy my work.") from the *Diagnose gesundheitsförderlicher Arbeit* [diagnosis of health-promoting work] (DigA; Ducki, 2000). These measure global job satisfaction on 5-point scales ranging from 1 (*not true*) to 5 (*absolutely true*). Cronbach's α was 0.86.

Finally, we used a German translation (Nübling et al., 2006) of the work–privacy conflict scale (Netemeyer et al., 1996) as an indicator of WFC. The scale has five items (e.g., "The demands at my work interfere with my home life.") rated on a 5-point scale ranging from 1 (*disagree*) to 5 (*totally agree*). Cronbach's α was 91. Note that this scale measures solely work-to-family conflict (and not family-to-work conflict).

Data Analysis

We examined reliability (Cronbach's α), descriptive statistics (*M* and *SD*), and correlations (Pearson product–moment and point-biserial correlations, Spearman correlations, Phi coefficient, Cramér's *V*) in SPSS Version 22. A Cronbach's α of 0.70 or higher can be rated as adequate for the present analysis (Nunnally and Bernstein, 1994). We recoded items so that high values reflected a high level of workload, supervisor support, WFC, emotional exhaustion, and job satisfaction.

We performed confirmatory factor analyses (CFA) and multivariate analyses with *structural equation modeling* (SEM) in Amos Version 22 using maximum likelihood (ML) methods of estimation. We chose this analytical technique because of its strengths in terms of controlling for measurement error while simultaneously considering multiple predictors and outcomes as well as reliably measuring relevant constructs through the aggregation of multiple indicators (Kline, 2011). In CFA, factor loadings should be at least 0.50 and ideally 0.70 or higher (Hair

et al., 2014). To estimate the global fit of the models we used the χ^2 value. However, the χ^2 value depends largely on sample size: in models based on large samples, the χ^2 value is high and mostly significant (thus indicating a poor fit). Because our sample was quite large, we used two alternative measures to assess global model fit: the root-mean-square error of approximation (RMSEA) and the comparative fit index (CFI). RMSEA values up to 0.08 (Browne and Cudeck, 1993) and CFI values close to 0.95 (Hu and Bentler, 1999) indicate a good fit between the proposed model and the data.

To test Hypotheses 1 and 2, we computed a basic Model M_0 with workload and support as predictors of emotional exhaustion and job satisfaction without WFC as intervening variable. Recent empirical evidence has indicated the presence of crossover effects (i.e., effects of demands on motivational outcomes and effects of resources on health-related outcomes) in the JD–R model (Knudsen et al., 2009; Crawford et al., 2010; Li et al., 2013; Ângelo and Chambel, 2014). Therefore, we integrated these effects in M_0 along with the effects assumed in Hypotheses 1 and 2. To test for the proposed partial mediation effects assumed in Hypothesis 3, we then entered WFC as intervening variable into Model M_1. This included both direct paths from workload and support to emotional exhaustion and job satisfaction and indirect paths mediated via WFC. Again, the model allowed for crossover effects. We tested the significance of path coefficients with the bootstrapping method and imputed missing data with the regression method. We considered ML estimates of the indirect effects and bootstrap confidence intervals (cf. MacKinnon et al., 2007).

We integrated relevant demographic variables and conditions of employment as control variables into the final model and considered their potential effects on model parameters.

RESULTS

Descriptive Statistics and Correlations

Table 1 presents means and standard deviations of the study variables and correlations between the study variables, demographic variables, and conditions of employment. Workload related negatively to supervisor support. Workload related positively to emotional exhaustion and WFC, but was unrelated to job satisfaction. Supervisor support related negatively to WFC and emotional exhaustion and positively to job satisfaction. Emotional exhaustion and job satisfaction interrelated negatively, and the former had a positive and the latter a negative relation to WFC.

Demographic variables and employment characteristics related to the study variables only to a minor degree. The correlation coefficients attained only partial significance and effect sizes were typically small (Cohen, 1988). Only job tenure showed some considerable relationships with our study variables, namely with workload, emotional exhaustion, and job satisfaction: participants with longer job tenure perceived a higher workload and they also reported higher emotional exhaustion and lower job satisfaction. Additionally, respondents with changing shifts and respondents with full-time work

TABLE 1 | Descriptive statistics and correlations (Pearson, Spearman, Phi coefficient, Cramér's *V*) between study variables (*N* = 1,127).

	M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Workload	3.30	0.81	–												
2. Supervisor support	2.53	0.88	−0.17***	–											
3. Work–family conflict	3.75	0.99	0.29***	−0.22***	–										
4. Emotional exhaustion	3.40	0.80	0.40***	−0.27***	0.61***	–									
5. Job satisfaction	2.74	0.93	−0.06	0.29***	−0.25***	−0.37***	–								
6. Gender[1]	1.56	0.50	−0.07*	0.05	0.06*	−0.06*	−0.03	–							
7. Age[2]	2.78	0.98	0.08**	0.05	−0.05	−0.02	−0.11***	0.05	–						
8. Job tenure[3]	2.79	1.09	0.16***	−0.09**	−0.09**	0.12***	−0.26***	0.10*	0.45***	–					
9. Marital status[4]	1.27	0.45	−0.01	0.04	0.05	0.00	0.01	−0.03	0.13***	0.15***	–				
10. Children of preschool age[5]	1.85	0.36	0.08**	0.11***	0.04	0.02	−0.03	−0.08**	0.24***	0.07	0.15***	–			
11. Children of school age[6]	1.72	0.45	0.01	0.03	0.07*	0.03	−0.03	−0.08*	0.28***	0.17***	0.21***	0.33***	–		
12. Working full/part time[7]	1.20	0.40	0.04	0.02	−0.15***	−0.03	−0.05	−0.25***	0.11**	0.14***	−0.04	−0.03	−0.12***	–	
13. Shift[8]	1.44	0.50	0.03	0.02	−0.15***	−0.03	0.03	−0.17***	0.07	0.21***	−0.01	−0.05	−0.04	0.32***	–

*[1] 1 = female; 2 = male. [2] 1 = ≤ 29 years; 2 = 30–39 years; 3 = 40–49 years; 4 = ≥ 50 years. [3] 1 = ≤ 2 years; 2 = 3–6 years; 3 = 7–11 years; 4 = ≥ 12 years. [4] 1 = in partnership; 2 = not in partnership. [5] 1 = yes; 2 = no. [6] 1 = yes; 2 = no. [7] 1 = full time; 2 = part time. [8] 1 = changing shifts; 2 = fixed shifts or day duty. *p ≤ 0.05, **p ≤ 0.01, ***p ≤ 0.001.*

arrangements reported higher WFC. We therefore integrated the variables job tenure, working full/part time, and shift as control variables into the final Model M_1.

Results of Structural Equation Modeling

We constructed the latent variables supervisor support, emotional exhaustion, job satisfaction, and WFC on the basis of several observed items. CFAs revealed that the integrated constructs were of good quality: all indicators showed statistically significant factor loadings ($p < 0.01$ or $p < 0.05$). These were clearly higher than the quality criterion of 0.50 recommended by Hair et al. (2014). Moreover, most of the factor loadings were close to or higher than 0.70, indicating that the constructs were of a very good quality. We used the single item of workload as an observed variable.

To test Hypotheses 1 and 2, we first considered Model M_0 without WFC as intervening variable. As Amos does not allow correlating the two endogenous variables, we correlated emotional exhaustion and job satisfaction through their error terms. Model M_0 fitted the data well, $\chi^2(85) = 465.71$, $p = 0.000$, CFI = 0.96, RMSEA = 0.06. The standardized regression weights and their significance are shown in parentheses in **Figure 2**. Higher levels of workload were associated significantly with higher levels of emotional exhaustion. This supported Hypothesis 1. Higher levels of supervisor support were associated significantly with higher levels of job satisfaction, supporting Hypothesis 2. Additionally, supervisor support was associated negatively with emotional exhaustion, indicating that higher levels of supervisor support were associated with lower levels of emotional exhaustion. Workload and supervisor support explained 22% of the variance in emotional exhaustion and 11% of the variance in job satisfaction. To test the proposed mediation effects, we next entered WFC into the model as an intervening variable, and considered the partial mediation Model M_1 (shown in **Figure 2**). Again, emotional exhaustion and job satisfaction were correlated through their error terms. The model fitted the data well, $\chi^2(162) = 774.24$, $p = 0.000$, CFI = 0.96, RMSEA = 0.06. Workload was associated positively and supervisor support was associated negatively with WFC. Together, they explained 13% of its variance. The ML estimate of the standardized indirect effect of workload on emotional exhaustion was positive and statistically significant (0.14, 95% bootstrap CI [0.10, 0.19], $p = 0.006$), indicating that higher levels of workload were related indirectly via an increase in WFC to higher levels of emotional exhaustion. Because the direct effect of workload on emotional exhaustion was still significant, results provided support for the partial mediation effect assumed in Hypothesis 3a. The ML estimate of the standardized indirect effect of supervisor support on job satisfaction was also positive and statistically significant [0.05, 95% bootstrap CI (0.03, 0.07), $p = 0.009$], indicating that higher levels of supervisor support were related indirectly via a reduction in WFC to higher levels in job satisfaction. This supported Hypothesis 3b. Again, results indicated a partial mediation effect, because of the significance of the direct effect of supervisor support on job satisfaction. In addition, the indirect effects not mentioned in our hypotheses, namely, the indirect negative effect of workload on job satisfaction (−0.06, 95% bootstrap CI [−0.09, −0.04],

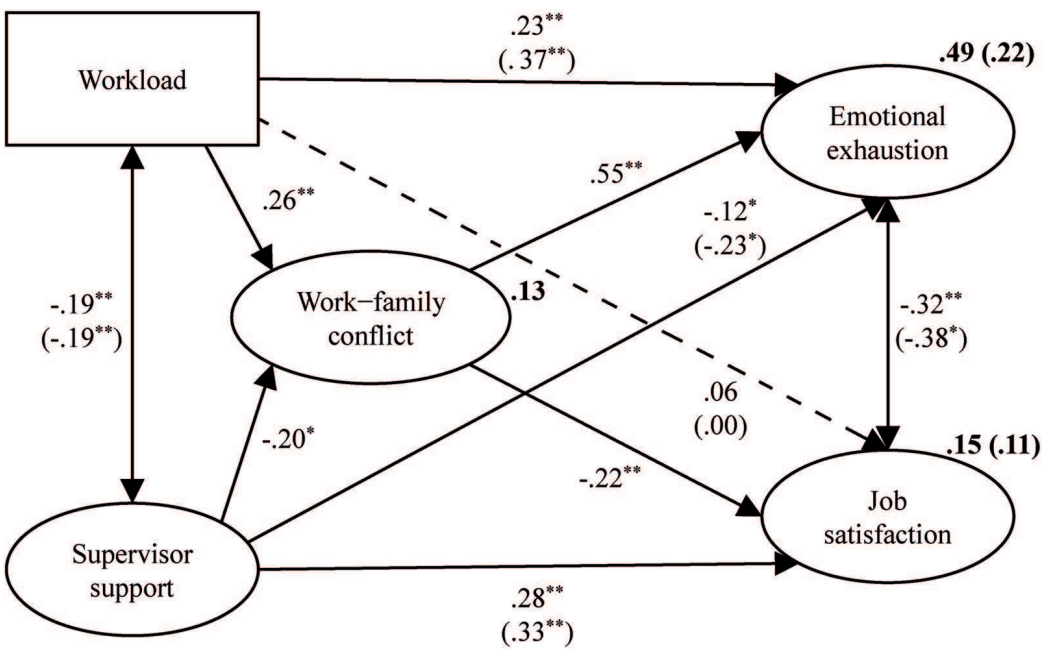

FIGURE 2 | Maximum likelihood (ML) estimates for Model M_1 ($N = 1,127$). The standardized regression weights of Model M_0 are depicted in parentheses. The broken line represents a non-significant effect. Amounts of explained variance are depicted in bold print. Workload is represented by a rectangle, because the single item was integrated into the model as a manifest variable. The standardized indirect effects of workload on emotional exhaustion (0.14, $p = 0.006$) and supervisor support on job satisfaction (0.05, $p = 0.009$) were statistically significant. *$p \leq 0.05$, **$p \leq 0.01$.

$p = 0.005$) and the indirect negative effect of supervisor support on emotional exhaustion [−0.11, 95% bootstrap CI (−0.15, −0.07), $p = 0.009$], were statistically significant.

We integrated the control variables job tenure, working full/part time, and type of shift work one at a time into the final Model M_1 and considered their effects on study variables and model parameters. In line with the bivariate correlations reported in **Table 1** job tenure had significant effects on our study variables: workload ($\beta = 0.15$, $p = 0.016$) and emotional exhaustion ($\beta = 0.16$, $p = 0.006$) increased with increasing job tenure; supervisor support ($\beta = -0.12$, $p = 0.009$), WFC ($\beta = -0.16$, $p = 0.009$), and job satisfaction ($\beta = -0.32$, $p = 0.004$) decreased. Additionally, working part time was related to lower levels of WFC ($\beta = -0.17$, $p = 0.009$) and job satisfaction ($\beta = -0.10$, $p = 0.018$) and higher levels of emotional exhaustion ($\beta = 0.06$, $p = 0.029$) compared to working full time. Finally, working in fixed shifts or day duty significantly reduced WFC ($\beta = -0.16$, $p = 0.007$) and slightly increased emotional exhaustion ($\beta = 0.05$, $p = 0.024$) compared to working in changing shifts. However, the integration of job tenure, working full/part time, and type of shift work into M_1 did not affect our major findings, namely, the direct and indirect effects of workload and supervisor support on emotional exhaustion and job satisfaction.

DISCUSSION

The aim of the present study was to explore the relationships between characteristics of the working environment (workload, supervisor support), emotional exhaustion, and job satisfaction among airport security officers (screeners). Emotional exhaustion and job satisfaction have proven to be important determinants of performance in general (e.g., Judge et al., 2001; Cropanzano et al., 2003; Bakker et al., 2004; Wright et al., 2007) and of safety performance in particular (Siu et al., 2004; Nahrgang et al., 2011). Despite the highly security-critical tasks of screeners, previous research has not focused on emotional exhaustion and job satisfaction in this important occupational group. The present study addressed this research gap by studying the effects of workload and supervisor support on emotional exhaustion and job satisfaction. The results of our study allow conclusions on which characteristics of screeners' working environment affect emotional exhaustion and job satisfaction, and are thus crucial for the security concept at airports. Additionally, we investigated WFC as an intervening variable in the JD–R model and examined indirect effects of workload and supervisor support on emotional exhaustion and job satisfaction among screeners.

The results supported our hypotheses. Consistent with Hypotheses 1 and 2, workload and supervisor support were confirmed as antecedents of emotional exhaustion and job satisfaction in screeners. Our results are in line with the assumptions of the JD–R model (Bakker and Demerouti, 2007) and with research findings in other occupational settings demonstrating the crucial role of the relation between workload and emotional exhaustion (e.g., Sonnentag et al., 2010; van Ruysseveldt et al., 2011). Screeners may try to maintain performance standards despite a high workload. This, in turn, may lead to an extensive expenditure of emotional energy and eventually to emotional exhaustion (Cordes and Dougherty, 1993). Consistent with Hypothesis 2 and findings from research in other occupational settings (e.g., Lewig and Dollard, 2003; Cortese et al., 2010; Biggs et al., 2014) we confirmed supervisor support as a predictor of job satisfaction among screeners. Supervisor support may supply the basic human need for affiliation and, as a consequence, may boost job satisfaction, and thus foster strong mental health.

In accordance with Hypothesis 3a, results supported the assumption that WFC is an intervening variable in the relationship between workload and emotional exhaustion in screeners. This is in line with research findings in other occupational settings (Peeters et al., 2004; Demerouti et al., 2005; Hall et al., 2010). High workload may deplete emotional resources among screeners and consequently give rise to WFC (cf. Semmer et al., 2010). WFC, in turn, may boost the experience of strain and subsequently lead to emotional exhaustion through impaired recovery (Geurts et al., 2003).

Moreover, in line with our Hypothesis 3b, WFC partially mediated the effect of supervisor support on job satisfaction. Employees' possibilities of gaining social support from their supervisor may well influence the motivational process, because supervisors may, directly or indirectly (e.g., through scheduling), support a family-friendly organization of work. This facilitates better adjustment and regulation and, in turn, reduces WFC. A good compatibility between family and work may, in turn, promote positive motivational outcomes such as high job satisfaction. These findings support and replicate recent empirical findings indicating the crucial role of supervisor support in WFC (Cortese et al., 2010; Muse and Pichler, 2011) and the important role of WFC in job satisfaction (Cortese et al., 2010; Amstad et al., 2011). Moreover, they broaden our knowledge on WFC in the stressor–strain chain by indicating a significant indirect effect of supervisor support on job satisfaction mediated via WFC. In previous research, this effect was either not tested statistically (e.g., Thompson et al., 2006; Yildirim and Aycan, 2008; Cortese et al., 2010; Lu et al., 2015) or non-significant (Ito and Brotheridge, 2012; Odle-Dusseau et al., 2012).

However, one could argue that the indirect effects could be considered as small, both in absolute terms and compared to the direct effects of workload and supervisor support on emotional exhaustion and job satisfaction. This is true, especially for the indirect effect of supervisor support on job satisfaction. However, this is not very surprising, because associations are often rather small in the social sciences and in non-experimental designs, and the product of these coefficients (i.e., the indirect effect) will, of course, be quite small as well (Berset et al., 2011). This indicates that many variables influence processes leading to emotional exhaustion and job satisfaction, including possible moderators (cf. Semmer et al., 1996). Therefore, we believe that our findings do enrich current research by indicating that WFC may play an additional role in the emergence of emotional exhaustion and job satisfaction among screeners. At the same time, the small indirect effect of supervisor support on job satisfaction highlights the need to explore other variables relating work and family as

explanatory mechanisms in the motivational process of the JD–R model. For instance, recent empirical evidence suggests that work–family enrichment could be an intervening variable in the motivational process as well (Odle-Dusseau et al., 2012; Lu et al., 2015).

Workload, supervisor support, and WFC explained a considerable amount of variance in screeners' emotional exhaustion (49%). This amount of explained variance is remarkable given the multifactorial conditionality of health- and well-being-related variables (Semmer et al., 1996). However, the amount of explained variance in job satisfaction was notably lower (15%). One possible explanation for this result is to be found in the medium-sized correlation between job satisfaction and emotional exhaustion. This substantial correlation between the dependent variables indicates that relevant amounts of variance in emotional exhaustion and job satisfaction may overlap; and, consequently, that a certain amount of common variance between the predictor variables and job satisfaction may be obscured by the substantial relations between the predictor variables and emotional exhaustion. Additionally, recent meta-analytic findings suggest that positive affect—as a major personality characteristic—is especially relevant in predicting affective (as compared to cognitive) job satisfaction (Kaplan et al., 2009). Because the measure of job satisfaction in the present study represents predominantly an assessment of affective job satisfaction, one can expect positive affect to be a major determinant, offering another explanation for the rather small effects of supervisor support and WFC on the respective measure of job satisfaction.

In addition to the effects assumed in Hypotheses 1 to 3, there were several significant crossover effects: (1) supervisor support was related directly to emotional exhaustion, indicating that the availability of social support from the supervisor leads to a direct decrease in emotional exhaustion. (2) Workload was related indirectly to job satisfaction, indicating that workload increases WFC, which, in turn, decreases job satisfaction. (3) Supervisor support was related indirectly to emotional exhaustion, indicating that supervisor support decreases WFC, which, in turn, increases emotional exhaustion. These crossover effects are in line with recent empirical evidence (e.g., Li et al., 2013; Goh et al., 2015) and indicate that it might not be suitable to strictly separate health-related and motivational processes when predicting emotional exhaustion and job satisfaction in screeners.

Strengths, Limitations, and Suggestions for Future Research

The main strength of this study is the theoretically grounded approach of integrating WFC into the JD–R model as an intervening variable. Additionally, we based our analysis on a large sample of screeners, thereby enabling us to draw first reliable conclusions on which factors relate to emotional exhaustion and job satisfaction in this occupational setting. We hope that our study can set the stage for further investigations of aviation security, because well-being-related factors have not yet been the focus of research despite their relevance for performance and thus for the security of airports.

Our results revealed the crucial role of supervisor support in the job satisfaction of screeners. However, we considered only its direct effects. It will be particularly important for future research to investigate the moderating effect of supervisor support in the relationships between workload, emotional exhaustion, and WFC (cf. Luk and Shaffer, 2005; Karatepe, 2010). In addition, previous research has pointed to the complicated nature of support and the role it plays in burnout (Cordes and Dougherty, 1993). Future research could identify which specific aspects of work social support (i.e., support stemming from coworkers, supervisors, or the organization) result in a reduction of burnout and WFC and contribute to job satisfaction, and then extend this approach by including sources of support in private life. Additionally, it would be interesting for future research to explore positive processes at the work–home interface such as work–family enrichment or facilitation as levers in the motivational process of the JD–R model (cf. Odle-Dusseau et al., 2012; Lu et al., 2015). Finally, it would be valuable to examine specific job demands of screeners (e.g., the need for constant attention to the task, interactions with difficult passengers) as predictors of their emotional exhaustion.

Our study did have several limitations: first, the present findings were based on a sample taken from just one organization, and more research will be needed before they can be generalized. Second, results on the relations between variables were based on cross-sectional data. Therefore, we could make no causal inferences, and reversed causalities may well be possible. Indeed, especially in the context of WFC research, the possibility of reversed causalities or reciprocal relationships (i.e., loss spirals) seems very plausible (Demerouti et al., 2004; van der Heijden et al., 2008). Third, we relied on self-report data, and this may inflate the associations between variables through common method variance (Podsakoff et al., 2003). Nonetheless, Semmer et al. (1996) have pointed out that substantive associations between working conditions and health remain after controlling for common method variance. However, longitudinal studies and an integration of both observational and physiological measures will still be needed to further validate our study results. Finally, we used a single item as an indicator of workload. Future research should explore the relations between workload, WFC, and emotional exhaustion based on a reliable multi-item measure of workload.

Practical and Theoretical Implications

Emotional exhaustion, job satisfaction, and the working conditions that influence them in screeners have not been a focus of research and health promotion in the past. Therefore, we hope that our study will set the stage for further investigations in this field. In view of the general need to promote the well-being and health of screeners along with the very specific need for aviation security, it is essential to engage in more research that can serve as a starting point for an appropriate health promotion of airport security staff.

From a practical perspective, our findings suggest that workload and supervisor support may play a crucial role in the emergence of emotional exhaustion and job satisfaction in screeners. They indicate that reducing the workload and promoting a supportive working environment may contribute to

preventing emotional exhaustion and promoting job satisfaction. Moreover, results obtained in this study strengthen earlier findings suggesting that WFC can be a risk factor for mental health problems such as emotional exhaustion and for motivational correlates such as job satisfaction. However, for aviation security staff, no work–life balance initiatives have been implemented so far. Therefore, it will be essential for aviation security organizations to take WFC into account in future workplace health promotion in order to decrease the risk of emotional exhaustion among screeners, to enhance their job satisfaction, and, as a consequence, to decrease the risk of further serious health problems and adverse organizational and societal outcomes. Workload and supervisor support turned out to be promising staring points, because they proved to be associated with emotional exhaustion and job satisfaction both directly and through the effect of WFC. However, workload is often difficult to reduce at short notice. Therefore, to reinforce the motivational and inhibit the health–impairing process, it is probably just as important to invest in social support processes as it is to try to reduce job demands. Supervisor support seems to be particularly important here, because screeners work under conditions in which other job resources (e.g., autonomy) are typically low and other sources of recognition and support (e.g., coworkers, customers) are typically available only to a limited extent.

From a theoretical point of view, the extension of the JD–R model seems to be particularly important. Recent studies have called for research to shed more light on the processes connecting working conditions and health-related or motivational outcomes in the JD–R model (Demerouti and Bakker, 2011; Fernet et al., 2013). WFC represents a promising extension of the JD–R model that may improve our understanding of the processes leading to emotional exhaustion and job satisfaction. It will, therefore, be important to clearly distinguish characteristics of the working environment (i.e., job demands and job resources) from confrontational states (i.e., WFC) as a consequence of these psychosocial workplace characteristics and as determinants of further health-related and motivational outcomes.

AUTHOR CONTRIBUTIONS

All authors substantially contributed to the conceptualization of the manuscript as well as to the aquisition, analysis, and interpretation of data. All authors critically revised the content of the manuscript repeatedly and approved the final version to be published. All authors agreed to be accountable for all aspects of the work. SB as the leading author contributed to the development of the questionnaire, the aquisition, analysis, and interpretation of data. SB was responsible for the conceptualization and the writing of the manuscript. AK predominantly contributed to the development of the questionnaire, the aquisition and interpretation of data. AK repeatedly revised and refined the content of the manuscript critically. AS predominantly contributed to the development of the questionnaire, the aquisition and interpretation of data. AS repeatedly revised and refined the content of the manuscript critically.

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How Changes in Psychosocial Job Characteristics Impact Burnout in Nurses: A Longitudinal Analysis

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Aims: The main aim of this longitudinal study was to test the Job Demand-Control-Support (JDCS) model and to analyze whether changes in psychosocial job characteristics are related to (changes in) burnout.

Background: Previous studies on the effects of JDCS variables on burnout dimensions have indicated that the iso-strain hypothesis (i.e., high job demands, low control, and low support additively predict high stress reactions) and the buffer hypotheses (i.e., high job control and/or social support is expected to moderate the negative impact of high demands on stress reactions) have hardly been examined concurrently in a longitudinal design; and that the effects of changes of psychosocial job variables on burnout dimensions have hardly been analyzed.

Design: This two wave study was carried out over a period of 14 months in a sample of 217 Italian nurses.

Method: Hierarchical regression analyses were used to test the cross lagged main and interactive effects of JDCS variables, and to analyse the across-time effects of changes in JDCS dimensions on burnout variables.

Results: The Time 1 job characteristics explained 2–8% of the variance in the Time 2 burnout dimensions, but no support for the additive, or the buffer hypothesis of the JDCS model was found. Changes in job characteristics explained an additional 3–20% of variance in the Time 2 burnout dimensions. Specifically, high levels of emotional exhaustion at Time 2 were explained by high levels of social support at Time 1, and unfavorable changes in demands, control, and support over time; high depersonalization at Time 2 was explained by high social support at time 1 and by an increase in demands over time; and high personal accomplishment at Time 2 was predicted by high demands, high control, interactive effect demands × control × social support, at Time 1, and by a decrease in demands over time. No reversed effects of burnout on work characteristics have been found.

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Conclusion: Our findings suggest that the work environment is subject to changes: the majority of employees experienced considerable changes in all job conditions over time. These changes impacted employee burnout. Limitations and implications of the study are discussed.

Keywords: burnout, nurses, job demands control support model, longitudinal study, change model

INTRODUCTION

A number of studies have shown that nurses, in the course of their careers, experience a great deal of stress that may have implications for their physical, and mental health status (McVicar, 2003; Cortese et al., 2010; Pisanti et al., 2011, 2015; Van Bogaert et al., 2014; Converso et al., 2015; Panagopoulou et al., 2015; Welp et al., 2015; Giorgi et al., 2016).

One of the most-researched long-term consequence of stress in nurses is burnout, which is defined as a multidimensional construct with three facets: emotional exhaustion, depersonalization, and lack of personal accomplishment (Maslach et al., 2001). Emotional exhaustion refers to feelings of being emotionally overextended and exhausted by one's work and contact with other people. Depersonalization refers to an unfeeling and impersonal response toward the recipients of one's care or service. Lack of personal accomplishment refers to a decline in one's feelings of competence and successful achievement in one's work. Burnout prevalence among nurses varies between 2 and 11% (Bourbonnais et al., 1999; Kilfedder et al., 2001; Schaufeli, 2007). Over the past decade its prevalence has increased substantially. The current economic crisis in Italy and other countries now forces nurses to work longer hours for lower pay, and there is also less job stability (Van Bogaert et al., 2009; Renzi et al., 2012; Canadas-De la Fuente et al., 2015). More recent studies have found higher percentages of nurses with high and moderate levels of burnout. For example, a study of Renzi et al. (2012) found that 46% of the nurses in their sample had elevated scores on emotional exhaustion.

Previous studies on the effects of psychosocial job variables on burnout dimensions have indicated that the iso-strain hypothesis (i.e., high job demands, low control, and low support *additively* predict high stress reactions) and the buffer hypotheses (i.e., high job control and/or social support is expected to moderate the negative impact of high demands on stress reactions) have hardly been examined concurrently in a longitudinal design. Moreover, most previous studies used a static approach focusing on the absolute level of psychosocial job characteristics at a given time point, neglecting that work conditions are likely to change (Roe, 2008; Schaufeli et al., 2009; Tang, 2014). To consider the dynamic nature of work conditions and its effects on well-being, we examined whether changes in work conditions have an unique effect on burnout dimensions that go above and beyond the static levels of work conditions.

Therefore, the main goal of this longitudinal study was to test the Job Demand-Control-Support (JDCS) model and to analyze whether changes in psychosocial job characteristics are related to (changes in) burnout.

The Job Demands Control Social Support Model

Psychosocial job characteristics may contribute to the incidence of burnout among health care employees (Schaufeli, 2007). Job demands, job control (skill discretion and decision authority), and social support from colleagues and supervisor are the core dimensions of the JDCS model (Johnson and Hall, 1988; Karasek and Theorell, 1990). The basic assumption of this model states that high job demands, low control, and low support *additively* predict high stress reactions (iso-strain hypothesis). On the one hand, researchers have focused on the buffer hypothesis, stating that high job control, and/or social support is expected to moderate the negative impact of high demands on stress reactions (Karasek and Theorell, 1990). This theoretical issue has an important implication for job redesign. A *buffer* effect of control and social support would lead to recommendations to increase job control and social support in order to decrease the detrimental effects of demands. On the other hand, if the "iso-strain" hypothesis is valid and poor well-being is the result of additive effects of demands, control, and social support, it would be insufficient to focus solely on the increment of job control and social support, with the high demands maintaining their unfavorable effect on employees health.

Several authors (van der Doef and Maes, 1999; de Lange et al., 2003; Häusser et al., 2010) reviewed the main assumptions of the JDCS model. Overall, a general conclusion from these reviews is that the additive hypotheses were most investigated and received more support than the buffer hypotheses.

Several studies have examined the main effects of the JDCS variables on burnout dimensions. These studies suggest that job demands (such as time pressure and workload) are a stronger predictor of emotional exhaustion and depersonalization than control but a weaker predictor of personal accomplishment than control (Lee and Ashforth, 1996; Schaufeli, 2007). Social support appears to be associated with each burnout dimension, although the relationship is less strong than in the case of job demands (Schaufeli, 2007). These findings were also confirmed in nursing populations (e.g., Proost et al., 2004; Bakker et al., 2005; Hochwalder, 2006, 2007). Reviewing the studies on nurses, Pisanti et al. (2012) found that the strain hypothesis was more frequently investigated than the buffer hypothesis: whereas 22 studies examined the additive effects of job demands and control only seven studies examined the interaction between these two psychosocial dimensions. Additive effects of demands and control were found in 7 of the 22 studies that tested this hypothesis, whereas only the study of De Rijk et al. (1998) found a buffer effect under condition of a third variable, i.e., active coping. In this study, control moderated the negative effects of job demands on emotional exhaustion only in the subsample of

nurses that showed higher values on active coping. In addition, the iso-strain hypothesis has been supported by the findings of three studies (Bourbonnais et al., 1999; Hochwalder, 2006, 2007) out of 12 that tested this hypothesis, whereas only one study (Proost et al., 2004) tested the three way interaction and found support only for personal accomplishment. Moreover, Pisanti et al. (2012) found that emotional exhaustion was the most frequently investigated burnout dimension (in e.g., Landsbergis, 1988; Bourbonnais et al., 1998, 1999; de Jonge et al., 1999; Tummers et al., 2002; Proost et al., 2004; Bakker et al., 2005; Schmidt and Diestel, 2010). Finally, two longitudinal studies (Bourbonnais et al., 1999; Gelsema et al., 2006) on nurses failed to support both hypotheses.

Although the longitudinal research designs are more suitable to draw conclusions concerning the causal relations among the study concepts than cross-sectional designs, we should acknowledge that the vast majority of existing longitudinal studies on job stress, and occupational strain focused on the influence of occupational stressors on a stress reaction at a later point in time (Taris and Kompier, 2003). For instance, a study among nurses (Ganster et al., 2001) found that, after controlling for the dependent variable at Time 1, neither the main effects of job demands, and control, nor their interactive term, accounted for significant portions of explained variance in mental health after 5 years. However, as suggested by several authors (e.g., de Lange et al., 2002; Roe, 2008; Boersma and Lindblom, 2009; Melamed et al., 2011; Schaufeli et al., 2011) the work environment is not a static phenomenon, it is dynamic, and susceptible to change. This is also shown by weak autocorrelations found in studies that analyzed the (normative) stability both of psychosocial job dimensions (e.g., Gelsema et al., 2006; Schaufeli et al., 2009; Adriaenssens et al., 2013) and burnout variables (e.g., Burisch, 2002; Rudman and Gustavsson, 2012).

A limited number of studies examine the influence of changes of psychosocial job dimensions on burnout outcomes. For example, in a longitudinal research with a 1–year time interval conducted among 201 Dutch telecom managers, Schaufeli et al. (2009) found that increases in job demands (i.e., overload, emotional demands, and work-home interference) and decreases in job resources (i.e., social support, autonomy, opportunities to learn, and feedback) were associated with increases of emotional exhaustion and cynicism over time. Likewise, Bourbonnais et al. (1999), in a sample of Canadian nurses, examined changes in the dimensions of the demand-control model, and found significant main effects of adverse changes in job strain condition (high demands and low control) across time, on emotional exhaustion over time. Finally, Gelsema et al. (2006), in a sample of nurses, found that an increase in job demands (i.e., workload and physical demands) was associated with increases in emotional exhaustion across time. In this latter study, the authors measured psychosocial job variables through an occupation specific measure.

Some authors (Kasl, 1996; Narayanan et al., 1999; van der Doef and Maes, 1999) have argued that generic measures to assess occupational stressors and resources might not adequately reflect the specific workplace conditions, and have pointed out the need for more occupation-specific assessment. They suggest that occupation-specific measurement of demands, control, and support could improve the explanatory and predictive power of the JDCS model (Kasl, 1996; van der Doef and Maes, 2002). Therefore, in the present study a measure to assess specifically nurse's job characteristics was used.

To recapitulate, the previous studies on the effects of JDCS variables on burnout have indicated four issues that we will deal with in the present research: (a) most of studies have examined the hypotheses of the JDCS model on emotional exhaustion, whereas the other two dimensions, depersonalization, and personal accomplishment, have been studied less frequently, (b) the iso-strain hypothesis and the buffer hypotheses have hardly been examined concurrently in a longitudinal design, (c) the effects of changes of psychosocial job variables on burnout dimensions are hardly examined, and (d) it would be advisable to adopt occupation-specific measures to examine the effects postulated by the JDCS model.

Research Hypotheses

On the basis of the theory and empirical studies described earlier, two hypotheses are addressed in this longitudinal study.

The first hypothesis deals with the prospective effects of the JDCS dimensions on burnout. After controlling for the effects of each Time 1 burnout dimension and demographic variables (age and gender), high job demands, low job control, and low social support at Time 1 will be additively associated with high levels of burnout at Time 2 (high scores of emotional exhaustion and depersonalization, low scores of personal accomplishment; *Hypothesis 1a*). Furthermore, in line with the JDCS model (Karasek and Theorell, 1990) the three-way interaction job demands, job control, and social support will explain a significant proportion of the variance in burnout. This interaction will indicate that high job control combined with high social support will buffer the impact of job demands on burnout (*Hypothesis 1b*).

The second hypothesis is concerned with the prospective effects of *changes* in JDCS variables on burnout. More specifically, we propose that increases in job demands and decreases in job control and social support (from Time 1 to Time 2) are associated with increases in emotional exhaustion and depersonalization and decreases in personal accomplishment (*Hypothesis 2*).

METHODS

Sample and Procedure

In line with the suggestions of some authors (e.g., de Lange et al., 2004; Boersma and Lindblom, 2009) who argued of taking into account in surveys on burnout an interval of at least 1 year between the study waves, a two-wave longitudinal study with a 14 months-time interval took place among nurses of an Italian academic hospital. The data collections were conducted in 2 months (March and May). During these months the hospitals are not particularly flooded with patients, as is the case in the months before and after summer, and the Christmas holidays. Finally, we checked whether important organizational changes (e.g., downsizing, re-organization) had taken place in the hospital. This was not the case in the 14 months interval between baseline and

follow-up. We approached subjects during workshops of the in-service training curriculum, and provided information about the purpose and design of the study. The voluntary nature of the study was emphasized. Data were collected by means of paper and pencil questionnaires. Sixty four subjects did not attend the courses for several reasons (e.g., they were not interested, or they were not available) and/or were not available to participate to survey. For privacy reasons, personal data of this group were not available. At both measurement times, we asked the respondents to generate an anonymous code. By means of this code we were able to link the questionnaires at both points in time. In Italy, ethical approval from the ethics committee of participating hospitals is required, and approval was granted by the ethics committee of S. Maria Hospital, Terni, Italy.

The study population consisted of 287 nurses from an Italian hospital. All nurses worked on a permanent basis. At Time 1, 264 (92%) usable questionnaires were returned. At Time 2, 217 (drop out 47 = 19%) questionnaires were returned. Our final study sample consisted of these 217 nurses who filled out both questionnaires (response rate of 76% of the initial group). Of these respondents, the majority was female (84%). The mean age was 42.7 years (SD = 7.2; range = 28–56). On the average the respondents had been working in a health care setting for 17.0 years (SD = 9.1; range = 1–37). Participants who completed both questionnaires and those who only participated in the baseline survey did not differ significantly on any demographic variable (age, gender, education, number of cohabitating children), or psychosocial job characteristic (JDCS), or burnout dimension.

Measures

Demographic Variables

Age was measured in years and gender was categorized as 1 = male and 2 = female.

JDCS Variables

These variables were measured with three scales of the Italian version of the Leiden Quality of Work Life Questionnaire for Nurses (LQWLQ-N; Maes et al., 1999; Pisanti, 2007; Pisanti et al., 2009). These three LQWQ-N scales provide an occupation-specific measurement corresponding closely to the original operationalization of job demands, control, and social support in the Job Content Instrument (JCI; Karasek, 1985). Responses are measured on a 4-point scale ranging from 1 (*totally disagree*) to 4 (*totally agree*). Job demands were measured with one scale (work and time pressure: 4 items; e.g., "I must care for too many patients at once"). Control was assessed using a composite scale of skill discretion (4 items; e.g., "My work is varied.") and decision authority (4 items; e.g., "I can decide for myself when to carry out patient-related tasks and when to carry out non-patient-related tasks."). According to Karasek and Theorell (1990) skill discretion and decision authority are theoretically and empirically closely related and therefore often combined in one scale. A composite measure is frequently used in research on the JDCS model, also in studies on nurses (e.g., Bourbonnais et al., 1998; Bakker et al., 2005). Perceived emotional and practical social support was assessed with two subscales: social support from supervisor (6 items; e.g., "I can count on the support of my direct supervisor when I face a problem at work.") and social support from co-workers (6 items; e.g., "The nurses in my department work well together."). Inspired by the papers of Bourbonnais et al. (1999) and Karasek (1985), both scales were integrated into one social support scale.

To examine the factorial structure of three scales of LQWLQ-N, we conducted principal component analysis (PCA) both at Time 1 and at Time 2. In both cases PCA revealed the presence of three factors explaining 50% of the variance at Time 1 and 56% of the variance at Time 2. In both cases an inspection of the scree plot revealed a clear break after the third component. These results were further supported by the results of parallel analysis, which in both measurements showed three dimensions with eigenvalues exceeding the corresponding criterion values for a randomly generated data matrix of the same size.

Burnout

Burnout was assessed by the Italian version (Pisanti et al., 2013) of the 20-item Maslach Burnout Inventory Human Service Survey (MBI-HSS; Maslach et al., 1996) which contains the three subscales: emotional exhaustion (8 items; e.g., "I feel emotionally drained from my work."); depersonalisation (5 items; e.g., "I don't really care what happens to some patients") and personal accomplishment (7 items; e.g., "I deal very effectively with the problems of my recipients."). Participants were asked to rate from 0 (*never*) to 6 (*daily*) how often they experienced feelings described in each of the 20-items.

To analyze the factorial structure of the MBI-HSS, we carried out principal component analysis (PCA) both at Time 1 and at Time 2. In both cases PCA revealed the presence of three factors explaining 56% of the variance at Time 1 and 51% of the variance at Time 2. In both cases an inspection of the scree plot showed a clear break after the third component. These results were further supported by the results of parallel analysis, which in both measurements revealed three dimensions with eigenvalues exceeding the corresponding criterion values for a randomly generated data matrix of the same size.

Data Analysis

The hypotheses were tested in hierarchical regression analyses. Five blocks of variables were created (see **Table 2**).

In the first block we controlled for the variables gender and age. Moreover, we included in the first block the outcome measured at Time 1. The second block concerned the main effects of job demands, job control, and social support measured at Time 1. Subsequently, the two way (third block) and three way interactions (fourth block) between the JDCS variables measured at Time 1 were considered in the model. To avoid multi-collinearity and to facilitate the interpretation of the interaction terms, the scores on the job conditions were standardized before analysis (Cohen et al., 2003).

The second hypothesis focused on across-time changes in burnout as a function of the changes of JDCS dimensions across time. First, in line with Taris (2000) and Smith and Beaton (2008), a change score (the residual score derived by regressing each psychosocial job condition measured at Time 2 on the corresponding Time 1 score) was computed for each job

condition. Next, in the final step of the hierarchical regression analyses, the change scores of each JDCS variable were entered.

Following the suggestions of Becker (2005) and Spector and Brannick (2011), we first checked the influence of the control variables gender and age on the final models. We ran the analysis with and without the control variables. Since the pattern of results was largely similar, we reported the findings of the more parsimonious model without control variables. Moreover, in line with the suggestions of Ford et al. (2014), we also considered the potential dynamics of reverse causation effects, thus we reversed the relationships of the hypothesized model psychosocial job dimensions T1 predicting Burnout variables T2, to test a reverse causation model, i.e., the Time 1 burnout dimensions explaining the Time 2 psychosocial job dimensions controlling for the psychosocial job dimensions at Time 1.

RESULTS

Descriptive data and zero-order Pearson correlations of the study variables are displayed in **Table 1**. All scales measuring the study variables displayed acceptable levels of reliability (alpha coefficients ranged from 0.67 to 0.96). Furthermore, **Table 1** shows that the auto-correlations of the JCDS variables between Time 1 and Time 2 vary from 0.35 (Job Control) to 0.48 (Social Support), indicating small, or moderate levels of auto-correlation. This finding supports the above mentioned argument that the psychosocial job variables are not very stable over time. The same applies to the burnout variables, showing T1–T2 auto-correlations ranging from 0.32 (Personal Accomplishment) to 0.53 (Emotional Exhaustion).

Testing the Additive and Interactive Effects of the JDCS Model

Regarding emotional exhaustion, the results in **Table 2** show that Time 1 emotional exhaustion (Beta = 0.49, $p < 0.001$) accounted for 24% of the variance in Time 2 emotional exhaustion [$F_{change(1,\ 183)} = 58.8$, $p < 0.001$]. In the second block, the inclusion of the main effects of Time 1 JDCS variables did not significantly improve the prediction of Time 2 emotional exhaustion [2% of explained variance, $F_{change(3,\ 180)} = 1.6$, $p > 0.05$] (Hypothesis 1a was not supported). However social support measured at Time 1 revealed a significant association (Beta = 0.14, $p < 0.05$) with emotional exhaustion measured at Time 2. In contrast to our assumption, social support had a positive effect on emotional exhaustion. Inclusion of the Time 1 JDCS two-way (Block 3) and three-way interactions (Block 4) did not significantly improve the prediction of Time 2 emotional exhaustion (Hypothesis 1b was not supported).

As concerns depersonalization, the first block [$F_{change(1,\ 186)} = 39.5$, $p < 0.001$, $\Delta R^2 = 21\%$] and the second block [$F_{change(3,\ 183)} = 3.9$, $p < 0.05$, $\Delta R^2 = 2\%$] accounted for significant variance in Time 2 depersonalization. Time 1 depersonalization was the most important predictor by far (Beta = 0.48, $p < 0.001$). In the second block, social support measured at Time 1 showed a positive association (Beta = 0.17, $p < 0.05$) with depersonalization measured at Time 2. (Hypothesis 1a was not supported). Also in this case, inclusion of the Time 1 JDCS two-way (Block 3) and three-way interactions (Block 4) did not significantly improve the prediction of Time 2 depersonalization (Hypothesis 1b was not supported).

Finally, personal accomplishment was mainly predicted by variables included in the Block 1, Block 2, and Block 4. The effect of Time 1 personal accomplishment (Beta = 0.41, $p < 0.001$) accounted for a significant proportion of the variance in the outcome variable [$F_{change(1,\ 186)} = 37.1$, $p < 0.001$, $\Delta R^2 = 17\%$]. Inclusion of the main effects of Time 1 JDCS variables improved the prediction of Time 2 personal accomplishment significantly by 8% [$F_{change(3,\ 183)} = 6.8$, $p < 0.001$, $\Delta R^2 = 8\%$]. Both Time 1 job demands (Beta = 0.23, $p < 0.001$) and Time 1 job control (Beta = 0.22, $p < 0.01$) were associated with Time 2 personal accomplishment. High job demands and high job control at Time 1 were associated with high personal accomplishment at Time 2 (Hypothesis 1a was not supported). Inclusion of the Time 1 two-way interactive effects (Model 3) did not significantly improve the prediction of Time 2 personal accomplishment. In block 4 the three-way interactive term demands × control × social support measured at Time 1 accounted for a significant additional proportion of variance [$F_{change(1,\ 179)} = 6.5$, $p < 0.001$, $\Delta R^2 = 3\%$]. The significant interaction effect was graphically represented according to the method described by Cohen et al. (2003). **Figure 1** shows that the interaction pattern (Beta = 0.20, $p < 0.05$) was synergistic or enhancing (Cohen et al., 2003): The highest sense of personal accomplishment was observed for nurses who perceived high demands, high control, and high social support. No support was found for a combined buffering effect of job control and social support on job demands (Hypothesis 1b was not supported).

All effects of the reverse causation models were non-significant, indicating that there was no evidence for any reverse causation.

Testing Associations between Changes in JDCS Dimensions and Changes in Burnout

Regarding our second hypothesis, the analyses in **Table 2** (Block 5) indicated to what extent changes in psychosocial job variables are associated with changes in the burnout outcomes. Controlling for the initial burnout dimension and for baseline job characteristics, the blocks that included the changes in job conditions explained significant additional variance in all outcomes measured at Time 2. The change scores explained an additional 20% of the variance in emotional exhaustion at Time 2 [$F_{change(3,\ 173)} = 23.9$, $p < 0.001$]. Those employees who showed an increase in job demands (Beta = 0.13, $p < 0.05$) and a decrease in job control (Beta = −0.29, $p < 0.001$) and social support (Beta = −0.22, $p < 0.005$) over time, reported more emotional exhaustion at Time 2 (Hypothesis 2 was supported). With regard to depersonalization, the block with change scores accounted for an additional 10% of variance [$F_{change(3,\ 176)} = 8.9$, $p < 0.001$). The results showed that an increase in job demands (Beta = 0.30, $p < 0.001$) was associated with an increase of depersonalization over time (Hypothesis 2 was only supported for demands). Regarding

TABLE 1 | Means (*M*), standard deviations (*SD*), internal consistencies (Cronbach's α), and zero-order correlations of the study variables (*N* = 217).

Variable	*M*	*SD*	α	1	2	3	4	5	6	7	8	9	10	11	12	13
BACKGROUND VARIABLES																
(1) Gender[a]	–		–	–												
(2) Age	42.7	7.2	–	−0.10	–											
TIME 1																
(3) JD	2.8	0.6	0.71	0.09	−0.08	–										
(4) JC	2.7	0.5	0.80	−0.05	0.16*	−0.13	–									
(5) SS	2.7	0.6	0.86	−0.15*	0.10	−0.16*	0.39***	–								
(6) EE	2.5	1.3	0.89	0.20**	0.11	0.19**	−0.34***	−0.25***	–							
(7) DP	1.1	1.1	0.72	−0.18**	0.03	0.17*	−0.22**	−0.05	0.42***	–						
(8) PA	4.4	1.1	0.87	0.03	0.05	−0.02	0.24***	0.01	−0.16*	−0.41***	–					
TIME 2																
(9) JD	2.7	0.6	0.79	0.16*	−0.04	0.37***	−0.22***	−0.09	0.17*	0.04	−0.05	–				
(10) JC	2.7	0.4	0.76	−0.05	−0.03	0.06	0.35***	0.37***	−0.19**	−0.08	0.10	−0.13	–			
(11) SS	2.7	0.5	0.88	−0.03	−0.03	−0.06	0.23***	0.48***	−0.15*	0.01	0.08	−0.16*	0.45***	–		
(12) EE	2.8	0.9	0.83	0.24***	0.20**	0.08	−0.18*	0.02	0.53***	0.18*	−0.20**	0.25***	−0.33***	−0.30***	–	
(13) DP	1.1	0.8	0.67	−0.22***	−0.11	−0.01	0.08	0.12	0.11	0.36***	−0.28***	0.25***	−0.07	0.03	0.17*	–
(14) PA	4.1	0.7	0.76	0.17*	0.04	−0.17*	0.32***	0.16*	−0.14*	−0.25***	0.32***	−0.13	0.29***	0.19**	−0.12	−0.36***

[a]*Male, 1; Female, 2. *p < 0.05; **p < 0.01; ***p < 0.001. JD, Job demands; JC, Job control; SS, Social support; EE, Emotional exhaustion; DP, Depersonalization; PA, Personal accomplishment.*

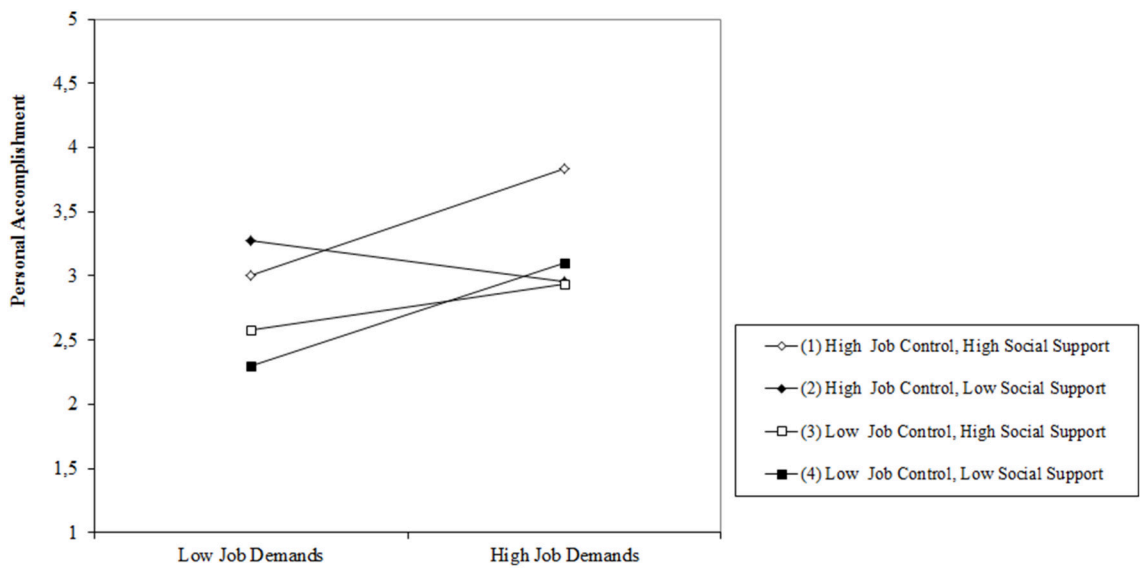

FIGURE 1 | Job demands × job control × social support, predicting personal accomplishment.

personal accomplishment, again the changes in job conditions between T1 and T2 contributed significantly to the (change in) personal accomplishment at T2. The block including the change scores accounted for an additional 3% of the variance [$F_{change(3,\ 176)} = 2.5$, $p < 0.05$): a decrease in job demands (Beta $= -0.14$, $p < 0.05$) was related to an increase in personal accomplishment over time. Also in this case Hypothesis 2 was only supported for demands: across-time changes in job demands were associated with changes in personal accomplishment over time.

DISCUSSION

Firstly, we hypothesized that high demands, low control, and low social support (all measured at Time 1) would longitudinally contribute to high burnout (high emotional exhaustion, depersonalization, and low personal accomplishment, all measured 14 months later—Time 2). In line with previous longitudinal studies (e.g., Gelsema et al., 2006; Adriaenssens et al., 2013) our results did not support *Hypothesis 1a*. Probably the influence of psychosocial job dimensions have on each

TABLE 2 | Results of hierarchical regression analyses examining the effect of the burnout dimension measured at time 1, psychosocial job dimensions measured at time 1, and changes in psychosocial job dimensions between Time 1 and Time 2 on the three burnout dimensions assessed at Time 2 ($N = 217$).

Variables	Emotional exhaustion at time 2	Depersonalization at time 2	Personal accomplishment at time 2
Burnout dimension T1	**0.49*** **	**0.48*** **	**0.41*** **
Block 1 ΔR^2	**0.24*** **	**0.21*** **	**0.17*** **
Burnout dimension T1	**0.49*** **	**0.47*** **	**0.32*** **
Demands T1	−0.01	−0.08	**0.23*** **
Control T1	−0.11	0.07	**0.22** **
Social support T1	**0.14***	**0.17***	0.06
Block 2 ΔR^2 (R^2)	0.02 (26)	**0.02*** (0.23)	**0.08*** **(25)
Burnout dimension T1	**0.51*** **	**0.46*** **	**0.32*** **
Demands T1	−0.04	−0.09	**0.22** **
Control T1	−0.10	0.08	**0.21** **
Social support T1	**0.14***	**0.16***	0.06
Demands T1 × Control T1	0.12	0.09	0.00
Demands T1 × Social support T1	−0.12	−0.11	0.08
Control T1 × Social support T1	−0.08	0.00	−0.02
Block 3 ΔR^2 (R^2)	**0.03*** (29)	0.01 (0.24)	0.01 (26)
Burnout dimension T1	**0.53*** **	**0.47*** **	**0.33*** **
Demands T1	−0.05	−0.10	**0.21** **
Control T1	−0.07	0.10	**0.27*** **
Social support T1	**0.15***	**0.16***	0.09
Demands T1 × Control T1	0.06	0.04	−0.08
Demands T1 × Social support T1	−0.11	−0.10	0.09
Control T1 × Social support T1	−0.03	0.05	0.06
Demands T1 × Control T1 × Social support T1	0.13	0.12	**0.20***
Block 4 ΔR^2 (R^2)	0.01 (30)	0.00 (0.24)	**0.02***(0.28)
Burnout dimension T1	**0.48*** **	**0.47*** **	**0.32*** **
Demands T1	−0.04	0.09	**0.20** **
Control T1	−0.08	0.08	**0.25** **
Social support T1	**0.22*** **	**0.15***	0.07
Demands T1 × Control T1	0.12	0.01	−0.08
Demands T1 × Social support T1	−0.07	−0.09	0.08
Control T1 × Social support T1	−0.04	0.06	0.06
Demands T1 × Control T1 × Social support T1	0.12	0.14	**0.20***
Δ Demands	**0.13***	**0.32*** **	**−0.14***
Δ Control	**−0.29*** **	−0.13	0.10
Δ Social support	**−0.22*** **	0.06	0.02
Block 5 ΔR^2(R^2)	**0.20*** **(50)**	**0.11*** ** (0.35)**	**0.03*** (0.31)
R^2	**50**	**0.35*** **	**0.33**
Adj *R*	**0.48**	**0.31**	**0.30**
Full Model	**$F_{(11, 184)} = 12.59$**	**$F_{(11, 187)} = 5.99$**	**$F_{(11, 187)} = 7.30$**

*The standardized regression coefficients (Beta's) are reported, the bold values are significant at *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; Block n DR^2, R Square Change. Δ Demands, Δ Control, Δ Social Support: changes scores in Demands, Control, and Social support.*

burnout variable is already accounted for by the inclusion of the baseline burnout score. The three burnout dimensions appeared differentially related to the hypothesized cross lagged main effects of demands, control, and social support.

Concerning the core dimensions of burnout (emotional exhaustion and depersonalization; Breso et al., 2007) the results showed that the employees, who experienced high levels of social support at Time 1, revealed higher levels of emotional exhaustion and depersonalization at Time 2. These results were not in line with our hypothesis. However, several studies have shown that under certain circumstances high levels of social support could have negative effects (de Jonge and Schaufeli, 1998; Wallace, 2005; Johnston et al., 2013). In line with the stress transfer theory (Karasek et al., 1982) less strained people could assimilate the strain of colleagues more stressed. In other words, in situations with strong social bonds, individuals may absorb more feelings of stress from those around them rather than be protected from stress (Karasek et al., 1982; Wallace, 2005; Johnston et al., 2013).

We should note that among the JDCS variables, contrary to our hypothesis and literature mentioned in the introduction (Lee and Ashforth, 1996; Schaufeli, 2007), job demands did not show a significant cross lagged association with emotional exhaustion and depersonalization. This result can be explained on the basis of the findings of Teuchmann et al. (1999). They found that job demands (operationalized in terms of time pressure as in the present study) fluctuated in parallel with emotional exhaustion over time. Likewise, in the present study we found significant cross sectional associations between job demands and emotional exhaustion both at Time 1 and at Time 2, suggesting that these two dimensions fluctuate concomitantly over time.

Finally, with respect to personal accomplishment, we found that, after controlling for personal accomplishment measured at Time 1, high levels of job demands and control (measured at Time 1) were significantly cross lagged related with high levels of personal accomplishment measured at Time 2. These findings do not support our Hypothesis 1a: only the relationship between job control and personal accomplishment was in line with our predictions. However, the positive association between high levels of demands and personal accomplishment has been previously reported (van Vegchel et al., 2004; Lee and Akhtar, 2007), and can be explained as follows. When high job control occurs in conjunction with high job demands ("active job"), it is hypothesized that employees are able to deal with these demands, protecting them from excessive strain, fostering in them feelings of learning and of mastery, and leading them to positive states, such as motivation and personal accomplishment (Karasek and Theorell, 1990).

Beyond the main effects previously discussed, we found a small but significant three-way interaction effect between job demands, job control, and social support on personal accomplishment. However, the pattern of conditional relationships was not consistent with our hypothesis (moderating pattern). The strength of the relationship between job demands measured at Time 1 and personal accomplishment measured at Time 2 increased as the values of job control and social support (both measured at time 1) increased. Thus the pattern was synergistic. This means that nurses, who perceived high job demands and high job control (previously described "active jobs") in conjunction with high social support at Time 1, experienced more personal accomplishment at Time 2, then their colleagues who experienced high job demands, high job control, and low social support at time 1 (simple slope test: $t = 2.76$, $p < 0.01$).

Although we adopted a specific measurement of the JDCS variables for nurses, hypothesis 2b was not supported in our study. This finding is in line with Taris (2006), who concluded that full support for the buffer hypothesis was found in a small percentage of studies, little more than chance level. The available evidence suggests that the moderating effect is an exception rather than the rule. The inconsistencies in demonstrating interaction effects between job demands and job resources may also be due to a lack of match between the kind of occupational stressors examined in combination with a specific form of job resource (job control and/or social support). de Jonge and Dormann (2006) argued that stressors and resources need to address similar domains of functioning (i.e., cognitive, emotional, physical) in order to interact in the prediction of domain specific strains.

Inclusion of changes in job conditions (Δ Demands, Δ Control, and Δ Social support) improved the prediction of burnout dimensions (3–20% of additional explained variance). Differential patterns of relationships between (changes in) job conditions and (changes in) burnout dimensions were found. In accordance with other longitudinal studies conducted among nurses in other countries (Bourbonnais et al., 1999; Burisch, 2002; Gelsema et al., 2006), changes in emotional exhaustion were most strongly influenced by increases in job demands and decreases in both job control and social support. This final model explained 50% of the variance in emotional exhaustion. With respect to depersonalization, the full model explained 35% of variance and the only significant predictor was changes in job demands: more specifically increases in job demands were associated with increases in depersonalization at Time 2. Finally, as regards personal accomplishment, the full model explained 33% of the variance. Decreases in job demands across time were associated with higher levels of Time 2 personal accomplishment. Furthermore, we can see a seemingly contradictory effect of job demands and change in demands on personal accomplishment. However, as suggested in a recent paper by Warr and Inceoglu (2012), high levels of job demands and challenges can be attractive for employees with higher levels of personal accomplishment and higher engagement in a job, "...leading them to become drawn in and still more energized." (page 131). Over time, increases of job demands could be deleterious leading employees to drain their feelings of personal accomplishment. Overall, this pattern of results suggests that an increase over time of job demands tends to result in elevated levels of all dimensions of burnout over time (high emotional exhaustion, depersonalization, and low personal accomplishment); however, only for emotional exhaustion the changes in job control and in social support seem to have a detrimental effect. This finding is in line with the general literature on burnout (Schaufeli, 2007): among all burnout dimensions, emotional exhaustion seems most strongly influenced by the psychosocial job conditions.

Strengths and Limitations

A first strength of the present study is that we tested our hypotheses in a two-wave panel research. Secondly, we focused on the effects of changes in the JDCS variables on (changes) in burnout. Longitudinal studies in this specific area appear to be rather scarce (e.g., Taris and Kompier, 2003), and have seldom investigated the influence of changes in psychosocial job characteristics on (changes in) burnout levels. Overall, our findings are in line with previous studies (Boersma and Lindblom, 2009; Schaufeli et al., 2011) which have shown how psychosocial job dimensions and burnout variables can be explained by a component reflecting stability and a component reflecting change in these constructs. Moreover, our results support the validity of the theoretical models postulating a causal link between changes in psychosocial job characteristics and (changes in) burnout dimensions. These results also suggest that improvements in psychosocial job variables through organizational interventions can have positive effects on nurse's burnout. Finally, our findings about the reverse causation effects are largely consistent with a recent quantitative review (Tang, 2014). The author found a weak evidence in support of a positive strain (emotional exhaustion and depersonalization)-to-job demands effect, but he did not find any support for either a strain-to-job control or for a strain-to-workplace social support effect.

Two limitations of the study should be noted. Firstly, the current data set was drawn from a specific group of employees (nurses, all working for the same organization). Organizational macro processes (Giorgi et al., 2015) such as culture (Schneider et al., 2013) and climate (Giorgi, 2012; Schneider et al., 2013) dimensions may affect both psychosocial job dimensions and burnout variables. However, de Lange et al. (2003) have concluded in their review that studies based on heterogeneous populations do not provide more support for the JDCS hypotheses than studies based on homogeneous samples "..this suggests that homogeneous populations provide enough true individual and within-occupation variation in job characteristics (i.e., provide enough exposure contrast) to be as useful as heterogeneous samples in testing the DCS model." (de Lange et al., 2003; page 300). Nevertheless, the specific nature of the present sample underlines the need to replicate the current findings on different occupational groups. Secondly, although two-wave longitudinal designs offer better opportunities for testing cross lagged associations than cross sectional studies, a more comprehensive examination of the cross-lagged relations between psychosocial job variables and burnout would require a multi-wave study to get more insight into the process regarding the impact of changes of psychosocial job characteristics on (changes in) burnout dimensions (Taris and Kompier, 2003).

In agreement with these reservations, it seems important that future longitudinal multi waves research analyzes the hypotheses presented in this study in different occupational groups.

Implications

The present study found evidence for longitudinal relationships between JDCS variables and occupational burnout. The results are encouraging because they suggest that job redesign interventions, focusing on improvement of psychosocial job characteristics may be an effective tool to prevent and reduce burnout.

According to Schalk et al. (2010), these improvements could be achieved by organizational interventions such as changing routines/responsibilities, organizing team meetings, and training in leadership qualities for supervisors (providing feedback and support, coaching). These strategies may augment nurse's job resources such as job control and social support. Moreover taking into account the positive cross lagged associations between social support and the core dimensions of burnout (emotional exhaustion and depersonalization), occupational health psychologists should pay attention to optimize the quality of teambuilding inside the nurses teams. These interventions should be integrated into current management activities. We should bear in mind that these intervention strategies are more effective if they are permanent rather than temporary and occasional: managing work-related stress is not a one-off activity but part of a continuing cycle of good management at work and of the effective management of occupational stress and well-being.

In conclusion, our study underlines the importance of investigating the associations between the changes in psychosocial job variables and the (changes in) burnout dimensions, across time. Even after controlling for demographic variables, burnout, and psychosocial job characteristics at Time 1, the effects of changes in psychosocial job variables on changes in burnout dimensions remained of interest. Thus, it appears that in future research more attention for this phenomenon is warranted, and also across time development in psychosocial job variables should be examined rather than focusing solely on their "static" effects. From a practical point of view, these findings suggest that interventions to promote favorable psychosocial changes may positively influence employees' levels of burnout. A next step would be to conduct experimental studies (Le Blanc et al., 2007) to examine whether through favorable changes in psychosocial job characteristics, burnout can be prevented or reduced.

AUTHOR CONTRIBUTIONS

RP conceived and designed this study, collected, and analyzed the data and wrote the paper. MV contributed to writing the paper. SM, LM, DL, and CV were involved in data acquisition. RP, MD, and LM, were involved in the statistical analyses for the project. RP, MV, LM, SM, DL, and CV agree to be accountable for all aspects of the work specifically to responding to questions related to the accuracy or integrity of any part of the work.

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The Buffering Effect of Workplace Resources on the Relationship between the Areas of Worklife and Burnout

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Background: Workplace resources are found to play a major role in the stress–strain relationship. However, usually different types of resources are investigated, whereas investigating different facets of stress ("stressors") receive less attention in research about the relationship between stress, strain and resources. Based upon recent research, we expected that workplace resources moderate the relationship between stressors (operationalized with the areas of worklife) and long-term strain (operationalized with three dimensions of burnout) in the sense that workplace resources buffer the negative effects of stressors on strain.

Method: Hypotheses were tested in a longitudinal sample of 141 Austrian workers, who participated two times in an online study over a period of 6 months. Hierarchical multiple regression analysis was used to test the proposed relationships.

Results: The results imply that workload and reward seem to be the most important predictors for burnout. Workload is important for emotional exhaustion, whereas reward is important for cynicism. Value-fit at the workplace plays a significant role for cynicism, but only if resources at the workplace are high. Further moderating effects of resources were found for the outcome personal accomplishment. More specifically, results indicate that having high resources in a high workload environment increases personal accomplishment after a time interval of 6 months. In addition, employees experiencing high levels of control but low workplace resources show less personal accomplishment.

Conclusion: Despite the limiting aspects of the relatively short period of time we can see that resources can buffer workload effects. This should be taken into consideration when doing risk assessments in practice as work design should focus on resources even more when high workload can be found.

Keywords: burnout, longitudinal, strain, stress, workplace resources

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INTRODUCTION

Workplace resources have an essential influence on the stress–strain relationship. Previous studies on buffering effect of resources on the stress–strain relationship mainly used a summarized factor of stress (e.g., high job demands) to predict negative work-related outcomes such as strain. This more global view of stress only scratches the surface in research on the stress–strain relationship.

However, authors emphasize that different types of stress have to be analyzed to get a better understanding about stress and strain (Bakker et al., 2005). Paradoxically, research around the stress–strain framework tends to investigate the moderating effects of different types of resources (e.g., social support, feedback, latitude) more deeply than the effects of different stress factors (e.g., Xanthopoulou et al., 2007; van den Tooren and de Jonge, 2012). Our study focuses on this complex subject and investigates the effects of different facets of stress (as we will call it later on synonymously stressors) and their interaction with workplace resources on strain.

Stress and Strain at the Workplace

In the long tradition of stress research, the terms stress and strain are often used interchangeably. A strict way to differentiate between them was introduced in the norm series of the ISO 10075 (ISO, 2000a,b, 2015). As we can see norms as the current status of scientific knowledge we therefore refer to these definitions in this text. The norm ISO 10075-1 (ISO, 2000a, p. 3; s.a. Demerouti et al., 2002; Zoni and Lucchini, 2012), defines mental stress and strain as follows: mental stress is the "*. . .total of all assessable influences impinging upon a human being from external sources and affecting that person mentally*" and mental strain is defined as the "*. . .immediate effect of mental stress within the individual depending on their current condition.*" Thus, the norm summarizes the objective stressors under the term "stress" and the outcome of these stressors (e.g., the individual evaluation of these stressors) as "strain." The consequences of strain can be further differentiated into short-term and long-term effects of strain. Short-term effects compass mental fatigue, monotony, satiation and stress sensations (Demerouti et al., 2002). Long-term effects of strain result from repeated exposure to strain. One important chronic reaction to prolonged impairing strain would be burnout which is now mentioned especially in the upcoming norm of the ISO 10075-1 (ISO, 2015).

The definition of stress is similar to the definition of "job demands" (Bakker et al., 2005), as job demands are described as physical, mental, social, or organizational aspects of the job that require sustained effort/skills and are associated with physiological and psychological costs (as in the concept of Meijman and Mulder, 1998). Bakker et al. (2005) emphasize that job demands are not necessarily negative and can influence positive outcomes (e.g., engagement) as well.

Stress is a neutral term and does not bear a negative (or positive) connotation. In the ISO 10075-1 (ISO, 2000a), stress is seen as a total value that results by summarizing all influences at the workplace – whether they have negative effects or not. However, it is possible to distinguish different stressors that might have different short-term or long-term outcomes. Rohmert (1984) distinguishes quantifiable and non-quantifiable stressors. In his view, quantifiable stressors compasses noise, temperature or air pressure. Non-quantifiable stressors usually results from working tasks and includes time pressure, monotony or responsibility.

One classification of stressors is stated in the ISO 10075-1 (ISO, 2000a, p. 4), which categorizes stress in following categories: task requirements, physical conditions, social and organizational factors, and societal factors. The ISO concept therefore focuses to a system of stressors which can lead to a variety of possible outcomes, negative but also positive ones. The main strength of this model lies in the strict distinction between stressors and the effects. As positive outcomes (e.g., practice effects or competence development) are also possible it is not meaningful to classify stressors as "good" or "bad," the consequences of stress are "depending on an individual's personal resources and his/her perception of the situation" (Demerouti et al., 2002, p. 425).

A framework that compasses different stressors which are seen as potential risk factors especially for burnout can be seen in the concept of the areas of worklife (Maslach and Leiter, 2008). In this concept, six domains of the work environment have been identified that can serve as "organizational risk factors" (Maslach and Leiter, 2008, p. 500) for negative work-related outcomes, such as burnout: workload, control, reward, community, fairness, and values.

The area of workload is described as experiencing qualitative and quantitative work overload that depletes the person's capacity to meet the demands of the job. Control means having sufficient latitude at work and having possibilities to make important decisions. Reward refers to financial and non-financial reward (e.g., recognition from colleagues, supervisors and clients) for the employees' work contributions. Community is the overall quality of social interactions of work. The area of fairness describes the extent to which decisions at work are perceived as fair. Finally, values (or value-congruence) describes the match of the employees' and organizations' job goals and expectations (a full description can be found, e.g., in Maslach and Leiter, 2008).

In all six areas, discrepancies between person and work environment can occur which are described as mismatch (Maslach and Leiter, 2008). In other words, these six areas are able to reveal critical work conditions. On the other hand, they serve as prevention factors for negative work-related outcomes if they are evaluated positively (Laschinger et al., 2015; Boamah and Laschinger, 2016). Especially the area of values is found to have an essential effect on work-related outcomes such as burnout (emotional exhaustion, cynicism, and personal accomplishment) and turnover intention (Leiter and Maslach, 2005, 2009; Leiter et al., 2009). A conflict between individual and organizational values leads to less engagement with the tasks, as work is perceived as personally irrelevant (Leiter and Maslach, 1999). This reduced involvement depletes the employees' energy and contributes to exhaustion and cynicism.

The areas of workload and reward are important predictors for emotional exhaustion and cynicism, respectively (Leiter and Maslach, 2009). A lack of (financial or non-financial) reward leads to feelings of inefficacy and meaninglessness and this in turn contributes to cynicism (Cartwright and Holmes, 2006). High workload prevents employees from adequate recovery which is a critical factor for fatigue and exhaustion (Sonnentag et al., 2010). Especially the relationship between workload and emotional exhaustion is rather persistent and stable over time, which means that high workload at one point is able to predict emotional exhaustion even after a long period of time (Michielsen et al., 2004).

The extent of short-term and long-term outcomes of stress depends on moderating variables, such as personal or workplace resources. In the ISO 10075-1 (ISO, 2000a), the current condition of the individual is highlighted, which is dependent on the individual's workplace resources. Next to individual resources, workplace resources (or "job resources") have received much attention in research about outcomes of stress (Karasek, 1979; Bakker et al., 2005). Indeed, targeting workplace resources is a sustainable way to prevent negative outcomes of stress as workplace resources seem to be the precursor of individual resources such as employees' self-efficacy, self-esteem, and optimism (Xanthopoulou et al., 2007).

The Role of Resources at the Workplace

Resources in the working context refer to the physical, psychological, social, or organizational aspects of the job that are able to reduce job demands, stimulate personal growth, learning and development and/or are functional in achieving work goals (Bakker and Demerouti, 2007). Resources at the workplace play a major role in the relationship between stress and strain (Demerouti et al., 2002) and have been studied in a variety of different frameworks: the demand-control model (Karasek, 1979), the effort-reward imbalance model (Siegrist, 1996), the job demands-resources (JD-R) model (Bakker and Demerouti, 2007), and the resources/recovery-stress model (Kallus and Kellmann, 2000; Kallus, 2016). Following the demand-control model, aspects of job control (e.g., latitude, autonomy) buffer the effect of stress on strain. In the effort-reward imbalance model, the important job resource is reward (e.g., salary, promotion, job security or esteem reward) that may buffer the critical relationship between stress and strain.

The important role of resources is also illustrated in Hobfoll's (1989) conservation of resources (COR) model. This model proposes that strain is a result of a threat to resources, actual loss of resources or insufficient gain of additional resources. Any of these three paths can cause strain and might lead to burnout over time.

In the JD-R model (Bakker and Demerouti, 2007), negative outcomes of stress can be decreased if job resources are high. In contrast to Karasek's (1979) or Siegrist's (1996) model, the JD-R model does not limit resources to one aspect (e.g., job control or reward) but expands the view of resources to a variety of states. Indeed, examples of job resources can be found on many levels, such as on the organizational level (e.g., career opportunities, salary), on the interpersonal level (e.g., social support from colleagues or supervisor) or on the task/work level (e.g., skill variety, participation possibilities) (Bakker et al., 2007). When a sufficient amount of job resources is available, it is even possible to have positive effects of stress in the sense of challenging jobs (Bakker et al., 2010). This again is in line with the model in the ISO 10075-1.

Kallus' (2016) resources/recovery-stress model assumes that workplace stress can be especially harmful and lead to negative outcomes if the relation between stress and recovery/resources is imbalanced. In his view the terms recovery and resources are used as nearly interchangeably. If a person experiences high stress, this stress can lead to strain depending on the person's individual resources and depending on the person's recovery processes to strengthen resources. In this model, resources are able to buffer the relation between stress and strain only if they have been recovered. This view is also shared by Oerlemans and Bakker (2014), where resources have to be replenished regularly to show stress-reducing effects. Therefore, the availability and state of resources must increase to the same extent as stress to cope successfully with the situation. This is in line with the COR model, where negative outcomes occur if work demands are high and resources have not been adequately replenished (Freedy and Hobfoll, 1994). Especially resources on the task level (latitude and autonomy) and on the interpersonal level (social support) have been found to reduce the negative effects of stress on strain (Halbesleben, 2006; Nahrgang et al., 2011). In the present study, we conceptualize workplace resources as a combination of task level and interpersonal level resources.

Theoretical Model and Hypotheses

The research reported in this article used a longitudinal research design to investigate the relationship between stress, workplace resources and outcomes of stress. To measure stress, we use the concept of the areas of worklife (Maslach and Leiter, 2008), which is a framework that compasses six different stressors (workload, control, reward, community, fairness, and values). Stress is often measured as a total value by summarizing many workplace stressors (e.g., as "demands," Hakanen et al., 2008; Trépanier et al., 2014). In our study we want to measure stress deeper in different facets; therefore, we focus on stressors described in the concept of the areas of worklife. In addition, we analyze the effects of stress at two time points (after 6 months), thus testing the causal relationship between stress and strain.

According to the ISO 10075-1 (ISO, 2000a), the immediate outcome of stress would be strain. However, we are more interested in the long-term effects of stress; therefore, the concept of burnout is used to operationalize the outcome of stress, which is a result from repeated exposure to strain (ISO, 2000a; Demerouti et al., 2002).

On basis of the studies conducted by Leiter and Maslach (2005, 2009) regarding the areas of worklife, following hypotheses are stated:

- H1: The area of workload is a significant predictor for Emotional Exhaustion.
- H2: The area of reward is a significant predictor for Cynicism.
- H3: The area of values is negatively associated with Emotional Exhaustion and Cynicism and positively associated with Personal Accomplishment.

In line with the JD-R model and the resources/recovery-stress model, we hypothesize that workplace resources are negatively related to burnout and are able to buffer the negative effect of stressors (measured with the six areas of worklife) on burnout.

- H4: Workplace resources are negatively related to emotional exhaustion and cynicism and positively related to personal accomplishment.
- H5: Workplace resources moderate the negative relation between stressors (measured with the areas of

worklife) and emotional exhaustion/cynicism such as the relationship is weaker for employees with high workplace resources.

H6: Workplace resources moderate the positive relation between stressors (measured with the areas of worklife) and personal accomplishment such as the relationship is stronger for employees with high workplace resources.

The main strengths of the present study lie in the differentiated view of stress by investigating the effects of different stressors and in the longitudinal design to detect causal relationships. In addition, moderating effects of workplace resources are tested cross-sectionally and longitudinally to gain better insight in the short-term and long-term buffering role of workplace resources in the stress–strain relationship.

MATERIALS AND METHODS

Participants and Procedure

The data were collected as part of a larger longitudinal study conducted among Austrian workers. For this study, persons were recruited from other studies executed at the Department of Psychology at the University of Graz and were asked for their consent to contact them again for future studies. The approval of the ethical commission was obtained before the start of the whole longitudinal study. The first measurement took place in spring and the second in autumn. The measurement times were carefully chosen to avoid holiday seasons. The time interval between the single measurement points was 6 months. The two measurement points are referred to as Time 1 (T1) and Time 2 (T2).

At T1, 626 participants filled-in all questionnaires in the online survey. At T2, 439 participants took part. The final sample consisted of 141 participants that took part at both measurement points and also were at the same workplace at both times. Of these 141 respondents, 61% were female (male: 39%) and their mean age was 43.7 years ($SD = 9.04$). The majority worked full-time or more (83.7%), 16.3% worked part-time. The participants worked in different industrial sectors, mostly from health sector (19.9%), manufacturing (12.1%), public sector (11.3%), and general services (9.2%). To analyze a possible drop-out bias, participants who participated in T1 were compared to those who participated in both waves. The analysis revealed that both groups did differ significantly in their experience of workplace resources ($p < 0.05$). More specifically, workplace resources were higher in the group that participated in both waves compared to participants who participated only in T1. For all other variables, no significant effects were found.

Measures

Areas of Worklife

The Areas of Worklife Scale (AWS; Leiter and Maslach, 1999) measures six different areas of worklife: (1) workload, (2) control, (3) reward, (4) community, (5) fairness and (6) values. The participants are asked to answer 29 items on a 5-point Likert-Scale ranging from 1 (strongly disagree) to 5 (strongly agree). One example item for the area of control is "I have professional autonomy/independence in my work" and one example item for the area of values is "My values and the organization's values are alike." The German translation by Schulze (see Brom et al., 2015) was used in this study.

Workplace Resources

The Recovery-Stress-Questionnaire for Work (RESTQ-Work; Jiménez and Kallus, 2016) assesses different aspects of stress and recovery activities and states in the past 7 days/nights. In the present study, the short version of the RESTQ-Work (RESTQ-Work-27) with 27 items was used. The items can be assigned to a stress or recovery/resources score. In the present study, only the workplace resources score without recovery aspects was analyzed (Jiménez et al., 2016a). The workplace resources score consists of three sub-dimensions, each measuring another type of work-related resources (leisure/breaks, psychosocial resources, work-related resources). The RESTQ-Work-27 allows giving feedback by using the stress and resources scores. The underlying sub-dimensions can only be used for screening purposes in the practical field (Jiménez et al., 2016a). One example item for the resources score is "In the past 7 days/nights. . . I was able to relax during my breaks" or "In the past 7 days/nights. . . I had the chance to work on a variety of tasks." The answer scale is a 7-point-Likert-Scale ranging from 0 (never) to 6 (always).

Burnout

The Maslach-Burnout-Inventory – General Survey (MBI-GS; Schaufeli et al., 1996) measures burnout with three dimensions: emotional exhaustion, cynicism, and personal accomplishment. In the present study, the German version of the MBI-GS by Büssing and Glaser (1998) was used. The 16 items can be answered on a 7-point-Likert-Scale ranging from 0 (never) to 6 (every day).

Analysis

With regard to analyses, we used bivariate correlation and hierarchical regression analyses. Hierarchical multiple linear regression analyses were performed for each dependent variable (emotional exhaustion, cynicism, personal accomplishment) and were conducted for the cross-sectional sample (at T1) and the longitudinal sample. In the longitudinal analysis, the dependent variable at T1 was controlled for all outcomes. To analyze the interaction between the variables, the interaction terms first were mean-centered (z-transformed) to minimize multicollinearity and then entered in the regression analysis. The data was analyzed using SPSS Version 22.

RESULTS

Descriptive Statistics

Descriptive statistics (means and standard deviations) all study variables are shown in **Table 1**. The descriptive statistics were calculated for both measurement points separately. The data for workplace resources and the three burnout dimensions were compared to the data of a representative Austrian sample, collected in 2015 (Jiménez et al., 2016b). Compared to the

TABLE 1 | Means (M) and standard deviations (SD) of all study variables.

Variable	Time 1 (T1)				Time 2 (T2)				Austrian representative sample	
	Longitudinal sample (*N* = 141)		All responses (*N* = 468)		Longitudinal sample (*N* = 141)		All responses (*N* = 402)		(*N* = 1200)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Workload	3.25	0.92	3.35	0.90	3.23	0.96	3.34	0.99	2.76	0.88
Control	3.46	0.89	3.45	0.98	3.30	1.10	3.38	1.03	3.40	1.03
Reward	3.07	0.86	3.07	0.84	2.88	0.83	2.95	0.87	3.32	0.98
Community	3.28	0.87	3.23	0.82	3.52	0.80	3.33	0.88	3.34	0.80
Fairness	2.85	0.93	2.89	0.85	2.77	0.94	2.77	0.90	3.05	0.80
Values	3.45	0.81	3.38	0.84	3.31	0.71	3.31	0.79	3.44	0.81
Workplace resources	2.96	0.98	2.87	0.97	3.08	1.11	3.08	1.09	3.28	1.16
Emotional exhaustion	3.83	1.22	3.95	1.20	3.76	1.24	3.87	1.22	3.23	1.30
Cynicism	3.34	1.26	3.38	1.25	3.36	1.34	3.28	1.33	2.97	1.28
Personal accomplishment	4.66	0.86	4.61	0.84	4.62	0.83	4.61	0.82	4.71	0.83

Note 1: areas of worklife at T2: N = 148 (all responses) and N = 53 (longitudinal sample).

representative Austrian sample, the study sample showed higher values in workload, emotional exhaustion and cynicism and lower values in fairness and workplace resources (see **Table 1**). Intercorrelations between variables for T1 and T2 (cross-sectional and longitudinal) as well as internal consistencies (Cronbach's Alpha, α) are shown in **Table 2**.

Cross-Sectional Sample

To test the proposed hypotheses, hierarchical multiple linear regression analyses were conducted for the cross-sectional sample (at T1) and the longitudinal sample. In **Table 3**, the results for T1 are depicted. In the first step, the areas of worklife were stepped into the equation, which was significant for all models ($\Delta R^2_{\text{emotional exhaustion}} = 0.55$; $\Delta R^2_{\text{cynicism}} = 0.57$, $\Delta R^2_{\text{personal accomplishment}} = 0.37$). The second step included workplace resources, which significantly accounted for an additional variance for all outcomes ($\Delta R^2_{\text{emotional exhaustion}} = 0.04$; $\Delta R^2_{\text{cynicism}} = 0.05$, $\Delta R^2_{\text{personal accomplishment}} = 0.07$). The third step included the interaction terms, which were non-significant for all models.

Out of the areas of worklife, the areas of reward and values showed to be the most important predictors for all three dimensions of burnout. The area of workload was significant for the criteria emotional exhaustion and cynicism. Workplace resources were negatively related to emotional exhaustion and cynicism and positively related to personal accomplishment. As for the interactions between the areas of worklife and workplace resources, only the interaction between workload and workplace resources was significant for the outcome variable emotional exhaustion. More specifically, the buffering effect of resources seems to work better in an environment with low workload, as low workload combined with high resources has the lowest level of emotional exhaustion (**Figure 1**).

The standardized regression coefficients (β) as well as *p*-values and ΔR^2 are presented in **Table 3**.

Longitudinal Sample

Table 4 present the four steps of the analyses. The dependent variables at T1 were stepped into the equation first. This step was significant for all models ($\Delta R^2_{\text{emotional exhaustion}} = 0.54$; $\Delta R^2_{\text{cynicism}} = 0.43$, $\Delta R^2_{\text{personal accomplishment}} = 0.44$). This step was followed by the six areas of worklife (step 2). The first step accounted for an additional variance for cynicism ($\Delta R^2_{\text{cynicism}} = 0.06$). The third step included workplace resources, which was non-significant for all outcomes. In the fourth and last step, the interaction terms were included. This step was not significant for all outcomes.

Workload showed to be the most important predictor for emotional exhaustion at T2 and reward was an important predictor for cynicism at T2 (hypotheses 1 and 2). The other areas of worklife did not show significant results with all three dimensions of burnout at T2. Contrary to hypothesis 3, resources at the workplace did not show any direct relationships with all three outcome variables.

Out of all interactions, only one was significant: the interaction between workload and workplace resources was significant for personal accomplishment. More specifically, high workload paired with high workplace resources at T1 lead to higher personal accomplishment at T2 (**Figure 2**). As for emotional exhaustion and cynicism, none of the proposed interactions showed significant results.

The standardized regression coefficients (β) as well as *p*-values and ΔR^2 are presented in **Table 4**.

DISCUSSION

This study explored the relationship between stressors, workplace resources and burnout as the long-term outcome of stress. We investigated which stressors are linked to burnout and if resources are able to buffer the negative effect of stress facets on burnout. The six areas of worklife (Maslach and Leiter, 2008) were used

TABLE 2 | Correlations and internal consistencies (Cronbach's alpha) between all study variables (Time 1 and Time 2; *N* = 141).

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Time 1 (T1)																				
(1) Workload	0.85																			
(2) Control	−0.33***	0.80																		
(3) Reward	−0.39***	0.36***	0.83																	
(4) Community	−0.32***	0.27***	0.41***	0.88																
(5) Fairness	−0.29***	0.43***	0.45***	0.50***	0.89															
(6) Values	−0.28***	0.39***	0.49***	0.45***	0.74***	0.81														
(7) Workplace resources	−0.44***	0.55***	0.63***	0.53***	0.51***	0.45***	0.87													
(8) Emotional exhaustion	0.65***	−0.45***	−0.57***	−0.27***	−0.38***	−0.40***	−0.61***	0.91												
(9) Cynicism	0.53***	−0.47***	−0.70***	−0.46***	−0.56***	−0.59***	−0.67***	0.71***	0.86											
(10) Personal accomplishment	−0.25***	0.48***	0.62***	0.33***	0.44***	0.50***	0.65***	−0.52***	−0.67***	0.86										
Time 2 (T2)																				
(11) Workload	0.65***	−0.13	−0.02	−0.03	−0.06	0.00	−0.02	0.31*	0.21	0.06	0.86									
(12) Control	−0.17	0.60***	0.13	0.23	0.29*	0.29*	0.50***	−0.30*	−0.36**	0.39**	−0.37**	0.89								
(13) Reward	−0.10	0.23	0.53***	0.04	0.33*	0.37**	0.30*	−0.17	−0.36**	0.33*	−0.14	0.34*	0.73							
(14) Community	−0.13	0.26	0.10	0.67***	0.37**	0.41**	0.45***	0.05	−0.14	0.32*	−0.20	0.41**	0.22	0.89						
(15) Fairness	−0.15	0.42**	0.40**	0.33*	0.81***	0.62***	0.47***	−0.27	−0.56***	0.54***	−0.23	0.53***	0.45***	0.42**	0.88					
(16) Values	−0.09	0.34*	0.14	0.20	0.56***	0.66***	0.29*	−0.03	−0.46***	0.30*	−0.30*	0.55***	0.44**	0.42**	0.68***	0.72				
(17) Workplace resources	−0.36***	0.41***	0.53***	0.44***	0.46***	0.43***	0.75***	−0.57***	−0.52***	0.56***	−0.17	0.76***	0.39**	0.55***	0.52***	0.49***	0.91			
(18) Emotional exhaustion	0.58***	−0.37***	−0.47***	−0.24***	−0.38***	−0.38***	−0.47***	0.73***	0.55***	−0.40***	0.66***	−0.48***	−0.38*	−0.22	−0.29*	−0.38**	−0.60***	0.91		
(19) Cynicism	0.39***	−0.36***	−0.56***	−0.30***	−0.49***	−0.53***	−0.52***	0.60***	0.66***	−0.48***	0.41**	−0.67***	−0.59***	−0.37**	−0.59***	−0.66***	−0.68***	0.73***	0.92	
(20) Personal accomplishment	−0.17*	0.30***	0.45***	0.20*	0.30***	0.35***	0.45***	−0.35***	−0.40***	0.67***	−0.12	0.65***	0.49***	0.48***	0.52***	0.52***	0.68***	−0.47***	−0.62***	0.84

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; Cronbach's alpha (α) in the diagonal; areas of worklife at T2: $N = 53$.

TABLE 3 | Cross-sectional, hierarchical multiple regression analysis for all predicted variables at Time 1 (T1).

	Emotional exhaustion T1			Cynicism T1			Personal accomplishment T1		
Step and variable	β	*p*	ΔR^2	β	*p*	ΔR^2	β	*p*	ΔR^2
Step 1: Areas of worklife			0.55***			0.57***			0.37***
Workload T1	0.50***	<0.001		0.16***	<0.001		−0.02	0.663	
Control T1	−0.01	0.829		−0.02	0.555		0.06	0.184	
Reward T1	−0.16***	<0.001		−0.27***	<0.001		0.23***	<0.001	
Community T1	0.00	0.985		−0.01	0.853		−0.03	0.465	
Fairness T1	0.07	0.131		−0.01	0.898		−0.10*	0.050	
Values T1	−0.10*	0.017		−0.25***	<0.001		0.22***	<0.001	
Step 2:			0.04***			0.05***			0.07***
Workplace resources T1	−0.26***	<0.001		−0.32***	<0.001		0.39***	<0.001	
Step 3:			0.01			0.00			0.01
Workload T1 × Workplace resources T1	0.08*	0.032		0.02	0.627		0.04	0.363	
Control T1 × Workplace resources T1	−0.01	0.835		−0.02	0.725		−0.05	0.284	
Reward T1 × Workplace resources T1	0.05	0.216		−0.01	0.869		0.00	0.952	
Community T1 × Workplace resources T1	0.01	0.895		−0.00	0.961		−0.03	0.582	
Fairness T1 × Workplace resources T1	−0.00	0.951		−0.01	0.773		−0.01	0.817	
Values T1 × Workplace resources T1	0.02	0.707		0.06	0.210		0.02	0.663	

*The (standardized) beta values (β) are the coefficients from the finale stage of the analysis; *p < 0.05, **p < 0.01, ***p < 0.001.*

to operationalize stressors. Our hypotheses could be partially verified.

As stated in hypothesis 1, workload is a significant predictor for emotional exhaustion. The relationship between workload on emotional exhaustion is also evident after 6 months, which supports the assumption that high workload causes emotional exhaustion in the long run. High workload has been repeatedly associated with emotional exhaustion (Maslach et al., 2001; Leiter and Maslach, 2009). Constant high workload creates a work environment where employees don't have time to recover from work demands. This depletes the employees' capacity to meet work demands and creates long-lasting fatigue and exhaustion. Interestingly, high workload seems to be negatively related to cynicism, indicating that working in an environment with high workload, cynicism is low. However, this effect is no longer visible after 6 months.

The area of reward is related to all dimensions of burnout, but seems to be a strong preventive factor for cynicism even after 6 months. This supports our second hypothesis as well as the findings of Maslach and Leiter (2008). A lack of reward contributes to feelings of inefficacy and meaninglessness which can be precursors for cynicism.

In past research, values showed to be one of the strongest predictors to prevent burnout as it directly affects emotional exhaustion, cynicism, and personal accomplishment (Leiter and Maslach, 2009). In the present study, we could replicate this assumption only in the cross-sectional analysis. Longitudinally, values are not related to burnout after 6 months, therefore hypothesis 3 was only supported in the cross-sectional sample.

Regarding workplace resources, we expected workplace resources to be an important predictor for all three burnout dimensions (hypothesis 4), which was supported in the cross-sectional analyses. However, the direct, positive effect of workplace resources on burnout is not found after 6 months. Furthermore, we expected workplace resources to be a buffer between stressors and burnout (hypotheses 5 and 6). We found a moderating effect of resources for the relationship between workload and emotional exhaustion. In a work environment with low workload, employees can access their resources more easily and thus the buffering effect of resources can take place. However, this effect was very small and was not replicated in the longitudinal sample. The JD-R model (Bakker and Demerouti, 2007), and the resources/recovery-stress model (Kallus, 2016) state that the negative relationship between stress and strain should be weaker if workplace resources are high. However, this buffering effect can only take place if workplace resources are strengthened parallel with increasing stress. In other words, very high stress demands a high recovery of resources to keep the

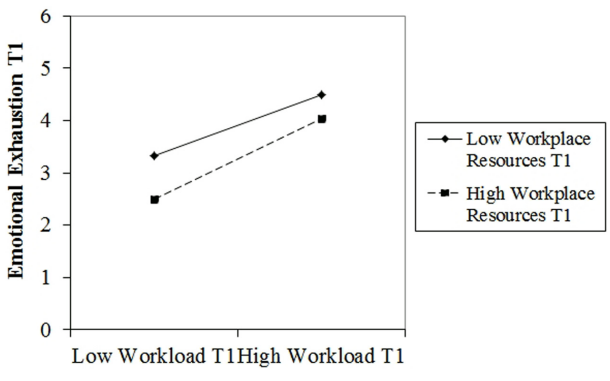

FIGURE 1 | Two-way interaction between workload (T1) and workplace resources (T1) on emotional exhaustion (T1).

TABLE 4 | Hierarchical multiple regression analysis for all predicted variables (T1–T2).

	Emotional exhaustion Time 2			Cynicism Time 2			Personal accomplishment Time 2		
Step and variable	**β**	***p***	**ΔR^2**	**β**	***p***	**ΔR^2**	**β**	***p***	**ΔR^2**
Step 1			0.54***			0.43***			0.44***
Dependent variable T1	0.52***	< 0.001		0.37***	0.001		0.65***	< 0.001	
Step 2: Areas of worklife			0.03			0.06*			0.01
Workload T1	0.17*	0.038		0.03	0.730		0.04	0.646	
Control T1	−0.02	0.828		0.04	0.628		−0.09	0.264	
Reward T1	−0.08	0.356		−0.19*	0.041		0.08	0.380	
Community T1	0.02	0.755		0.11	0.163		−0.05	0.566	
Fairness T1	−0.06	0.505		−0.08	0.421		−0.04	0.712	
Values T1	0.02	0.821		−0.08	0.445		0.03	0.779	
Step 3:			0.00			0.01			0.00
Workplace resources T1	−0.02	0.825		−0.16	0.125		0.15	0.196	
Step 4:			0.02			0.04			0.05
Workload T1 × Workplace resources T1	0.08	0.334		0.00	0.983		0.22**	0.010	
Control T1 × Workplace resources T1	−0.02	0.849		0.05	0.541		0.04	0.686	
Reward T1 × Workplace resources T1	0.09	0.344		0.17	0.094		−0.02	0.840	
Community T1 × Workplace resources T1	0.14	0.087		0.11	0.220		−0.12	0.162	
Fairness T1 × Workplace resources T1	−0.18	0.126		−0.15	0.225		0.12	0.344	
Values T1 × Workplace resources T1	−0.02	0.877		−0.16	0.192		0.15	0.251	

*The (standardized) beta values (β) are the coefficients from the finale stage of the analysis; *p < 0.05, **p < 0.01, ***p < 0.001.*

balance (Kallus, 2016). In a work environment with long-lasting stress, workplace resources might be difficult to utilize or might even be depleted to an extent that they cannot be replenished anymore (see also Freedy and Hobfoll, 1994).

In line with hypothesis 6, we found a moderating effect of resources for workload on personal accomplishment. More specifically, high workload seems to be able to enhance personal accomplishment if workplace resources are high. This is in line with the JD-R model, where working in a high workload environment does not have harmful effects when workplace resources are high. In our study, workplace resources even show a beneficial effect, as working in a high workload environment contributes to personal accomplishment when workplace resources are high. The demand-control model (Karasek, 1979) categorizes high demands paired with high resources as "active jobs" and these are characterized with high engagement.

The effects found in the present study are small and do not fully support the buffering effect of workplace resources between stressors and burnout. However, the findings should not be neglected. In the present sample, the participants had much higher values in workload and burnout and lower values in workplace resources compared to the Austrian norm sample. For workload and burnout, we have a "ceiling effect" where significant differences are difficult to detect. Therefore, we suggest interpreting the results in the direction of a buffering effect of workplace resources, although we must point out that this result has to be interpreted with high caution.

In the study of Maslach and Leiter (2008), employees experiencing problems with fairness at the workplace were especially vulnerable to develop burnout over time. Interestingly, our analyses revealed a negative relation between fairness and personal accomplishment at T1, indicating that high fairness at the workplace is associated with lower personal accomplishment. In the simple bivariate correlation, the relationship is positive, though. As we used multiple regression analysis, confounding effects of predictor variables are considered and gives a better representation of the relationship between predictor and outcome. The effect is very small and no longer apparent after 6 months, though. Nevertheless, future studies should be conducted to shed light on this unexpected result.

The area of community was not related to burnout at T2, although research provides evidence that social support at work is related to a lower burnout-risk (e.g., Halbesleben, 2006). The same applies for control. Aspects of control (e.g., autonomy, participation possibilities, latitude) were not directly related to

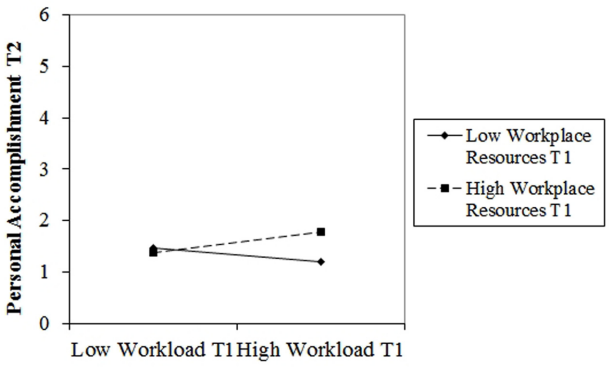

FIGURE 2 | Two-way interaction between workload (T1) and workplace resources (T1) on personal accomplishment (T2).

burnout in our study. In their mediation model of job burnout, Leiter and Maslach (2005, 2009) showed that community and control are not directly related to burnout but show indirect relations through values (for community) and through workload (for control). Therefore, all areas of worklife play important roles for burnout, either directly or indirectly through mediation.

Methodological Issues

An important point of this study lies in the investigation of different types of stress (stressors) instead of using one global indicator of stress. By analyzing different stressors together with different types of resources, the complex interaction between stressors and resources could be investigated much more deeply. In the present study, we used a global indicator of resources as the questionnaire used in this study (RESTQ-Work-27; Jiménez et al., 2016a) only allows building a global score of resources. In future studies, different types of stressors and resources should be assessed to get a deeper understanding in the complex interactions at the workplace.

Same-source bias is a possible limitation of the study. We collected data at different points in time, a practice suggested by Podsakoff and Organ (1986) to reduce the effects of common method bias. Nevertheless, it is possible to take objective indicators for work environment for the analyses (e.g., sickness absences, accident statistics), but these are usually difficult to obtain as companies are hesitant to hand over sensitive data.

As the online survey was declared as "stress study" and open for every interested person, a self-selection bias could occur. Comparing the values of the study sample with a representative sample of Austrian workers, the study sample consists of persons with more burnout and higher stress. This "ceiling effect" has not just drawbacks but also "advantages" in the more conservative sense of research: It is even more difficult to detect significant effects if a ceiling effect is present.

A reason for not finding more longitudinal effects may lie in the time interval of 6 months. It seems plausible to assume that for a health indicator such as burnout, which is considered as relatively stable, permanent changes are not easily achieved but require an exposure over a longer time interval. This assumption is supported by other analyses where effects over a period of 1 year were found (Maslach and Leiter, 2008). Non-significant results also could be due to lack of power because of our small sample size. We therefore emphasize that some coefficients are not significant yet substantial in absolute value, so we do not claim that there is no effect in this case.

Practical Implications and Conclusion

The findings in the presented study show small effects for the buffering effect of workplace resources on the relationship between stress and the long-term consequence, burnout. In the cross-sectional sample, workplace resources seem to be important prevention factors for burnout, but moderating effects with stressors are still weak. As for the longitudinal effects, more data are needed to investigate this relationship further. Our study includes effects after half a year, but extending the research for longer time periods is needed.

Nevertheless, we stress that workplace resources are important and so it has to be looked on short- and long term effects of resources. In the practical field of risk assessment, assessing workplace resources together with stressors is sometimes overlooked but important to develop sustainable interventions. The stress-strain chain which is the base of risk analysis and the design of workplaces (ISO, 2000b) has to include the stressors as well as buffering aspects especially (Portuné, 2012; Zoni and Lucchini, 2012). For the risk of burnout – which is seen as a long-term impairing effect of stressors (Demerouti et al., 2002; ISO, 2015) – especially the time aspect must be considered in combination with different stressors. Looking at workplaces with high workload for sure the rule of work design means that at first the work environment has to be changed (Portuné, 2012). Especially for these workplaces possible workplace resources should be taken into account when workplace design is considered.

ETHICS STATEMENT

This study was carried out in accordance with the recommendations of the guidelines of the Ethics commission of the University of Graz with written informed consent from all subjects. All subjects gave written informed consent in accordance with the Declaration of Helsinki. The protocol was approved by the Ethics commission of the University of Graz from 02.03.2012.

AUTHOR CONTRIBUTIONS

PJ and AD designed the study; conducted research and analyzed the data; AD and PJ wrote and edited the article.

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Individual- and Organization-Level Work-to-Family Spillover Are Uniquely Associated with Hotel Managers' Work Exhaustion and Satisfaction

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Purpose: Building on the Conservation of Resources theory, this paper examined the unique and interactive associations of negative and positive work-to-family spillover (NWFS and PWFS, respectively) at the individual and organizational level with hotel managers' work exhaustion and satisfaction, beyond job demands and supervisors' leadership style.

Design/Methodology/Approach: Guided by the levels of analysis framework, we first tested the unique associations of NWFS and PWFS with emotional exhaustion and job satisfaction at the individual level (571 hotel managers), beyond job demands supervisors' leadership style. Second, using multilevel modeling, we tested the climate effects of NWFS and PWFS on emotional exhaustion and job satisfaction aggregated at the organizational level (41 hotels). Third, we examined the role of the organizational climate of PWFS in the associations of individual-level NWFS with emotional exhaustion and job satisfaction.

Findings: Beyond the effects of psychological job demands and supervisor's transformational leadership, at the individual level, hotel managers who experienced higher NWFS than other managers reported more exhaustion and lower job satisfaction, whereas those with higher PWFS reported less exhaustion and higher satisfaction. At the organizational level, working in hotels where the average level of NWFS was higher than other hotels was associated with feeling more exhaustion of the individual members; working in hotels with higher PWFS was associated with feeling less exhaustion. The negative link between individual-level NWFS and job satisfaction was buffered when organization-level PWFS was higher, compared to when it was lower.

Originality/Value: This study moves beyond a focus on traditional job characteristics, toward considering individual and organizational experiences in the work-family interface as unique predictors of work exhaustion and satisfaction. Strengths of the study

include illuminating organizational work-family climate effects such that coworkers' shared experiences of NWFS and PWFS explain individual members' work exhaustion, beyond their own experiences of spillover. The results also highlight that a high level of organizational PWFS can buffer the negative effects of individual NWFS.

Keywords: conservation of resources theory, emotional exhaustion, hotel industry, job satisfaction, organizational climate, work-to-family spillover

INTRODUCTION

Work and family are interconnected spheres of life that play a vital role in employee well-being. Work-to-family spillover (WFS) refers to the process whereby behaviors, moods, and stress from the work sphere affect those in the family sphere (Mennino et al., 2005). Negative WFS (NWFS) refers to strain from the workplace interfering with one's family and personal life, whereas positive WFS (PWFS) indicates positive moods and energy from work facilitating performance of family and personal roles (Grzywacz and Marks, 2000). Guided by the Conservation of Resources (COR) theory (Hobfòll, 1989, 2001) that links between resources and stress in the work-family interface, this study examined the unique and interactive associations of NWFS and PWFS with hotel managers' work-related emotional exhaustion and job satisfaction at the individual and organizational levels.

The U.S. hotel industry is a part of the service sector that provides 24/7 customer service. Examining hotel managers was of our interest, because their work experiences are more likely to be spilled over to the home because of their long work hours, unpredictable work schedules, and permeable boundaries between work and family (Cleveland et al., 2007; Lawson et al., 2013). During the pilot work in which this study is based, the hotel managers described frustrations that arise due to interruptions at home and having to be available at all times for hotel needs (Cleveland et al., 2007), which were associated with the experience of high NWFS (Lawson et al., 2013).

For hotel managers, emotional exhaustion and job satisfaction are two important work-related outcomes. Their service work requires emotional labor (Hochschild, 1983) that may have emotional consequences (Wharton, 1993). Emotional exhaustion refers to a state of fatigue and burnout in response to one's work (Maslach and Jackson, 1981), and it indicates a problem in the work context that needs addressing to avoid both health and performance issues. A high level of emotional exhaustion is associated with poor physical health (Kim et al., 2011), the prevalence of early retirement intentions (von Bonsdorff et al., 2010), and low job performance (Halbesleben and Bowler, 2007). Job satisfaction is one of the most studied variables in organizational psychology that indicates the extent of positive attitudes about the job (Kashefi, 2009). Given the amount of time spent at work and its importance in providing meaning to employees' lives, it is important to understand what enhances or diminishes job satisfaction. A high level of job satisfaction is also beneficial for organizations as it is associated with high organizational commitment and job performance, and low turnover rate and absenteeism (Harter et al., 2002). By assessing emotional exhaustion and job satisfaction, we sought to examine whether and how NWFS and PWFS predict important features of employee outcomes that are implicated in workplace productivity.

This study had three specific aims. The first aim was to test whether NFWS and PWFS were uniquely associated with hotel managers' work exhaustion and satisfaction, beyond job characteristics (i.e., psychological job demands and supervisor's transformational leadership). Hotel managers tend to have high psychological job demands (Cleveland et al., 2007), which have been strongly associated with high emotional exhaustion and low job satisfaction across occupations (Maslach et al., 2001; Lewig and Dollard, 2003). Hotel managers are also profoundly affected by their supervisors' behaviors because they need to get effective support and supervision to deal with demands from customers (Cleveland et al., 2007; Brownell, 2010). Supervisor's transformational leadership has been found to be important for hotel managers' emotional exhaustion and job satisfaction (Gill et al., 2006; Erkutlu, 2008; Clark et al., 2009). In relation with WFS, the majority of previous studies have examined the mediating role of WFS in the links between job characteristics and employee outcomes (Demerouti et al., 2005; Baeriswyl et al., 2016). However, according to the COR theory (Hobfòll, 1989), WFS reflects the interference with or facilitation of resource accumulation in the work-family interface, meaning more than characteristics of the job (i.e., job demands and transformational leadership). Thus WFS may explain unique variance in employee outcomes, rather than solely explaining a partial variance in the causal chain of job characteristics to employee outcomes (Demerouti et al., 2004). We also examine the unique importance of PWFS that is often neglected in prior research (Bianchi et al., 2010).

The second aim was to test the organizational climate effects of WFS on hotel managers' work exhaustion and satisfaction. Most research to date remains at the individual-level analysis, which lacks the ability to consider organizational influences (Bliese and Jex, 2002; Grzywacz et al., 2007; van Emmerik and Peeters, 2009). To address this gap, this study adopts the Kozlowski and Klein's (2000) levels of analysis framework that emphasized the importance of considering organizational factors at higher levels for individual outcomes at lower levels. Specifically, we investigate the organizational effects of NWFS and PWFS, using the aggregate of individual ratings at the same hotel, which reflects shared experiences of NWFS or PWFS between coworkers. The hotel industry is an appropriate field to study organizational climate effects, as individual hotels are

separate units that are comparable to one another in their basic structure.

Lastly, the third aim was to examine the interactive associations of organizational PWFS and individual NWFS with hotel managers' work exhaustion and satisfaction. This type of cross-level interaction has been rarely examined in prior research, but it can test whether organization-level PWFS plays an important role as social support in the workplace, similar to the role of a high-level community support from the COR framework (Hobfòll, 2001). Findings from this study may contribute to the design of future workplace interventions that target to change work and family interconnections through informal support and formal policies that can decrease NWFS and increase PWFS.

THEORETICAL BACKGROUND LINKING WORK-TO-FAMILY SPILLOVER TO EMOTIONAL EXHAUSTION AND JOB SATISFACTION

In his COR theory, Hobfòll (1989, 2001) suggested that individual resources are vulnerable to stressful circumstances. Resources include time, energy, and conditions (e.g., family relationships) that are valued by the individual. The main tenet of the COR is that a loss or the potential loss of resources are psychologically threatening. When confronted with externally induced stressors, individuals strive to minimize net loss of resources ("conservation of resources"). When freed from stressors, individuals strive to develop a resource surplus in order to offset the possibility of future loss. Applied to our study, NWFS reflects one's loss of resources (e.g., less time and energy for the family) due to work stressors carried over to the home domain interfere with performing family roles. A loss of resources are stressful (Hobfòll, 1989), and thus experiencing higher NWFS may be associated with feeling higher emotional exhaustion and lower satisfaction toward work. In contrast, PWFS refers to a state of resource surplus (e.g., better mood and more energy for the family), such that positive experiences from work facilitate performing family roles. A gain of resources benefits one's emotional energy and motivation toward work, which may be manifested through low emotional exhaustion and high job satisfaction.

The effects of WFS on hotel managers' work exhaustion and satisfaction may exist beyond the effects of traditional indicators of job characteristics, such as job demands (Bakker and Demerouti, 2007) and supervisor's leadership style (Gill et al., 2006). For example, a mother who works as a hotel manager can experience high NWFS if emotional work at her job makes her less engaged in interactions with her child at home. The experience of high NWFS may make her less satisfied with her job, beyond how many demands (and also transformational leadership) she has on the job. Because NWFS and PWFS represent one's loss or gain of perceived resources in the work-family interface (Hobfòll, 1989), their influences on employee outcomes would be above and beyond job characteristics. Also note that high NWFS may not be translated to low PWFS: NWFS and PWFS are each important in their own right and the association between PWFS and employee outcomes is independent of NWFS (Grzywacz, 2000). We tested the associations of NWFS and PWFS with hotel managers' emotional exhaustion and job satisfaction, net of job demands and supervisor's leadership. Our first set of hypotheses is:

H1. Individual-level NWFS is positively associated with hotel managers' emotional exhaustion, whereas individual-level PWFS is negatively associated with emotional exhaustion.

H2. Individual-level NWFS is negatively associated with hotel managers' job satisfaction, whereas individual-level PWFS is positively associated with job satisfaction.

ORGANIZATIONAL WORK-TO-FAMILY SPILLOVER ON HOTEL MANAGERS' WORK EXHAUSTION AND SATISFACTION

In addition to individual WFS, we examined organizational WFS, by adopting the Kozlowski and Klein's (2000) levels of analysis framework that emphasized the importance of considering organizational factors at higher levels for individual outcomes at lower levels. Individual experiences of WFS aggregated at the organizational level—organizational WFS—represents shared experiences between coworkers through affective and behavioral sharing processes (Kelly and Barsade, 2001). Organizational NWFS may be perpetuated by hearing coworkers complain about lack of family time or having fewer coworkers available to pick up and cover for employees when they need help. Thus, organizational NWFS reflects a negative work-family climate, operationalized as the degree to which managers in a given hotel share similar experiences of work stress carrying over to the home and interfering with family responsibilities. In a similar way, organizational PWFS reflects a positive work-family climate, operationalized as the degree to which managers share similar experiences of positive work events carrying over to the home and facilitating family roles. Importantly, organizational climate of WFS may be associated with individual members' work outcomes beyond their own experience of WFS. Affective sharing process involves tuning in to the emotions and attitudes of others, affecting not only employees who have similar experiences, but also those who do not. There is some evidence of how affective and behavioral sharing between coworkers influence individual employees beyond their own experiences. O'Neill et al. (2009) reported that higher time demands and lower manager support about family needs aggregated at the organization-level (i.e., a negative climate) were linked to higher turnover intentions and lower organizational commitment of employees in the organization, beyond the effects of the individual-level reports. Feierabend et al. (2011) also showed that a positive work-family climate and dialogue about family issues in organizations had effects on high commitment to the organization and low intention to quit of employees *without* any child or elderly care responsibilities. Their findings suggest that individual-level experiences of NWFS or PWFS can be

shared with coworkers which, in turn, may influence hotel managers who do not even directly experience such spillover effects.

To represent a shared experience between coworkers in the same organization, this study takes the direct consensus approach that creates the average of individual-level managers' reports within each hotel. Scholars generally agree that work-family research needs to move beyond the individual as the unit of analysis (Grzywacz et al., 2007; Spell and Arnold, 2007; van Emmerik and Peeters, 2009; Moen et al., 2015); however, there is no consensus on the operationalization of organization-level constructs. Some studies used the percentage of employees falling in the high-risk group per team (Bakker et al., 2006; van Emmerik and Peeters, 2009), while others used the aggregate of individual responses, called the direct consensus approach (Bliese and Jex, 2002; Spell and Arnold, 2007; Lam et al., 2010). In the direct consensus approach, organizations with a high average level of NWFS will have many individual members who experience high NWFS. Working in a hotel where the organization-level NWFS is high may have negative effects on the individual managers' outcomes, because their coworkers experience high demands and thus have lack of psychological resources available to others (e.g., less sensitive to others' pain), according to the COR perspective (Hobfòll, 1989). Organizations with the average level of PWFS is high will have many individual members who experience high PWFS. These individuals may give aid to coworkers who do not experience such high PWFS by sharing their own strategies (that worked for them) for how work can positively influence family life. The COR theory predicts that individuals enrich their resources by investing to other network resources with a long-term outlook, such as providing support to kith and kin (Hobfòll, 1989). Similarly, individual members with higher PWFS may give support to others in their work context to get help when they need it. In this sense, organizational PWFS may indicate the extent of social support by coworkers, such as role modeling behavior and practical as well as emotional support. Working in a hotel where the organization-level PWFS is high may have positive effects on the individual managers' outcomes, owing to the availability of coworker social support individual manager can draw upon (Hobfòll, 1989). To capture organizational climate effects of WFS that are independent of individual experiences of WFS, we controlled for individual WFS in our analyses. As such, we tested the organizational-level associations of WFS with hotel managers' work exhaustion and satisfaction, beyond the effects of individual-level WFS as well as job demands and supervisor's transformational leadership. We hypothesized:

H3. Organization-level NWFS is positively associated with individual members' emotional exhaustion, after controlling for individual-level NWFS. In contrast, organization-level PWFS is negatively associated with individual members' emotional exhaustion, after controlling for individual-level PWFS.

H4. Organization-level NWFS is negatively associated with individual members' job satisfaction, after controlling for individual-level NWFS. In contrast, organization-level PWFS is positively associated with individual members' job satisfaction, after controlling for individual-level PWFS.

INTERACTIVE EFFECTS OF ORGANIZATIONAL SPILLOVER AND INDIVIDUAL SPILLOVER ON HOTEL MANAGERS' WORK EXHAUSTION AND SATISFACTION

Hobfòll (2001) highlighted that the influence of higher-level support, such as community- and organization-level support, becomes more important when individuals are under a lack of resources. More specifically, when individuals who have a lack of resources are surrounded by others who can provide social support, the negative effects of a lack of resources may be buffered. Linking this perspective to the current study, organization-level PWFS may buffer the negative effects of individual-level NWFS on hotel managers' work exhaustion and satisfaction. For example, managers who experience high levels of NWFS at the individual level may be less satisfied with their work. However, if they work in hotels where the average level of PWFS is high, the potential adverse effects of higher NWFS on emotional exhaustion and job satisfaction may become weaker, because they can take advantage of resources available from coworkers (Hobfòll, 1989).

This study is one of the first to examine the role of organizational PWFS, as coworker social support in the workplace. Many studies have examined the role of social support directly measured by individual employees' responses. Social support is closely related to overall emotional support (e.g., advice, listing), whereas organizational PWFS represents role modeling or advice between coworkers that is specific to the spillover process. In other words, working in an organization where many coworkers—who are "similar to me"—have positive work-family experiences indirectly shows the employee that such positive spillover is possible and offers hope and optimism (Hobfòll, 2001). Thus organizational PWFS assesses the availability of coworker social support specific to spillover, although it is an indirect measure compared to the social support measure. Our measure of organizational PWFS also has methodological strength. Responses on the social support measure can be biased in that emotionally exhausted or less satisfied employees may report less social support (Podsakoff et al., 2003). Organizational PWFS may have less self-report bias, by aggregating the individual members' responses at the organizational level.

To date, no previous studies have examined the cross-level interaction between organization-level PWFS and individual-level NWFS. However, a rare example of this kind can be seen in a study by Bliese and Castro (2000). They examined a three-way multilevel interaction between work demands, role clarity, and work-group level supervisory support predicting employees' psychological strain. They found that the negative effect of work demands on psychological strain was moderated by role clarity only when work-group support was high. This finding lends support to Hobfòll (2001) in that the importance of organization-level support became apparent for employees who experienced work overload and thereby needed role clarity. Extending upon the prior work, we tested the interaction effects

between organization-level PWFS and individual-level NWFS on hotel managers' work exhaustion and satisfaction. In a similar vein, if individuals who experience high NWFS work in an organization where the average level of NWFS is also high, then it may exacerbate the adverse effect of their own NWFS due to contagion and no way to conserve. Although the COR theory does not explicitly predict that a lack of higher-level resources exacerbates individual-level strain, we tested whether organization-level NWFS interacts with individual-level NWFS to influence hotel managers' work exhaustion and satisfaction. Our last set of hypotheses is:

H5. The positive association between individual-level NWFS and emotional exhaustion is weaker when organization-level PWFS is high compared to when it is low.

H6. The positive association between individual-level NWFS and emotional exhaustion is stronger when organization-level NWFS is high compared to when it is low.

H7. The negative association between individual-level NWFS and job satisfaction is weaker when organization-level PWFS is high compared to when it is low.

H8. The negative association between individual-level NWFS and job satisfaction is stronger when organization-level NWFS is high compared to when it is low.

METHODS

Participants and Procedures

Data came from a project investigating connections between work stress, health, and family relations of employees in the hotel industry. Considering that increasing sample size at organization-level is critical to achieve high levels of statistical power in multilevel analyses (Scherbaum and Ferreter, 2008), the project investigators targeted to sample more than 40 hotels. The research design involved initial contact with General Managers (GMs) at each of 56 full-service hotels located across major U.S. regions. During the meeting with the hotel GMs, researchers asked for permission and access to managers at the hotel. Middle-level managers were contacted across all departments, including sales and marketing, human resources, room operations, and food and beverage operations. Approximately 83% of the managers who were contacted agreed to complete an interview (588 managers at 50 hotels). Structured telephone surveys were conducted by trained survey research center personnel using computer-assisted telephone interviewing procedures. Interviewers rephrased questions if participants did not understand the wording without altering the meaning. Participants received a $20 honorarium. This research was conducted following ethics outlined by the Institutional Review Board.

After excluding nine hotels that did not contribute at least three managers (for rationale see Krasikova and LeBreton, 2012), the final sample consisted of 571 managers at 41 hotels. On average per hotel, 14 managers provided data (*Range* = 3–53). Our sampling strategy met the suggested criteria by Scherbaum and Ferreter (2008) that sampling approximately 10 employees in 35 groups may achieve sufficient statistical power in organizational research.

The managers worked 12.97 years ($SD = 7.88$) in the hotel industry and 4.72 years ($SD = 5.28$) in their current hotel. The average age of the managers was 37.72 years ($SD = 9.08$), and the average length of their formal education was 15.25 years ($SD = 1.70$) which corresponds to 3 years of college, vocational or technical school. About half of them (51.49%) were men. More than half (64.97%) were married or cohabitating with a permanent romantic partner. Of those managers who had a partner, the partner was employed in 81.94% of the cases. The average number of biological or adopted children living in the household was 0.81 ($SD = 1.11$) and 13.31% of the managers had young children aged 0–7.

Measures

Psychological Job Demands

We used the job demands subscale by Karasek et al. (1998), which measures psychological stressors such as time pressure and workload. The job demands scale consists of seven items such as, "Your job requires your working fast" and "Your job requires a great deal of work to be done." The responses ranged from 1 (strongly disagree) to 4 (strongly agree). Cronbach's α was 0.78.

Supervisor's Transformational Leadership Style

Managers reported about leadership styles of GMs who were their direct supervisors. There was only one GM at each hotel, and several managers within a hotel reported about the same GM (supervisor). Transformational leadership style was measured by fifteen items from the Multifactor Leadership Questionnaire (MLQ 5X; Bass and Avolio, 1995). The 15 items comprise of four sub-factors of transformational leadership: idealized influence attributed and behavior (6 items), inspirational motivation (3 items), intellectual stimulation (3 items), and individualized consideration (3 items). We used the mean of the fifteen items. An example item (in idealized influence) is, "Your supervisor instills pride in you for being associated with him/her." Each response ranged from 1 (not at all) to 5 (frequently, if not always). Cronbach's α was 0.93.

Negative and Positive Work-to-Family Spillover

We used work-to-family spillover scales from the National Survey of Midlife Development in the United States (Grzywacz and Marks, 2000). NWFS was measured by four items including, "Your job reduces the effort you can give to activities at home." PWFS was assessed by asking three items such as, "The things you do at work help you deal with personal and practical issues at home." The original PWFS scale consists of four items, but we removed one item ("having a good day on your job makes you a better companion when you get home") due to low correlations with the other three items. Each response ranged from 1 (never) to 5 (all the time). Cronbach's α of NWFS was 0.80 and α of PWFS was 0.61. A confirmatory factor analysis with the seven items of WFS corroborated that there are two factors that clearly distinguish three items of PWFS from the four items of NWFS.

Emotional Exhaustion

Wharton's (1993) Job-Related Exhaustion Scale was used to capture how tired or stressed out managers feel at the end of an

average work day. The scale consists of five items, such as, "You feel used up at the end of the work day." Responses ranged from 1 (strongly disagree) to 4 (strongly agree). Cronbach's α was 0.90.

Job Satisfaction

Three items from a scale by Kopelman et al. (1983) were used. Kopelman et al. (1983) modified the 3-item General Job Satisfaction scale that is part of the Job Diagnostic Survey (Hackman and Oldham, 1975). The modification was substituting the term "career" for the word "job." A sample item is, "You are satisfied with your present job situation." Each response ranged from 1 (strongly disagree) to 5 (strongly agree). Cronbach's α was 0.81.

Covariates

We considered managers' individual and family characteristics that may denote degrees of family-related demands and resources and thus may relate to their work exhaustion and satisfaction. Those include managers' age (in years), gender (0 = female, 1 = male), number of children, and the presence of young children aged 0–7 (0 = no, 1 = yes). Given that living with a non-working spouse/partner may help the managers in reducing tensions between work and family roles, partner employment status was categorized as living with an unemployed partner (0) or employed partner (1) versus being single (2; the reference category). As such, we combined married/partnered status and partner's employment status into one variable, because most spouses/partners were employed (81.94%) and thus including two variables was redundant. We also controlled for negative affect that occurred in the past 2 weeks. In this way we are tapping into more trait like aspects of negative affect. We used the mean across 10 items ("To what extent you have felt: scared, afraid, upset, distressed, jittery, nervous, ashamed, guilty, irritable, and hostile, in the past 2 weeks?") from the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988). Responses ranged from 0 (very slightly or none of the time) to 4 (extremely; M = 0.78, SD = 0.60). All continuous covariates were centered at the sample mean.

Analyses

We fit multilevel models with SAS Proc Mixed to take into account the "nested" data structure, such that the 571 hotel employees were nested within 41 hotels (Raudenbush and Bryk, 2002). Intraclass Correlations (*ICC*) were computed to assess the ratio of the between-organization variability to the total variability in the variable. *ICC*s have been often used to justify the use of multilevel analyses (O'Neill et al., 2009). For example, *ICC*s should be larger than zero to have organization-level variance to be explained. However, large values of *ICC*s (e.g., ≥0.15) also indicate that there is a strong relationship between the data collected from individuals within the same organization (i.e., greater degree of dependence, little unique information; Scherbaum and Ferreter, 2008). Model 1 tested the individual-level effects of job demands and organization-level supervisor's transformational leadership in addition to the effects of all covariates. For psychological job demands, we assessed them only at the individual level, not the organization level, because psychological job demands reflect individual perceptions about their specific job that puts a strain on them; these are likely to vary at the individual level due to different jobs and different individual capacities for those jobs. Thus it does not make sense to aggregate job-level demands to the organizational level. For supervisor's transformational leadership, we used only organization-level (controlling for the individual-level) to assess the individual members' shared perception of the leadership at a hotel. Supervisor's (GM's) leadership style resides at the supervisor level, something that all managers at a hotel share. Thus this is a supervisor-level characteristic, and we wanted to measure a shared view on supervisor's leadership in each organization, which is a more objective measure than individual perceptions. Individual-level predictors were centered at each hotel mean and thus higher scores indicated that hotel managers had higher scores than the other managers within the same hotel. Organization-level predictors were centered at the grand mean, such that higher scores reflected higher averages than the other hotels. In Model 2, we added NWFS and PWFS at both levels. The two-level predictors decomposed variances in each work outcome, such that the effect of organization-level NWFS indicates how working in hotels where the average level of NWFS is higher than the other hotels is associated with more or less exhaustion of the members in the hotels. In Model 3, we added two interaction terms: individual-level NWFS × organization-level PWFS and individual-level NWFS × organization-level NWFS. Note that we estimated fixed effects with no random slopes, because we made hypotheses about the sample-level estimate at each level and did not assume that each employee or each organization had their own slope.

RESULTS

Table 1 presents descriptive statistics and correlations among key variables. Job characteristics were correlated with work exhaustion and satisfaction in the expected directions. The values of the *ICC* were small, ranging from 0.014 to 0.044, meaning that there was more variability between individuals (managers) than between organizations (hotels). Thus, each manager in a hotel provided unique (not redundant) information of NWFS and PWFS, and work exhaustion and satisfaction, with 1.4–4.4 percent of the variability in the variables were attributable to differences between hotels. In addition, given that our sample included both married/partnered (65%) and single managers, we conducted supplementary difference tests to see whether there are differences by partnered vs. single status in our main variables of interest. There was no difference between married/partnered managers and single managers in the levels of NWFS, PWFS, emotional exhaustion, and job satisfaction.

The results of multilevel models predicting emotional exhaustion and job satisfaction are presented in **Tables 2**, **3**, respectively. Beginning with emotional exhaustion, in Model 1, age, partner employment status, and negative affect were significant covariates for emotional exhaustion. Younger managers (than the sample average = 37.72 years), managers who were living with a non-working spouse/partner (vs. single),

TABLE 1 | Descriptive statistics and correlations between key variables.

	iM (iSD)	*hM (hSD)*	*Range*	1	2	3	4	5	6
1. Job demands	3.16 (0.52)	–	1.71–4	**0.043**	–[a]	–	–	–	–
2. Supervisor's transformational leadership	3.75 (0.86)	3.69 (0.40)	1.07–5	−0.23	**0.023**	−0.48	0.51	−0.67	0.69
3. Negative work-to-family spillover	3.04 (0.81)	3.08 (0.30)	1–5	0.46	−0.26	**0.025**	−0.37	0.71	−0.57
4. Positive work-to-family spillover	2.87 (0.79)	2.88 (0.31)	1–5	−0.09	0.24	−0.18	**0.014**	−0.61	0.54
5. Emotional exhaustion	2.24 (0.75)	2.31 (0.32)	1–4	0.53	−0.42	0.60	−0.29	**0.044**	−0.79
6. Job Satisfaction	3.58 (1.13)	3.50 (0.50)	1–5	−0.33	0.50	−0.41	0.31	−0.67	**0.044**

N = 571 hotel managers from 41 hotels; iM and iSD indicate Means and Standard Deviations (SD) at the individual level; hM and hSD indicate Means and Standard Deviations (SD) at the hotel level; All correlations presented at the table were significant at $p < 0.05$; Diagonals (bold) show Intraclass Correlation Coefficients (ICC = organization-level variance/total variance) of the variable. Numbers below diagonal represents individual-level correlations (based on 571 managers) and numbers above diagonal indicates organization-level correlations (based on 41 hotels).

[a]*Job demands were only assessed at the individual level.*

and those who had lower negative affectivity reported less emotional exhaustion. Individual-level job demands were positively linked to emotional exhaustion, whereas organization-level supervisor's transformational leadership was negatively linked to exhaustion. Model 1 explained 45% of the variance in emotional exhaustion. Turning to job satisfaction, women and managers who had lower negative affectivity reported higher levels of satisfaction. Individual-level job demands were negatively associated with job satisfaction. Organization-level supervisor's transformational leadership was positively linked to job satisfaction. Job demands and leadership along with covariates explained 37% of the variance in job satisfaction.

After adjusting for these effects, Model 2 tested whether NWFS and PWFS at both the individual and organizational levels were significantly associated with emotional exhaustion and job satisfaction. At the individual-level, managers who experienced higher NWFS than the other managers in the same hotel reported more exhaustion, but those with higher PWFS reported less exhaustion (H1 was supported). Moreover, managers who experienced higher NWFS reported lower satisfaction, whereas those with higher PWFS reported higher satisfaction (H2 was supported). At the organization-level, working in hotels where the average level of NWFS was higher than the other hotels was associated with feeling higher emotional exhaustion, whereas working in hotels where the PWFS was higher was associated with feeling lower emotional exhaustion (H3 was supported). However, organization-level NWFS and PWFS were not significantly associated with the members' job satisfaction (H4 was not supported). The inclusion of NWFS and PWFS contributed to an additional 11% of the variance in emotional exhaustion and an additional 5% variance in job satisfaction which were not accounted by job demands and supervisor's transformational leadership.

Model 3 included interactions between individual-level NWFS and organization-level PWFS and NWFS, in addition to all variables from the prior model. However, none of the interactions were significantly associated with emotional exhaustion (H5 and H6 were not supported). However, the interaction between individual-level NWFS and organization-level PWFS was significantly associated with job satisfaction. **Figure 1** shows that, for managers who experienced higher NWFS, the negative link between NWFS and job satisfaction was weaker when they worked in hotels where the average level of PWFS was higher, compared to when they worked in hotels where PWFS was lower (H7 was supported). The interaction between individual-level NWFS and organization-level NWFS was not significantly associated with job satisfaction (H8 was not supported).

DISCUSSION

Drawing upon the conservation of resources theory (Hobfòll, 1989, 2001), this study examined the unique and interactive associations of negative and positive WFS with hotel managers' work exhaustion and satisfaction, independent of psychological job demands and supervisor's leadership style. Guided by the levels of analysis framework (Kozlowski and Klein, 2000), we examined the associations at the organizational aggregated level, in addition to individual manager level. Results generally supported our hypotheses. NWFS and PWFS were uniquely associated with emotional exhaustion and job satisfaction, even after adjusting for how many demands and how much transformational leadership managers had in their work context. There were also significant organizational climate effects of NWFS and PWFS on emotional exhaustion. Moreover, there was a cross-level interactive effect of NWFS and PWFS, such that a high level of organization-level PWFS buffered the negative effect of individual-level NWFS on job satisfaction. This study moves beyond a focus on traditional job characteristics, toward considering individual and organizational experiences in the work-family interface as important predictors of work-related outcomes. The unique effects of individual WFS on hotel managers' emotional exhaustion and job satisfaction demonstrate the need to provide workplace policies that target work and family interconnections in hotel employees' lives, which may, in turn, increase their work productivity (Anttonen and Vainio, 2010). The results may also be broadly applicable to a range of occupations (other than hotel managers) where high NWFS is a concern (Nomaguchi, 2009).

Our findings clearly indicate that NWFS and PWFS are shared with coworkers, and thus signify a specific component

TABLE 2 | Results from multilevel models predicting emotional exhaustion.

	Model 1	Model 2	Model 3
	B (*SE*)	*B* (*SE*)	*B* (*SE*)
Fixed Effects			
Intercept	2.32 (0.05)***	2.29 (0.04)***	2.28 (0.05)***
COVARIATES			
Age	−0.01 (0.00)***	−0.01 (0.00)*	−0.01 (0.00)*
Gender, men (vs. women)	−0.03 (0.05)	0.02 (0.05)	0.02 (0.05)
Number of children	−0.01 (0.03)	0.01 (0.03)	0.01 (0.03)
Living with young children age ≤7 (vs. no)	0.17 (0.09)†	0.11 (0.08)	0.12 (0.08)
Partner employment			
Partner unemployed (vs. single)	−0.21 (.09)*	−0.26 (0.08)**	−0.26 (0.08)**
Partner employed (vs. single)	−0.00 (0.06)	−0.02 (0.05)	−0.02 (0.05)
Negative affect	0.32 (0.04)***	0.18 (0.04)***	0.17 (0.04)***
JOB DEMANDS			
Individual-level	0.55 (0.05)***	0.41 (0.05)***	0.41 (0.05)***
SUPERVISOR'S TRANSFORMATIONAL LEADERSHIP			
Individual-level	−0.23 (0.03)***	−0.16 (0.03)***	−0.16 (0.03)***
Organization-level	−0.47 (0.10)***	−0.26 (0.10)*	−0.26 (0.10)*
NEGATIVE WORK-TO-FAMILY SPILLOVER (NWFS)			
Individual-level		0.29 (0.04)***	0.29 (0.04)***
Organization-level		0.40 (0.11)***	0.40 (0.11)***
POSITIVE WORK-TO-FAMILY SPILLOVER (PWFS)			
Individual-level		−0.14 (0.03)***	−0.14 (0.03)***
Organization-level		−0.34 (0.12)**	−0.34 (0.12)**
INTERACTIONS BETWEEN INDIVIDUAL-LEVEL NWFS AND ORGANIZATION-LEVEL PWFS/NWFS			
Individual NWFS × Organization PWFS			−0.17 (0.12)
Individual NWFS × Organization NWFS			0.06 (0.12)
Random Effects			
Organization-level variance	0.009 (0.01)	0.003 (0.01)	0.004 (0.01)
Individual-level variance	0.310 (0.02)***	0.259 (0.02)***	0.258 (0.02)***
Pseudo R^2	0.448	0.551	0.552

N = 571 hotel managers from 41 hotels; For categorical predictors, reference group (coded as 0) is in parenthesis.
*†p < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001.*

of organizational work-family climate. Being part of a hotel with higher NWFS and lower PWFS was associated with higher emotional exhaustion for managers at the hotel. A number of studies have documented the significance of WFS—primarily NWFS—for employee well-being at the individual-level; however, little research has examined the organization-level influence of WFS (but see van Emmerik and Peeters, 2009; Moen et al., 2015, for exceptions). Our findings contribute to understanding of an additional link: Experience of NWFS is shared within the same organization, such that working in an organization where many coworkers experience high NWFS can lead to feeling exhausted for individual members at the organization. This finding is in line with the levels of analysis framework (Kozlowski and Klein, 2000) in that working in organizations where the overall NWFS is high may drain psychological resources of individual members at the organization. Again, these organization-level associations were found after controlling for individual-level WFS, meaning that organizational influence of WFS on emotional exhaustion exists regardless of individual managers' own experiences of WFS. Note, however, that we did not find significant main effects of organizational WFS on job satisfaction; it seems that job satisfaction is less likely to be affected by the shared experiences of WFS between coworkers. Unlike emotional exhaustion, job satisfaction may be more related to a personal evaluation about his/her job (e.g., "You are satisfied with your present job situation"). Therefore, whether coworkers in the same hotel experience NWFS or PWFS may not be significantly associated with the hotel managers' own job satisfaction overall. However, we found in the cross-level interactive effect that organizational PWFS becomes important for individual managers' job satisfaction when they experience high levels of NWFS.

The cross-level interaction effect of NWFS and PWFS on job satisfaction showed that working in an organization where the average level of PWFS is high can buffer the negative effect of individual-level NWFS. This finding supports the COR theory (Hobfòll, 2001) that highlights the saliency of higher-level

TABLE 3 | Results from multilevel models predicting job satisfaction.

	Model 1	Model 2	Model 3
	B (SE)	*B (SE)*	*B (SE)*
Fixed Effects			
Intercept	3.55 (0.08)***	3.58 (0.08)***	3.59 (0.08)***
COVARIATES			
Age	0.01 (0.00)	0.00 (0.00)	0.00 (0.00)
Gender, men (vs. women)	−0.22 (0.08)**	−0.28 (0.08)***	−0.28 (0.08)***
Number of children	0.05 (0.05)	0.03 (0.05)	0.03 (0.05)
Living with young children age ≤7 (vs. no)	−0.21 (0.15)	−0.14 (0.14)	−0.15 (0.14)
Partner employment			
Partner unemployed (vs. single)	0.23 (0.15)	0.28 (0.14)*	0.27 (0.14)†
Partner employed (vs. single)	0.04 (0.09)	0.07 (0.09)	0.06 (0.09)
Negative affect	−0.48 (0.07)***	−0.36 (0.07)***	−0.35 (0.07)***
JOB DEMANDS			
Individual-level	−0.37 (0.08)***	−0.27 (0.08)**	−0.27 (0.08)**
SUPERVISOR'S TRANSFORMATIONAL LEADERSHIP			
Individual-level	0.50 (0.05)***	0.43 (0.05)***	0.43 (0.05)***
Organization-level	0.71 (0.16)***	0.52 (0.18)**	0.52 (0.19)**
NEGATIVE WORK-TO-FAMILY SPILLOVER (NWFS)			
Individual-level		−0.22 (0.06)***	−0.21 (0.06)***
Organization-level		−0.25 (0.20)	−0.26 (0.20)
POSITIVE WORK-TO-FAMILY SPILLOVER (PWFS)			
Individual-level		0.25 (0.05)***	0.25 (0.05)***
Organization-level		0.41 (0.22)†	0.40 (0.22)†
INTERACTIONS BETWEEN INDIVIDUAL-LEVEL NWFS AND ORGANIZATION-LEVEL PWFS/NWFS			
Individual NWFS × Organization PWFS			0.44 (0.21)*
Individual NWFS × Organization NWFS			−0.03 (0.20)
Random Effects			
Organization-level variance	0.034 (0.02)†	0.030 (0.02)†	0.030 (0.02)†
Individual-level variance	0.784 (0.05)***	0.727 (0.05)***	0.723 (0.05)***
Pseudo R^2	0.366	0.419	0.424

N = 571 hotel managers from 41 hotels; For categorical predictors, reference group (coded as 0) is in parenthesis.
*†p < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001.*

support under the individual experience of stress. To the best of our knowledge, this is the first study that shows the importance of a positive work-family climate in terms of its buffering effect (but see Feierabend et al., 2011, for its main effect on employee outcomes). Considering that there is an increasing trend of NWFS with increased competition and 24–7 operations in a range of occupations (Nomaguchi, 2009), focusing on PWFS may help protect or improve employees' satisfaction and attitudes toward their work. Note also that we did not find a significant interactive association between organization-level NWFS and individual-level NWFS on emotional exhaustion or job satisfaction. Perhaps, NWFS on an individual level is sufficient to impart damage on work-related well-being outcomes, regardless of how much anyone else is suffering NWFS. This idea is consistent with the COR perspective (Hobfòll, 1989) that stressors narrow one's focus to be self-protective; thus those with higher NWFS may not be able to see others' pain or respond to it. This assumption, however, needs to be empirically tested in future research.

In terms of practical implications, we suggest implementing workplace programs that target increasing PWFS in the organization. Increasing organizational PWFS requires increasing each employee's PWFS. However, rather than attributing to employee-level responsibility, organizations could make workplace-level efforts to increase their employees' PWFS. For example, having facilitated discussions with employees to share strategies to increase PWFS or a message board to post PWFS experiences may increase chances for individual-level PWFS. Moreover, considering that organizational PWFS reflects role modeling and sharing processes between coworkers, educating leaders and senior managers to give more positive feedback to their team members and show more family-supportive behavior (Hammer et al., 2011; Bray et al., 2013; Kossek et al., 2014) may create more positive work episodes that may "spill over" to the home and facilitate performing family roles. Increased individual-level PWFS may, in turn, create more resources and support in the workplace available by coworkers that can protect the job satisfaction of employees who suffer

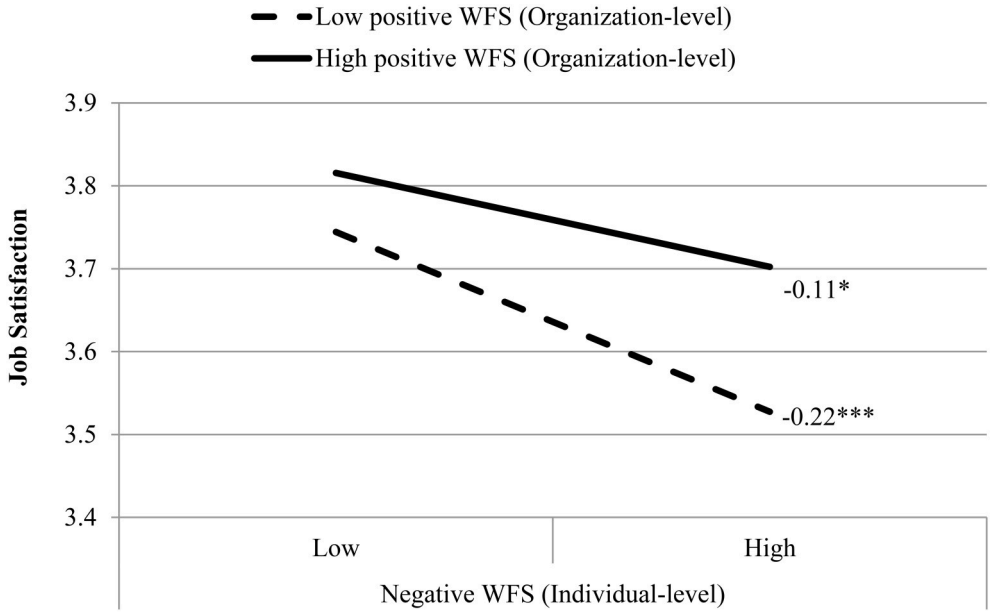

FIGURE 1 | Interactive effect between organization-level positive work-to-family spillover and individual-level negative work-to-family spillover on hotel managers' job satisfaction. $N = 571$ from 41 hotels. WFS, Work-to-Family Spillover; Low and high means ½ standard deviation below and above the sample mean, respectively. A half standard deviation was chosen in order to have an adequate sample size for conducting the necessary statistical tests across the cells, following the common practice in previous research (e.g., Almeida et al., 2015). * $p < 0.05$, *** $p < 0.001$.

from high NWFS, as evidenced in this study. Most workplace intervention programs have focused on reducing a negative aspect of work at individual level, such as decreasing NWFS experienced by employees (Kelly et al., 2011, 2014). However, future workplace efforts could move toward increasing PWFS of their employees to create a positive work environment.

LIMITATIONS AND FUTURE DIRECTIONS

The current study has limitations. First, we used self-reports to measure WFS and well-being, which poses a potential risk for a common-method bias (Podsakoff et al., 2003). Although we addressed this issue in part, by incorporating organization-level ratings by aggregating multiple assessments from several managers within each hotel, individual-level effects might still be inflated by common-method bias. To address this problem, future research should incorporate more objective data (e.g., biomarkers, job performance evaluated by organizations). Second, Cronbach's alpha for PWFS in the present study was less than desirable (0.61). This raises an issue regarding the reliability of the scale, which may lead to limited power to find effects. Future research should refine measurement of this construct. Third, the cross-sectional data constrain our ability to identify any causality. Although our statistical models imply that NWFS and PWFS predict emotional exhaustion and job satisfaction, our design does not rule out reverse causality. In other words, it is possible that one feels dissatisfied or exhausted at work, and this creates negative WFS. There is likely a spiraling effect, as proposed by COR (Hobfòll, 1989), over time. Future work could use a more rigorous assessment of spillover, such as separately measuring stressors at work and mood and behaviors at home across time. Then changes in mood or behaviors at home as a function of stressors at work may indicate the degree of spillover (e.g., Judge and Ilies, 2004). Using this within-person slope of spillover, future analyses could examine how spillover predicts work- and family-related well-being outcomes. Lastly, we used a sample of hotel managers in the U.S. context, and thus our findings may not generalize to the population of employees in other industries or hotel managers in other cultural contexts.

In conclusion, this study suggests that the experience of high NWFS and low PWFS is one of the main reasons why hotel managers become exhausted or dissatisfied with their job. Our results illuminate the importance of organization-level PWFS. Future research should continue to examine the implications of organization- and individual-level NWFS and PWFS with diverse industry samples and their long-term effects on employees and family members. Although it may not be easy to change the trend of increasing NWFS, such efforts may help understand how PWFS is protective of employee well-being and their family relationships from the adverse effects of NWFS.

AUTHOR CONTRIBUTIONS

SL contributed to the design, draft and revision of the current manuscript. She also analyzed and interpreted data. KD contributed to the acquisition of data, revising the current manuscript, and investigation of the accuracy of the work. CN contributed to the initial design and draft of this study and the revision of the current manuscript. She also contributed to the initial analyses and interpretation of data. AG contributed to design of research questions and strengthening theoretical

arguments. CL contributed to the initial design, analyses and interpretation of data. DA contributed to the acquisition of data, design of this study, revising the manuscript, ensuring the accuracy of work, and final approval of the version to be submitted.

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Job Demands, Engagement, and Turnover Intentions in Polish Nurses: The Role of Work-Family Interface

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Background: Poland has lower ratios of employed registered nurses per 1,000 inhabitants than the EU average. Polish nurses work under miserable conditions without assisting personnel, and they reconcile their professional demands with responsibilities for their families; 96% of them are women.

Rationale/Aims: This study uses Hobfoll's conservation of resources (CORs) theory to explain the role of various resources in the improvement of work conditions in the nursing profession. Work-family conflict (WFC) and family work conflict (FWC) threaten to deplete nurses' resources. This paper set out to (1) examine the extent to which perceived job demands (workload and interpersonal conflicts at work) and engagement (vigor, dedication, and absorption) are associated with turnover intentions (the intention to leave the present workplace and the intention to leave the nursing profession); (2) attempt to determine whether levels of WFC and FWC moderate these associations.

Design/Method: This study comprised 188 female registered nurses. The inclusion criterion was to live with a partner and/or have children.

Results: WFC was moderately related to FWC. Hierarchical regression analyses showed that only high job demands and low vigor were significantly associated with turnover intentions. WFC was experienced more intensively than FWC. Job demands, vigor, dedication, and turnover intentions had a strong effect on WFC, while absorption had a strong effect on FWC. However, levels of WFC and FWC did not significantly moderate these associations.

Originality/Conclusion: The study produces new knowledge by examining a constellation of job demands, work engagement and WFC, which reflect the management of personal resources. Results from such a constellation in nurses from countries with a post-transformational economic system have not previously been discussed in the light of COR theory. Most importantly, we conclude that WFC does not intensify turnover intentions.

Keywords: work-family conflict, family work conflict, interpersonal conflicts, workload, work engagement, turnover intentions

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INTRODUCTION

Nursing work is demanding and stressful, which is often associated with poor well-being (e.g., Sorgaard et al., 2010; Pisanti et al., 2011, 2015; Purcell et al., 2011; Giorgi et al., 2016). Most nurses are women (in Poland, 96%) who traditionally must reconcile professional demands with responsibilities for the family. In recent years, the demands on this profession have increased, while the reward have decreased, which has resulted in miserable work conditions, and consequently in turnover intentions. Heavy workload, low salaries, as well as lack of recognition and prestige, are huge problems for nurses in post-transformation countries. Nursing is an alarmingly languishing profession in Poland. Due to a lack of nurses, patient safety is seriously threatened. At home, nurses worry not only about whether they have hurt their patients' feelings, but also whether they have committed malpractice. In one Polish hospital, nurses took the dramatic decision to start a protest against the poor working conditions (24th May 2016).

The Social and Cultural Context

Economic transition and rapid development have transformed the demands on employees in Poland. The most important changes concern the commercialisation of medical institutions and the introduction of work for hire in place of contracts of employment for medical staff (Strózik, 2006). A relatively low salary and the low prestige of the nursing profession co-occur with work overload, extended working hours and job insecurity (Basinska and Wilczek-Ruzyczka, 2011, 2013; Borowiak et al., 2011). The number of nurses who abandon the profession has increased in recent years (Main Chamber of Nurses and Midwives, 2010; National Trade Union of Nurses and Midwives, 2015) and others have left the country to work in other EU member states (Binkowska-Bury et al., 2010; Beckford and Macfarlane, 2014). Further, few young women are interested in becoming nurses (Borowiak et al., 2011). The mean age of Polish nurses is 45 years. Poland has a lower number of employed nurses per 1,000 inhabitants than the average in the EU (5.2, to be compared to 10.2 in Sweden and 14.8 in Norway; Eurostat Statistics Explained, 2015). Moreover, Polish registered nurses are not supported by nursing associate professionals or health care assistants. In the light of the need to retain nurses in Poland it may prove valuable to explore how the nurses manage their personal resources, as well as the relationship between turnover intentions and work-related variables.

A system based on dual earners, in which females are subject to a double burden, is adopted in post-transformation countries. Additional demands on women in these countries arise from a tradition in which women take care of elderly parents, and therefore must play several roles: mother, wife, and caring daughter.

Theoretical Framework: Hobfoll's Theory of the Conservation of Resources (COR)

Hobfoll's COR theory (Hobfoll, 1989, 2011, 2012) was applied as a theoretical framework for this study. COR theory states that people strive to retain, gain and protect their resources, such as health, well-being, family, money, time, or energy (e.g., knowledge, credit). These resources are universally valued. The theory states that stress occurs when there is a loss of resources, or a threat of loss. People attempt to preserve, retain, protect, and create new resources in order to maximize their ability to manage and mitigate the stress.

Conservation of resources theory is built on four principles (Hobfoll, 1989, 2011, 2012). The first principle states that in comparison to resource gain, "resource loss is disproportionate in terms of not only degree, but also speed" (Hobfoll, 2011, p. 117). The second principle states that people "must invest resources in order to protect against resource loss, recover from losses and gain resources" (Hobfoll, 2011, p. 117), which means that those with fewer resources are more sensitive to losses than to gains and pay more to limit a loss than to achieve a gain. The third and fourth principles state that, as regards resources, "gain and loss cycles, respectively, occur in chronically stressful conditions, or where individuals or organizations are resource poor and any major stressor occurs" (Hobfoll, 2011, p. 118).

Hobfoll (1989, 2011, 2012) uses metaphors to explain different concepts and the relationships between resources. For example, a development of resources may be visualized as a camel caravan in which resources support each other and their additive actions are worth more than a single resource. The concept of "loss spirals" (Hobfoll, 1989) is often used to explain why people with a low level of resources are more vulnerable to a loss of resources and less able to regain them, and are likely to take a defensive position to protect their resources, at least when under high stress. Thus, loss spirals develop because these people "lack the resources to offset loss. If resources are used to prevent loss of other resources, such loss would be predicted to lead to further decreases in the likelihood of possessing necessary resource reserves" (p. 519).

High Work-Family Conflict (WFC) and Family Work Conflict (FWC) as a Threat of Loss of Resources

The conflict between professional and family life is bilateral (Grzywacz and Marks, 2000): consequences of excessive job demands can be transferred into family life and *vice versa*; troubles at home can be transferred to work. We have adopted the terms work-family conflict (WFC) and family work conflict (FWC) from Netemeyer et al. (1996) who stated that "WFC is a form of inter-role conflict in which the general demands of, time devoted to, and strain created by the job interfere with performing family related responsibilities. FWC is a form of inter-role conflict in which the general demands of, time devoted to, and strain created by the family interfere with performing work-related responsibilities" (p. 401). According to Netemeyer et al. (1996) WFC seriously impairs the employee's performance. WFC may lead to a loss of resources in the process of seeking a compromise between work and family roles (Grandey and Cropanzano, 1999). In particular, when work is performed under miserable conditions and still involves the

responsibility for other persons' safety, employees with high WFC may deplete their personal resources such as energy, motivation and engagement. Excessive demands in the work domain may reduce the available resources and impair function in the family domain.

According to COR theory, high quantitative and interpersonal job demands lead to depletion of resources, mainly energetic and emotional resources, because demands require effort and costs, mainly in the form of physical, mental, and emotional energy. Next, an imbalance between work and private life can pose a threat to various resources. WFC means that the nurse's work uses up too many resources, which limits the use of these resources at home. Too much FWC means that the nurse's home requires more resources than are available, and that this situation impedes her work. Further, work engagement is related to motivation to invest one's resources as well as to retain and build resources. Engagement, as a resource, is the internal energy that is invested in the nurse's work. Finally, intentions of turnover, that is, of seeking a new job, can be an attempt to protect resources and prevent further losses. In conclusion, job demands, conflicts between work and family, work engagement, and turnover intentions are closely related to the management of personal resources. COR theory has been supported by past research on WFC and FWC (Grandey and Cropanzano, 1999; Netemeyer et al., 2005; Nohe et al., 2015; Lee et al., 2016).

Miserable Job Demands (Quantitative Workload and Interpersonal Conflicts at Work) Deplete Resources

Job demands may be experienced as important stressors that interfere with family life. We examine two types of nurses' job demands: those concerning the tasks to be carried out (quantitative workload, that is, too much work to do in too short time), and interpersonal relations (possible conflicts with patients, patients' families, and other medical staff).

Quantitative workload is defined as "the sheer volume of work required of an employee" (Spector and Jex, 1998, p. 358). Shaffer et al. (2011) have shown that job demands include broad categories of working hours and time pressure, work expectations and role stressors. Quantitative workload is correlated with role conflict and frustration (Spector and Jex), fatigue after the working day (Basinska and Wilczek-Ruzyczka, 2011) and burnout (Pisanti et al., 2011). A high workload is related to a certain level of uncertainty (feelings of worry and anxiety; Beehr and Bhagat, 1985), because an employee who has too much to do may neglect some aspects of work life or family life. The low ratio of nurses/patients leads to a high workload, which may result in excessive absorption, a difficulty to detach oneself from work. For example, if a nurse has too much work to do with her patients, she has to use extra resources in the form of emotional energy. If she has no such extra resources, and, in addition, has no assistants and too few co-workers, her resources are depleted.

Interpersonal conflicts at the workplace are one of the most important stressors (Keenan and Newton, 1985); for instance, the risk that nurses are exposed to violence is significant (Nachreiner et al., 2005; Happell, 2008). Conflicts at work are associated with lower efficiency of the team and lower productivity (Alper et al., 2000; Dunlop and Lee, 2004). Interpersonal conflicts at work range from minor disagreements to severe violence. Non-physical violence, however, such as incivility or serious verbal abuse directed at nurses, is more common (Spector et al., 2014). Acts of physical violence are most prevalent in psychiatric, geriatric and emergency departments, and are committed by patients in about two-thirds of cases, and by patients' family or friends in about one third. Approximately 10% of violent acts are committed by other nurses, physicians, or staff. The results from Polish studies are alarming (Merecz et al., 2006, 2009). A majority of nurses had experienced aggression in the form of raised voices and threats, and had experienced a dangerous attitude or vulgar behavior in the presence of co-workers and in the presence of patients (Kowalczuk et al., 2011). Interpersonal conflicts at work are a common stressor and they may be taken home (Spector et al., 2014). Therefore, our study examines the role that conflicts at work and the weight of workload may play in turnover intentions.

Work Engagement Promotes Investment and Protects Resources

Work engagement is an indicator of a personal (energetic) resource that is brought into an organization by the employees. Time spent working may be sometimes stressful, but it engages people and makes their working life meaningful. Work engagement is defined as "a positive, fulfilling work-related state of mind that is characterized by vigor, dedication, and absorption" (Schaufeli et al., 2002, p. 74). It is one of the most important components of subjective well-being at work (Bakker and Oerlemans, 2011). Vigor is reflected in high levels of energy and cognitive resilience while at work, the willingness to invest effort at work, and perseverance in the face of difficult situations at work. Dedication is reflected in an experience of a sense of significance, enthusiasm, inspiration, pride, and challenge while at work. Finally, absorption is reflected in the state of being fully focused and deeply engrossed in one's work, so much that time passes quickly and one has difficulty detaching oneself from the work.

We have assumed that work engagement is an indicator of a personal resource that is important for the employee's performance at work. A nurse is expected to develop smooth relationships with the patients, to be empathetic, and thus engaged. Work engagement is positively correlated with intrinsic motivation (Schaufeli and Salanova, 2007). An engaged employee is energetic, effective in work activities, and experiences himself or herself as able to deal well with work-related demands (Schaufeli et al., 2002). Employees who have high levels of work engagement are more committed to delivering high-quality performance at work, receive higher work ratings from their supervisors, are promoted more rapidly within the organization, and enjoy higher levels of gratitude from their customers (Schaufeli et al., 2001). An engaged employee is also willing to

carry out both in-role behavior and extra-role behavior at work (Bakker and Schaufeli, 2008). Thus, according to past research, it may be expected that at least one aspect of engagement, vigor, is negatively correlated with turnover intentions. Organizations can transform the engagement of employees as an organizational resource to build a competitive advantage. We suggest that different levels of work engagement indicate different degrees of investment of personal resources in the work process.

Turnover Intentions as Consequences of Threat of Loss of Resources

Employees adopt various strategies to manage stressors between work and home. One of these strategies is to develop a turnover intention, that is, considering leaving one's job. We define two turnover intentions: (a) the intention to leave the present workplace; and (b) the intention to leave the nursing profession. Turnover intentions are high in nurses throughout the world (e.g., Chan et al., 2008; Binkowska-Bury et al., 2010; Sawatzky and Enns, 2012; Homburg et al., 2013). The reason for turnover intentions is not only related to nurses' dissatisfaction with pay and benefits, as is true in Macao nurses (Chan et al., 2008). In Netherlands, it is also determined by the nurses' general dissatisfaction with management and leadership quality, with their inability and lack of possibilities to manage WFC/FWC, but not by career development opportunities (Homburg et al., 2013), while in Japan it is determined by unfulfillment of the psychological contract and to a lack of opportunity for advancement (Takase et al., 2016).

It should be noted that FWC has been found to be directly and indirectly related to turnover intentions in employees in a financial firm (Frone et al., 1997), school teachers and administrators, real estate sales personnel, small-business owners (Netemeyer et al., 1996), police department employees (MacEwen and Barling, 1994), government employees (Brotheridge and Lee, 2005), and bank employees (Hammer et al., 2003). Amstad et al. (2011) have shown that both WFC and FWC are positively correlated with turnover intention. Chen et al. (2015) showed that among Taiwanese nurses, WFC mediates the relationship between job satisfaction and turnover intention to leave the present organization. In addition, one's level of engagement is the key predictor of turnover intentions in Canadian registered nurses' working at emergency departments (Sawatzky and Enns, 2012).

Work-family conflict and FWC have been found to be moderately correlated, but their antecedents and consequences differ. Nohe et al. (2015) showed that WFC has a stronger effect than FWC on work-specific responses to demands such as burnout, depression, and psychosomatic symptoms. Byron's (2005) meta-analysis showed that WFC is related to the perceived intensity of occupational and family related stress. Mesmer-Magnus and Viswesvaran's (2005) meta-analysis showed that WFC has a moderate correlation with work overload and role conflict, as well as low correlations with many family related stressors (e.g., perceived family demand, parental demands, within-family personal conflict, time-commitment to family). In contrast, in a sample of Polish nurses (Baka, 2013), FWC had almost zero correlations with age, job seniority, and working hours per week. The only significant positive correlation (0.19) was between FWC and the number of children. The number of hours devoted to professional work was positively related to WFC in Baka's study. A similar pattern of correlations was shown in a convenience subsample of Polish women (Lubranska, 2014, **Table 3**).

Previous research has indicated that WFC is stronger than FWC (Grandey and Cropanzano, 1999; Netemeyer et al., 2005; Baka, 2013; Lubranska, 2014), that is, a negative impact of work on family life occurs more often than the reverse (Geurts et al., 2003).

In summary, according to COR theory, those who experience a high WFC feel high work stress because resources are lost in the process of combining work and family roles. Those who experience a high FWC feel that family duties compete for resources that are needed to fulfill their professional role. FWC may also interfere with work-related performance, but this aspect has rarely been investigated.

Rationale and Aims

The role of WFC/FWC with job demands and work engagement in turnover intentions in nurses is not well-investigated in post-transformational countries. We therefore aimed to investigate, using COR theory, the relationship between these variables in registered nurses in Poland.

Drawing on COR theory as our theoretical framework, we believe that: (1) Excessive demands harm personal resources, contributing to loss of resources; (2) WFC and FWC constitute a struggle for resources between two important domains of life, because if work demands are too high and one has to reconcile them with household chores, then one has to give something up, which leads to a threat of loss of resources; (3) Engagement is an investment of resources – to the benefit of patients but not necessarily leading to any reward for nurses; however, it may improve relationships with patients and in return build new resources for nurses (respect and recognition, improvement of professional, and social skills). Others have argued that conflict between one's professional and family lives may lead to exhaustion and burnout (e.g., Leineweber et al., 2014).

The present study focuses on turnover intentions, which is a current world-wide problem (Chan et al., 2008; Binkowska-Bury et al., 2010; Homburg et al., 2013). Using a cross-sectional design, we examine, in the framework of this theory, nurses' perceptions of job demands, work-family interface and work engagement, and to which extent these variables are associated with turnover intentions.

The aims of our study are twofold. Firstly, we examine the extent to which perceived job demands (workload and interpersonal conflicts at work) and engagement (vigor, dedication, and absorption) are associated with turnover intentions (the intention to leave the present workplace and the intention to leave the nursing profession). Secondly, we attempt to determine whether levels of WFC and FWC moderate these associations. Studies that seek to illuminate the role of such factors for the turnover intentions of Polish nurses have not previously been published.

MATERIALS AND METHODS

Rationale for Recruitment of Participants and Procedure

We were interested in examining a group that can truly experience WFC. We therefore aimed to focus explicitly on nurses who had additional duties at home and a responsibility for a family. Female nurses, employed in various hospitals and public or private clinics in southern Poland, and who were taking a continuing education course, required for registered nurses in the European Union, were invited to take part. They were not offered any reward for their participation in our study. The study was conducted in accordance with applicable ethical rules (the Helsinki Declaration) and was reviewed by the local ethics committee (DNR 2014/730 B 22, University West).

Those who accepted the invitation to take part in the study were informed in writing that participation in the study would be voluntary and anonymous and the data would be used for research only. They gave their written consent to participation in the study. Questionnaires were completed by the participants during the free time between lectures. Two-hundred and two questionnaires were returned. Data from 14 nurses, who did not fulfill the inclusion criterion of living with a partner and/or having children, were excluded. Data from the remaining 188 female nurses (mean age, $M = 41$ years, $SD = 5.5$, range: 28–56) were analyzed. Their average duration of employment was 19.5 years ($SD = 7$, range: 1–35 years). Around 70% of the participants had at least two children, which is a circumstance that may intensify WFC. **Table 1** presents descriptive statistics for the participants.

Measures

Quantitative workload was assessed by Spector and Jex's (1998) five-items Quantitative Workload Inventory (QWI). The Polish version was used (Baka and Cieslak, 2010). Responses are given on a scale of 1 (*Less than once per month or never*) to 5 (*Several times per day*). An example item is "How often does your job require you to work very fast?" The sum of scores of the five-items indicates the quantity of work in the participant's work situation. High scores correspond to a high workload. In the current study Cronbach's alpha was 0.80.

TABLE 1 | Individual and organizational characteristics of the nurses ($N = 188$).

Variable	*n*	%	Missing data
Has a partner	178	95	0
Has an employed partner	166	94	2
Has no children	9	5	0
1 child	49	26	
2 children	82	44	
3–5 children	48	25	
Supervises others	20	11	21
Works at a hospital[a]	120	64	33
Works at a public institution[b]	119	63	15
In full-time employment	168	89	8

[a]*The remaining participants worked at public or private clinics.* [b]*The remaining participants worked at a non-public or a private institution.*

Interpersonal conflicts at work were measured by Spector and Jex's (1998) four-items Interpersonal Conflict at Work Scale (ICAWS). The Polish version was used (Baka and Cieslak, 2010). Participants are asked to indicate on a five-point scale how often each of the four events described by the statements occurs at work. The response options range from 1 (*Less than once per month or never*) to 5 (*Several times per day*). An example item is "How often do you get into an argument with others at work?" High scores correspond to frequent conflicts with others, and describe how often the respondent experiences disagreements or is poorly treated at work. In our study, Cronbach's alpha was 0.61.

Work engagement was measured using the Polish version of the Utrecht Work Engagement Scale (UWES-9; Schaufeli and Bakker, 2003). The UWES-9 comprises nine statements that measure the concepts of vigor ("At my work, I feel that I am bursting with energy"), dedication ("I am enthusiastic about my job"), and absorption ("I feel happy when I am working intensely"). Each item is rated on a seven-point scale that ranges from 0 (*Never*) to 6 (*Always/every day*). The average of the sum of scores divided by the number of items gives the level of engagement. Higher scores indicate a higher work engagement. Cronbach's alpha in the present group was 0.73, 0.73, and 0.64 for vigor, dedication, and absorption, respectively.

Work-family conflict and family work conflict were measured by the Polish versions of the Work-Family Conflict and Family Work Conflict Scales (Netemeyer et al., 1996; Zalewska, 2008). These scales assess how work affects family life and *vice versa*. Each scale comprises five-items. The scale ranges from 1 (*Strongly agree*) to 7 (*Strongly disagree*). An example of an item from the WFC scale is "The amount of time my job takes up makes it difficult to fulfill family responsibilities." The items of FWC parallel the items of WFC, reversing the source of the stressor. Cronbach's alpha in the present study was 0.89 for WFC and 0.88 for FWC.

Turnover intentions were assessed by two single-item scales. **Intention to leave the present workplace** was measured by the following item: "During the recent period I have considered leaving this hospital/organization to begin work in another hospital/organization," while **Intention to leave the nursing profession** was assessed by the item "During the recent period I have considered leaving the nursing profession." Each item is rated on a four-point scale that ranges from 0 (*Never*) to 4 (*Always*). High scores indicate high levels of turnover intentions.

Control Variables

We asked nurses about their individual and family characteristics in order to describe the group. Some of these variables were chosen as control variables in our analyses, because these may denote degrees of family related duties and thus may relate to WFC/FWC and to turnover intentions. Those included nurses' age, number of children, living with a partner (coding 0 *without a partner*; 1 *with a partner*) and partner employment status (coding 0 *an unemployed partner*; 1 *an employed partner*).

Treatment of Data and Statistical Analyses

Standard descriptive statistics were used to summarize the data. Exact *p*-values for both significant and non-significant results, and bootstrap corrected, 95% bias corrected and accelerated confidence intervals (BCa CIs) around the means estimated for 1000 samples, were reported. Analyses were performed with SPSS version 23. The distributions of the variables were checked for severe deviations from normality. Non-parametric (Spearman's Rho, Kendall's tau) and Pearson correlation coefficients were calculated. The Bonferroni correction was applied to the significance tests.

The distribution of FWC was positively skewed (see **Figure 1**), and we therefore report median values of WFC and FWC. We compare values for these variables using a non-parametric test, the Wilcoxon signed-rank test. The effect size estimate was calculated using a *z*-score (see Field, 2013, p. 227).

We examined the effect on the dependent variables of being below or above the median in WFC and FWC. Those with median scores were not included in these analyses. Differences in the continuous variables between low and high groups were examined by independent *t*-test, and Levene's test was used to examine whether the two groups had equal variances. We computed effect sizes (Cohen's *d*) (Cohen, 1988) of the differences in means using an on-line calculator[1]. Differences in frequencies of two control categorical variables (has a partner, partner employed) were examined by Chi-squared tests. To assess the significance of the difference between two correlation coefficients, r_a and r_b, found in two independent samples, we calculated values of *z* using the Fisher *r*-to-*z* transformations through an online calculator[2].

We carried out two hierarchical multiple analyses in order to determine the relative importance of the measures examined for turnover intentions. Three control variables were included as a first step. In order to generalize our results to different groups of nurses we cross-validate the model by reporting two types of adjusted R^2; one computed by SPSS using Wherry's equation (Wherry, 1931), and another one, computed by hand, using Stein's formula (see Field, 2013, p. 312). The latter calculation was done because Wherry's equation has been criticized due to a poor ability to predict how well our regression model "would predict scores of a different sample of data from the same population" (Field, 2013, p. 312).

RESULTS

Descriptive Statistics

Work-family conflict was positively correlated with FWC (**Table 2**). This relationship was still significant after the Bonferroni correction, and the effect size was moderate.

[1]http://www.uccs.edu/~lbecker/

[2]http://www.vassarstats.net/rdiff.html

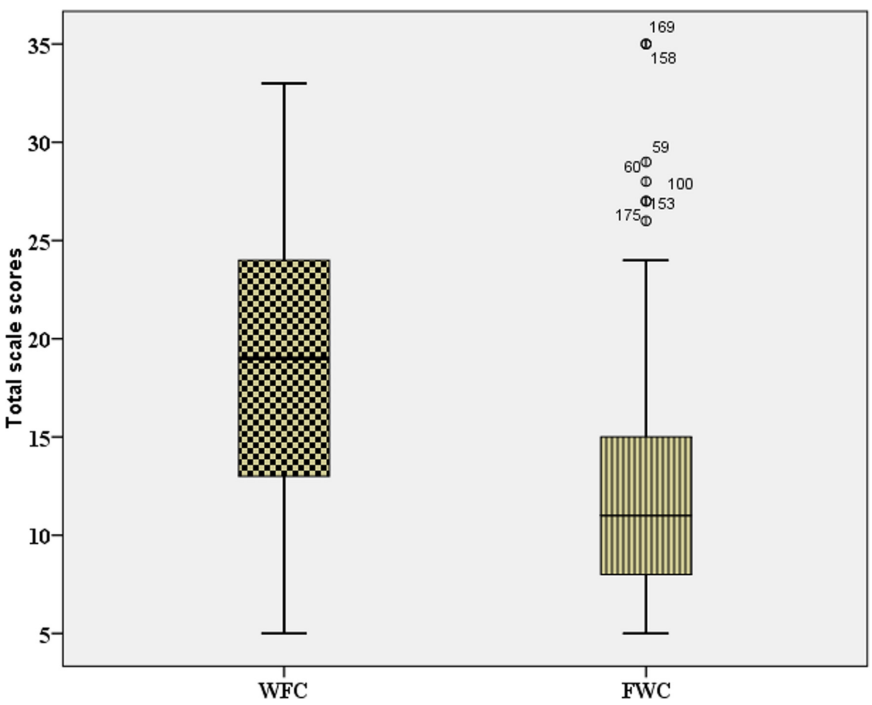

FIGURE 1 | The distribution of scores of work-family conflict (WFC) and family work conflict (FWC) for the group of Polish nurses (*N* = 188). The figure shows the minimum and maximum values, the medians (the dark lines inside the boxes), the lower quartiles (the bottom lines in the boxes), the upper quartiles (the top lines in the boxes), and extreme values (outliers) of the FWC.

Results in **Table 2** show also that WFC and FWC were positively related to job demands and to turnover intentions, and that WFC and FWC were negatively related to the components of engagement. Few correlations remained statistically significant after the Bonferroni correction. WFC was positively related to workload and to turnover intentions, and was negatively related to vigor. The strengths of these correlations, and thus, the effect sizes, were moderate. In contrast, FWC was positively related only to absorption, and this effect size was moderate.

The relative strength of WFC and FWC was examined by the related samples Wilcoxon signed rank test. WFC levels were significantly higher (median = 19) than FWC levels (median = 11), $T = 959$, $p < 0.001$, $r = -0.72$. The effect size of −0.72 corresponds to a large difference in the levels of these two measures (above Cohen's benchmark of 0.50). It is apparent that WFC was experienced with greater average intensity than FWC. **Figure 1** illustrates the distribution of the two variables.

To What Extent are Perceived Job Demands and Engagement Associated with Turnover Intentions?

Table 2 shows that the mean value of the intention to leave the present organization was larger than it was for the intention to leave the nursing profession. We compared these values using a paired *t*-test. The difference, 0.51, BCa 95% CI [0.41, 0.61], was significant $t(187) = 9.89$, $p < 0.001$.

We performed two separate hierarchical multiple regression analyses in order to examine the extent to which perceived job demands (workload and interpersonal conflicts at work) and engagement (vigor, dedication, and absorption) are associated with turnover intentions (the intention to leave the present workplace and the intention to leave the nursing profession). The control variables relevant for WFC (age, the number of children, has an employed partner) were introduced in step 1, and the variables related to personal resources (job demands, WFC, work engagement) were entered in step 2. The correlations of turnover intentions with FWC and absorption were weak (0.14, 0.12 and −0.03, −0.06, respectively, see **Table 2**), and despite the fact that past research has suggested that FWC predicts turnover intention (e.g., Brotheridge and Lee, 2005) we excluded FWC, as well as absorption, from the analyses.

Table 3 illustrates a summary of the regression model of antecedents of nurses' intention to leave the present workplace. The control variables had no impact: R^2 was significantly different from zero only at the end of the second step. The adjusted R^2 value of 0.37 indicates that more than a third of the variability in nurses' turnover intention to leave the present workplace is predicted by WFC, job demands (interpersonal conflicts at work, quantitative workload) and engagement (vigor and dedication). This regression model indicates that a high level of interpersonal conflicts at work contributes the most to that prediction while high quantitative workload and low vigor contributed modestly. Neither WFC nor dedication add anything to the prediction.

Table 4 presents a summary of the regression model of antecedents to nurses' intention to leave the nursing profession. Also in this model, R^2 was significantly different from zero only at the end of the second step, which means that control variables had no impact on this prediction. The adjusted R^2 value of 0.34 indicates that about a third of the variability in nurses' turnover intention to leave the nursing profession is explained by WFC, job demands (interpersonal conflicts at work, quantitative workload) and engagement (vigor and dedication). This regression model indicates that a high level of interpersonal conflicts at work contributes the most to that prediction, while high quantitative workload and low vigor contributed modesty. Neither WFC nor dedication add anything to the prediction.

The standardized regression coefficients (β), displaying the relative importance among all examined predictors in each regression analysis, indicate that the variable "Interpersonal conflicts at work" was the most important for turnover intentions.

Comparison between Nurses with Low and High Work-Family Conflict

There were no significant differences between those with low and high WFC in any of the examined control variables (data not shown). For example, the number of children was similar in those with low WFC ($M = 1.95$, $SD = 1.07$) compared to those with high WFC ($M = 1.99$, $SD = 0.87$). **Table 5** shows that participants with high WFC experienced significantly more job

TABLE 2 | Correlations and descriptive statistics of the variables for the participants ($N = 188$).

Variable	*M*	*SD*	*S*	*K*	1	2	3	4	5	6	7	8
(1) QW	19.17	3.81	−0.46	−0.28								
(2) ICAWS	7.33	2.85	0.91	1.05	0.07							
(3) VI	3.77	0.97	−0.12	−0.58	−0.09	−0.19						
(4) DE	4.51	0.98	−0.41	−0.29	0.03	−0.19	0.66*					
(5) AB	3.04	1.25	0.25	−0.75	0.18	−0.25*	0.21	0.29*				
(6) ILW	2.03	0.79	0.41	−0.27	0.26*	0.45*	−0.37*	−0.34*	−0.03			
(7) ILNP	1.52	0.67	0.93	−0.29	0.23	0.50*	−0.32*	−0.27*	−0.06	0.54*		
(8) WFC	18.45	6.53	−0.08	−0.81	0.38*	0.21	−0.25*	−0.14	0.09	0.35*	0.31*	
(9) FWC	11.96	5.48	1.42	3.19	0.12	0.11	−0.05	0.04	0.45*	0.14	0.12	0.31*

$p < 0.05$, after the Bonferroni correction (0.05/36 = 0.0014). S, skewness; K, kurtosis; QW, quantitative workload; ICAWS, interpersonal conflicts at work; VI, vigor; DE, dedication; AB, absorption; ILW, intention to leave the present workplace; ILNP, intention to leave the nursing profession; WFC, work-family conflict; FWC, family work conflict. Results are based on 1000 bootstrap samples (BCa CIs are not shown).

demands (quantitative workload and interpersonal conflicts) and significantly less engagement (vigor, dedication, and absorption) and greater turnover intentions than participants with low WFC. The effect sizes of the differences in means were large for both turnover intentions. The level (low vs. high) of WFC had non-significant effects on associations between turnover intentions and the examined variables.

Comparisons between Nurses with Low and High Family Work Conflict

There were no significant differences between participants with low/high WFC in any of the examined control variables (data not shown). Similarly as for WFC, the number of children was similar in those with low FWC ($M = 2.00$, $SD = 1.04$) compared with those with high FWC ($M = 1.95$, $SD = 0.99$). As is shown in **Table 6**, nurses with high FWC experience higher WFC than those with low FWC. The effect size of the difference was moderate. It should be noted that participants with high FWC had a significantly higher level of absorption. This effect size was large. Participants who experienced a high negative impact of family on work (those with high FWC) experienced also a higher frequency of interpersonal conflict at work and tended to want to leave the nursing profession. The effect sizes of the differences in means were small for both turnover intentions. The level (low vs. high) of FWC had non-significant effects on associations between turnover intentions and examined variables.

TABLE 3 | Linear model of antecedents of an intention to leave the present workplace, with 95% Bias corrected and accelerated (BCa) confidence intervals (CIs) in parentheses, among Polish nurses ($N = 188$).

Measure	*B* [BCa 95% CI]	*SE B*	β	*p*
Step 1				
Constant	3.07 [1.736, 4.372]	0.67		<0.001
Age	−0.02 [−0.037, 0.005]	0.01	−0.11	0.141
No of children	−0.05 [−0.172, 0.061]	0.06	−0.07	0.379
Has an employed partner	−0.14 [−0.581, 0.345]	0.24	−0.04	0.558
Step 1				
Constant	1.90 [0.404, 3.233]	0.68		0.006
Age	−0.01 [−0.024, 0.012]	0.01	−0.05	0.496
No of children	−0.01 [−0.113, 0.093]	0.06	−0.01	0.874
Has an employed partner	−0.07 [−0.368, 0.244]	0.15	−0.02	0.590
Work-family conflict	0.02 [−0.002, 0.039]	0.01	0.15	0.067
Interpersonal conflicts at work	0.09 [0.059, 0.123]	0.02	0.34	0.001
Quantitative workload	0.04 [0.004, 0.069]	0.02	0.17	0.030
Vigor	−0.18 [−0.310, −0.036]	0.02	−0.22	0.014
Dedication	−0.11 [−0.262, 0.038]	0.07	−0.14	0.132

$R^2 = 0.02$, adj$R^2 = 0.00$ for step 1 ($p = 0.386$); $\Delta R^2 = 0.38$, Adj$R^2 = 0.37$ (using Wherry's equation), and 0.32 (using Stein's equation, see Field, 2013, p. 312) for step 2 ($p < 0.001$). B, unstandardized coefficient; SE, standard error; β, standardized coefficient. CIs and SEs are based on 1000 bootstrap samples.

TABLE 4 | Linear model of antecedents of an intention to leave the nursing profession, with 95% BCa CIs in parentheses, among Polish nurses ($N = 188$).

Measure	*B* [BCa 95% CI]	*SE B*	β	*p*
Step 1				
Constant	2.26 [0.884, 3.413]	0.69		0.002
Age	−0.01 [−0.028, 0.015]	0.01	−0.05	0.500
No of children	−0.04 [−0.133, 0.050]	0.47	−0.06	0.390
Has an employed partner	−0.20 [−0.781, 0.362]	0.76	−0.07	0.469
Step 2				
Constant	0.90 [−0.534, 2.117]	0.72		0.203
Age	0.00 [−0.011, 0.018]	0.01	0.03	0.649
No of children	0.00 [−0.079, 0.087]	0.04	0.01	0.918
Has an employed partner	−0.12 [−0.609, 0.350]	0.21	−0.04	0.546
Work-family conflict	0.01 [−0.007, 0.024]	0.01	0.09	0.265
Interpersonal conflicts at work	0.10 [0.074, 0.123]	0.01	0.43	0.001
Quantitative workload	0.03 [0.001, 0.055]	0.01	0.16	0.024
Vigor	−0.14 [−0.267, −0.010]	0.06	−0.21	0.021
Dedication	−0.04 [−0.161, 0.088]	0.06	−0.06	0.512

$R^2 = 0.01$, adj$R^2 = -0.01$ for step 1 ($p = 0.646$); $\Delta R^2 = 0.36$, Adj$R^2 = 0.34$ (using Wherry's equation), and 0.29 (using Stein's equation, see Field, 2013, p. 312) for step 2 ($p < 0.001$). B, unstandardized coefficient; SE, standard error; β, standardized coefficient. CIs and SEs are based on 1000 bootstrap samples.

TABLE 5 | Comparisons between nurses with low and high values of work-family conflict (WFC).

Variable	Low WFC ($n = 92$)		High WFC ($n = 86$)		t	df	p	d
	M	SD	M	SD				
Intention to leave the present workplace (ILW)	1.75	0.69	2.31	0.77	5.16	176	<0.001	0.80
Intention to leave the nursing profession (ILNP)	1.34	0.54	1.71	0.73	3.79	156	<0.001	0.58
FWC	10.52	3.99	13.34	6.36	3.51	141	0.001	0.53
Quantitative workload	18.14	3.67	20.27	3.62	3.87	176	<0.001	0.58
Interpersonal conflicts	6.68	2.28	7.99	3.21	3.13	153	0.002	0.47
Vigor	4.04	0.93	3.49	0.94	3.97	176	<0.001	0.59
Dedication	4.75	0.93	4.27	0.99	3.36	176	0.001	0.50
Absorption	2.93	1.20	3.09	1.26	0.86	176	0.390	0.13
Correlations with ILW	$r_{\text{Low WFC}}$	p	$r_{\text{High WFC}}$	p		z	p	
Quantitative workload	0.12	0.123	0.26	0.014		0.95	0.342	
Interpersonal conflicts	0.47	<0.001	0.37	<0.001		0.80	0.424	
Vigor	−0.28	0.007	−0.36	0.001		0.58	0.562	
Dedication	−0.30	0.004	−0.24	0.030		0.42	0.675	
Absorption	−0.05	0.648	−0.01	0.903		0.26	0.795	
Correlations with ILNP								
Quantitative workload	0.18	0.084	0.17	0.125		0.07	0.944	
Interpersonal conflicts	0.49	<0.001	0.47	<0.001		0.17	0.865	
Vigor	−0.29	0.005	−0.23	0.030		0.42	0.675	
Dedication	−0.29	0.005	−0.17	0.110		0.83	0.407	
Absorption	−0.14	0.176	−0.03	0.776		0.73	0.465	

WFC, work-family conflict; FWC, family work conflict. The group with low WFC comprised participants with a value of WFC below the median of 19, while the group with high WFC comprised those with a value of WFC above this level. Participants (n = 10) with WFC = 19 were excluded from the analyses. p is two-tailed. Results are based on 1000 bootstrap samples (BCa CIs are not shown).

DISCUSSION

This study has examined the relationships between WFC, FWC, and relevant work-related variables in a group of nurses from Poland, a post-transformation country with a long tradition of high full-time employment rates for women (Matysiak and Steinmetz, 2008). It is known that an increase in work demands occurs over time in post-transformation countries, because of rapid changes in society, increased competition, and thus, more demanding work conditions. In summary, in our results, WFC and FWC were moderately correlated. Mean WFC was higher than mean FWC. WFC was positively related to quantitative workload and turnover intentions, and negatively related to vigor. In contrast, FWC was positively related only to absorption. Next, turnover intentions were predicted by high interpersonal conflicts at work, high quantitative workload, and low vigor. Further, nurses with high WFC (a negative impact of work on family life) experienced greater job-related demands (quantitative workload and interpersonal conflicts at work) and less work engagement (vigor, dedication) than nurses with low WFC (moderate effect sizes). In addition, they declared greater turnover intentions (large effect size). Finally, nurses with high FWC (a negative impact of family life on work) experienced higher levels of interpersonal conflicts at work and declared an intention to leave the nursing profession (small effect sizes), felt higher WFC, and had a higher level of absorption (moderate and large effect size, respectively) than those with low FWC. However, levels of WFC and FWC did not significantly moderate these associations.

The magnitude of WFC was greater than that of FWC in our study (**Table 2**), as has previously been shown in other countries (e.g., Grandey and Cropanzano, 1999), as well as in a convenience sample of Polish people (e.g., Lubranska, 2014). This was previously also shown in Polish nurses (Baka, 2013). This result is here confirmed in a new group of Polish nurses. It should be noted that mean values of WFC and FWC were higher in both samples of Polish nurses compared with Lubranska's sample, and that these values were greater in Baka's study than in the current study. We cannot state that the nurses in our study manage their resources more economically than those in Baka's study.

Work-family conflict was positively correlated (with a moderate effect size) with job demands, quantitative workload, and interpersonal conflicts. An excessive workload is one kind of work demand that is linked to WFC (Geurts et al., 2003). Further, the occurrence of interpersonal conflicts, which is an example of an emotional demand, is also linked to WFC (Peeters et al., 2005). WFC, but not FWC, had a positive correlation (moderate effect size) with turnover intentions, which is theoretically and empirically reasonable (Nohe and Sonntag, 2014; Chen et al., 2015). This result is not in line with the result of Grandey and Cropanzano (1999), which may be partly explained by the fact that WFC and intention to leave the current job were

TABLE 6 | Comparisons between nurses with low and high values of family work conflict.

Variable	Low FWC ($n = 90$)		High FWC ($n = 84$)		t	df	p	d
	M	SD	M	SD				
Intention to leave the present workplace (ILW)	1.92	0.80	2.11	0.79	−1.52	172	0.130	0.24
Intention to leave the nursing profession (ILNP)	1.40	0.63	1.66	0.70	−2.57	172	0.011	0.39
WFC	16.22	7.08	20.39	5.14	4.47	162	<0.001	0.67
Quantitative workload	18.98	4.10	19.54	3.43	−0.98	172	0.328	0.15
Interpersonal conflicts	6.86	2.75	7.76	2.95	−2.10	172	0.037	0.32
Vigor	3.89	0.94	3.65	1.00	1.56	172	0.120	0.25
Dedication	4.66	1.02	4.40	0.95	1.73	172	0.085	0.26
Absorption	2.66	1.33	3.52	0.04	−4.76	167	<0.001	0.91
Correlations with ILW	$r_{\text{Low FWC}}$	p	$r_{\text{High FWC}}$	p		z	p	
Quantitative workload	0.40	<0.001	0.17	0.113		1.63	0.103	
Interpersonal conflicts	0.46	<0.001	0.45	<0.001		0.08	0.936	
Vigor	−0.43	<0.001	−0.31	0.004		0.90	0.368	
Dedication	−0.38	<0.001	−0.24	0.028		1.01	0.313	
Absorption	−0.15	0.160	0.08	0.475		0.46	0.646	
Correlations with ILNP								
Quantitative workload	0.32	0.002	0.14	0.222		1.24	0.215	
Interpersonal conflicts	0.47	<0.001	0.55	<0.001		0.70	0.484	
Vigor	−0.36	0.001	−0.29	0.007		0.51	0.610	
Dedication	−0.33	0.002	−0.18	0.096		1.04	0.298	
Absorption	−0.22	0.038	−0.04	0.750		1.19	0.234	

WFC, work-family conflict; FWC, family work conflict. The group with a low FWC comprised participants with a value of FWC below the median of 11, while the group with a high FWC comprised those with a value of FWC above this level. Participants (n = 14) with FWC = 11 were excluded from the analyses. p is two-tailed. Results are based on 1000 bootstrap samples (BCa CIs are not shown).

assessed by other measures in the latter study. The strength of the relationship between FWC and one of the dimensions of engagement, absorption, was moderate. It is possible that absorption is related to an excessive commitment to work, and thus, excess investment of resources without gain. Nurses who are more absorbed by their work may feel discomfort when household responsibilities detach them from their beloved work.

The current study showed that high levels of interpersonal conflicts and high quantitative workload and low vigor predicted both an intention to leave the present workplace and an intention to leave the nursing profession. So a common important feature for the two types of turnover intentions is high job demands and a low level of vigor. Job demands deplete personal resources, especially energetic resources. Vigor represents additional energetic resources that can be invested, but in our study the nurses had no more energy to invest, neither in their present workplace nor in the nursing profession. In fact, they could only offer negative energy, their exhaustion, because about 20% of the variation in both turnover intentions was explained by poor vigor. Thus the relationship between interpersonal conflicts, quantitative workload and vigor seems to demonstrate competition for resources in two important domains: family and work. Low vigor predicted both types of turnover intentions, which is in line with the concept of loss spirals in COR theory (Hobfoll, 1989), as loss spirals develop when nurses lack energy to compensate for poor organizational resources in the form of work conditions. Miserable work conditions may kill the internal energy and willingness to invest effort in nurses' work activity. Employees who feel great vigor at work are highly motivated by their jobs and are likely to remain persistent when encountering difficulties (Mauno et al., 2006). In contrast, our nurses showed low willingness to invest effort in their work activity and did not show perseverance when faced with difficulties. It may be assumed that these nurses believe in better working conditions in a new workplace. Turnover is a strategy of managing the balance between work and family. The current trend toward globalization in the nursing profession, which provides good opportunities to leave the present workplace for another that may offer better working conditions, may improve the retention of nurses in their profession. It is, however, not a good solution for countries whose populations are aging and where many nurses are needed.

In our study, nurses with high scores for WFC and FWC differed from those with low scores in the degree of interpersonal conflicts at work. FWC was, however, more intense in nurses with high WFC. These results (see **Table 5**) are compatible with the COR theory, which predicts that personal resources (here: vigor and dedication) will deteriorate when excessive demands (here: quantitative workload and interpersonal conflicts at work) are experienced, like in our nurses with high WFC. In addition, these nurses tended to declare both an intention to leave the present workplace and an intention to leave the nursing profession.

In past research on Polish nurses (Baka, 2013), family size was found to intensify WFC, because nurses with many children may require more time and energy to invest in the children's school and free-time activities compared with nurses without children or with only one child, and these conditions are more manageable when one's partner is not employed. In the current study, however, family size (here, the number of children) or other traditional covariates in WFC research, such as an unemployed partner, were not significantly associated with either WFC or FWC, or with turnover intentions.

Our results are consistent with the COR theory, which states that when personal resources are depleted, people will conserve their remaining resources by intending to relieve the stress. Nurses' personal resources may be depleted and their self-esteem as professional nurses and respectable human beings may be threatened. One of the protesters on 24 May 2016, a nurse with 35 years of experience, said: "There are too few of us. But, unfortunately, we can't clone ourselves." This is a situation that is risky for patients' safety and the standard of work in the nursing profession.

The current study has its methodological shortcomings, which should be addressed. First, all studies on WFC/FWC are based on self-reports, which may increase the risk of common-method variance. Future research on the relationship between WFC/FWC and other work-related variables should comprise some objective indicators as alternative or additional measures. Second, the cross-sectional research design limits the possibility of drawing conclusions about the causal nature of the relationships and gives us no idea of changes in behavior and perceptions over time. Therefore, future studies that aim at explaining relationships between WFC/FWC, job demands, and engagement and turnover intentions in nurses may, preferably, have longitudinal/processual designs which gives us the possibility to employ path analyses. Third, Cronbach's alpha for absorption was relatively low in the present sample of nurses. A similar figure, however, was found in a large sample of Spanish nurses (Garrosa et al., 2011), and it should be remembered that this measure comprises only three-items. Fourth, the measure used to assess interpersonal conflicts suffers from limitations. Several recent studies (such as Sliter et al., 2014) have used modified versions of the scale, and asked respondents about different sources of work conflict. Fifth, turnover intentions have been operationalized with single-item measures that may be unreliable (Voydanoff et al., 1988; Rice et al., 1992). We argue, however, that in this case assessment by a single question is appropriate, and single-item measures of turnover intention have been successfully used in earlier studies (see, for example, Parasuraman, 1982). Finally, we have not considered links between non-work related variables and FWC. For example, we have not collected data concerning the number of children living at home (Kinnunen and Mauno, 1998). We assessed only the number of children, which had no significant associations with the studied variables. Examples of other demands that we have not examined are home workload (Peeters et al., 2005), caring for sick or elderly parents (Marks, 1998), marital conflicts (Fincham, 2003), family climate (Michel et al., 2011), and leader support (Nohe and Sonntag, 2014). In the future, a dyadic design, in which data regarding WFC/FWC are collected among the nurses' family members, could be considered. We had no opportunity to interview the nurses' family members and ask them how they experienced the nurses' work. We have at least gone one step further than those who only ask if their participants are married.

To which populations may our results be generalized? Our study was not planned to have a sample that possesses all the characteristics of the population in similar proportions. However, our nurses represent a broad range of experienced nurses with a mean age (41 years) similar to the mean age of Polish nurses (45 years). We therefore believe that generalization of our results is possible to Polish nurses in general. We can probably not generalize our results to male nurses, nor to nurses who have neither a partner nor children, but it should be remembered that 96% of Polish nurses are women, and the majority of them have a partner and/or children. Because our study concerns a new application of the concepts of COR theory, we have no similar results to compare with.

We argue that a poor work environment causes personal resources to acquire a different meaning for the employees than in more optimal conditions (Fischer and Boer, 2011; Xanthopoulou et al., 2012). Our results can possibly be applied to nurses from other countries, working under similar (poor) working conditions as those that participated in our study.

This is the first study that has examined how a constellation of WFC/FWC, job demands, and work engagement may predict turnover intentions of Polish nurses, based on COR theory. Future research should include additional measures (e.g., burnout, self-esteem, personality), and the present study may give some guidelines for which measures should be included in the regression model. Further, processual models are needed to investigate relationships between job characteristics that are related to the management of resources, as well as dyadic studies in the family or private domain. The integration of our results has been based on the group or phenomenon level, a more or less implicit assumption being that all nurses with a high WFC experience intense work demands, and experience these as a threat to their highly valued resources. The COR theory states that an individual's perception of what constitutes resources and what constitutes threats to these resources is strongly influenced by his or her values, which can, in turn, be regarded as the basis of culture (Hobfoll, 1989).

Some practical implications could be emphasized. Excessive workload and frequent interpersonal conflicts at work, as well as a lower degree of engagement, may lead to a lower efficiency of nurses, which may place the safety of patients at risk. The first practical aim for a manager should be the improvement of working conditions. Organizations need engaged employees not only to build competitive advantage, but also to enable development. This is particularly true in the service sector. The study of White et al. (2014, p. 1634) confirmed that work engagement can be considered to be a personal resource that an employee invests in the organization, and showed that "the engagement of nurses and front-line clinical teams is a major component of creating, developing and sustaining a culture of improvement." The engagement of nurses thus empowers ward teams to be active and innovative.

Guidance and counseling for nurses in Polish health organizations are required to retain them in the organizations and to promote decent working conditions and a happy life. To our knowledge, the current policy is to scare people not to strike, as this can lead to loss of their jobs, and foster them to believe that it is not possible to improve working conditions because there are no funds for this. Such policies may enhance turnover intentions. We suggest that intervention programs be developed, which should at least deal with the management of work conflicts. Such management is possible by, for example, recruitment and education of managers among experienced nurses and by formulation of guidelines regarding what kind of co-worker behavior is acceptable. In their study of registered nurses, Leineweber et al. (2016, p. 1) concluded that adequate staffing, good leadership, and support for nurses are crucial" for the nurses' mental health.

We have shown that stress indicators in form of high quantitative workload, interpersonal conflicts at work are significant predictors of turnover intentions. High turnover rates are currently a major problem in post-transformation countries, which is also a global problem. Our results highlight an awareness of the fact that interventions are needed to improve the working conditions of registered nurses, a measure which is in line with others' (e.g., Leineweber et al., 2016) suggestions for hospital managers to develop "policies and practices to facilitate the successful combination of work with private life for employees" (p. 1).

AUTHOR CONTRIBUTIONS

Both authors (AD, BB) substantially contributed to the conceptualization and design of the manuscript, as well as to the acquisition, analysis, and interpretation of data; drafted the manuscript and repeatedly revised and refined it critically for important intellectual content; approved the final version; agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. BB was responsible for the study design, prepared the set of questionnaires and the selection criteria for the sample, and also organized the data collection.

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From Exhaustion to Disengagement via Self-Efficacy Change: Findings from Two Longitudinal Studies among Human Services Workers

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This longitudinal research examined the relationship direction between burnout components (exhaustion and disengagement) within the context of personal resources measured by self-efficacy and social support. In line with the conservation of resources theory we hypothesized that exhaustion may trigger a spiral loss of personal resources where self-efficacy declines and subsequently, social support also declines and in turn predict disengagement. Participants in Study 1 were mental healthcare providers ($N = 135$) working with U.S. military personnel suffering from trauma. Participants in Study 2 were healthcare providers, social workers, and other human services professionals ($N = 193$) providing various types of services for civilian trauma survivors in Poland. Baseline and 6-month follow-up measurements included burnout components, burnout self-efficacy and perceived social support. The path analysis showed consistent results for both longitudinal studies; exhaustion measured at Time 1 led to disengagement at Time 2, after controlling for baseline disengagement levels. Across Study 1 and Study 2 these associations were mediated by self-efficacy change: Higher exhaustion led to greater decline in self-efficacy which in turn explained higher disengagement at the follow-up. Social support, however, did not mediate between self-efficacy and disengagement. These mediating effects were invariant across Studies 1 and 2, although the mean levels of burnout and personal resources differed significantly. The results contribute to a discussion on the internal structure of job burnout and a broader understanding of the associations between exhaustion and disengagement that may be explained by the underlying mechanism of change in self-efficacy.

Keywords: burnout, exhaustion, disengagement, self-efficacy, social support

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INTRODUCTION

Job burnout is recognized as one of the key consequences of job stress (Maslach et al., 2001). Its high prevalence was demonstrated across occupational groups of human services workers, reaching up to 67% for burnout in a community of mental health workers (Morse et al., 2012). Predictors of burnout and co-occurring mental health problems have been thoroughly investigated (Maslach and Leiter, 2008; Leiter et al., 2013; Cieslak et al., 2014). However, only a few studies have examined

the causal relationships among burnout components (Taris et al., 2005). Our study aims to fill this gap by examining the effects of exhaustion on disengagement, two core components of burnout. The effects of exhaustion on disengagement will be evaluated further in the context of potential indirect pathways through personal resources (via self-efficacy and social support; Schwarzer and Knoll, 2007).

Traditionally, burnout has been conceptualized as a prolonged response to chronic emotional and interpersonal stressors that occur in the work setting (Maslach et al., 2001). The three original components of burnout proposed by Maslach et al. (2001) are (1) emotional exhaustion; the feeling of being overstrained and depleted of emotional and physical resources, (2) depersonalization; a negative and cynical attitude toward people, and (3) reduced personal accomplishment; the tendency to evaluate one's work negatively and diminish one's own achievements. In the process of generalizing burnout to processes observed in occupations other than human services the original names of the burnout components were changed (Maslach et al., 2001). In particular, emotional exhaustion became exhaustion, depersonalization was replaced with cynicism, and reduced personal accomplishment was replaced with a lack of professional efficacy. Research confirmed that the three components of burnout were interrelated (Lee and Ashforth, 1996; Taris et al., 2005; Houkes et al., 2011).

Across several models of burnout, exhaustion is one of its key facets. For example Melamed et al. (2006) viewed burnout as a multidimensional construct consisting of emotional exhaustion, physical fatigue, and cognitive weariness. Other approaches suggested that burnout might be reduced to a single common experience of exhaustion (cf. Kristensen et al., 2005; Malach-Pines, 2005).

Yet another prominent model of burnout (Demerouti et al., 2001) assumed only two components, exhaustion and disengagement. In this model exhaustion accounts not only for affective, but also physical and cognitive aspects (Demerouti et al., 2001). Disengagement refers to both withdrawing oneself from work and creating negative attitudes toward one's work. Thus, disengagement is broader than depersonalization in that it refers to emotions toward the work as well as the relational elements such as engagement in work tasks or identification with one's work (Demerouti et al., 2001). Following this new conceptualization of exhaustion and disengagement, an alternative measure of job burnout was proposed (cf. Oldenburg Burnout Inventory; OLBI; Halbesleben and Demerouti, 2005).

Dropping the personal accomplishment component is in line with theoretical developments (cf. Demerouti et al., 2001) and meta-analyses pointing out that this concept may be difficult to distinguish from other constructs, such as self-efficacy (Cordes and Dougherty, 1993; Shoji et al., 2015). It has also been argued that the personal accomplishment component develops to a great extent independently from exhaustion and disengagement (Lee and Ashforth, 1993; Taris et al., 2005). Importantly, the independence of self-efficacy and personal accomplishment may be questionable (Cordes and Dougherty, 1993). A recent meta-analysis of 57 studies confirmed that compared to other burnout dimensions, personal accomplishment forms the strongest relationship with self-efficacy (Shoji et al., 2015).

Understanding the interplay between burnout components is also critically important to consider. Three different models have been proposed. First, Demerouti et al. (2001) indicated that exhaustion is a consequence of prolonged physical, affective, and cognitive work stress. Although, Demerouti et al. (2001) suggested that exhaustion and disengagement are not causally related, they assumed that exhaustion may develop faster than disengagement because of higher individual sensitivity to job demands. In contrast, Leiter and Maslach (1988) argued in their process model that chronic job stress leads to emotional exhaustion, which in turn causes depersonalization. These prolonged feelings of depersonalization may in turn result in reduced personal accomplishment. In comparison, Lee and Ashforth (1993) offered a different approach. In line with the process model, they suggested that depersonalization may result from emotional exhaustion. However, in contrast to Leiter and Maslach (1988), they argued that reduced personal accomplishment is derived from a heightened level of emotional exhaustion rather than depersonalization. The third model proposed suggested a phase approach (cf. Taris et al., 2005). The phase model begins with depersonalization in response to heightened work stress leading to negative beliefs about one's achievements. Emotional exhaustion then follows due to high depersonalization levels and low personal accomplishment beliefs.

Collectively these models proposed different directions for the relationships between burnout components. All three models suggested that exhaustion is a response to work stress (Leiter and Maslach, 1988; Lee and Ashforth, 1993; Demerouti et al., 2001) and two of the models (Leiter and Maslach, 1988; Lee and Ashforth, 1993) argued that exhaustion causes depersonalization.

There are a limited number of longitudinal studies investigating the direction of associations among job burnout components, yet the findings are relatively consistent. In support of the process model (Leiter and Maslach, 1988), Taris et al. (2005) found that exhaustion predicted depersonalization, which in turn predicted lack of accomplishments. Another longitudinal investigation (Diestel and Schmidt, 2010) indicated that exhaustion predicted depersonalization and that both exhaustion and depersonalization explained personal accomplishment, measured at a 12-month follow-up. A study with an 8-year follow-up provided evidence that exhaustion predicted cynicism (Toppinen-Tanner et al., 2002). Houkes et al. (2011) found that among women, emotional exhaustion triggered depersonalization, which in turn predicted reduced personal accomplishment. Among men, however, depersonalization preceded exhaustion (Houkes et al., 2011). This differential gender effect may result from differences in gender-related individual characteristics and differences in working conditions among men and women. For instance, Houkes et al. (2011) suggested that women may face more challenges in the areas of work-life balance, which may cause more emotional exhaustion among women. Men may use avoidance coping strategies more frequently than women. Depersonalization may reflect the use of avoidance coping (disengagement) and, therefore,

depersonalization may be more salient among men (Houkes et al., 2011). In sum, the majority of (albeit not all) the research suggested that exhaustion precedes depersonalization. Importantly, none of these longitudinal studies evaluated the underlying mediating mechanisms that may explain why exhaustion might lead to disengagement or cynicism. The present studies attempt to fill this void.

Self-efficacy and social support are among the most frequently examined resources that play important roles in understanding the development of work stress consequences such as burnout (Cordes and Dougherty, 1993; Perrewe et al., 2002; Smoktunowicz et al., 2015). Perceived social support represents the perception that help provided by others (e.g., coworkers, supervisors) is adequate and also refers to the perceived quality of support which facilitates adjustment (Schwarzer and Knoll, 2007). Self-efficacy is defined as one's beliefs in one's own ability to manage environmental demands and exercise control over one's own functioning (Bandura, 1997). According to social cognitive theory (Bandura, 1997; Luszczynska and Schwarzer, 2015) self-efficacy measures should be context-specific because self-efficacy itself is a context-specific belief. Self-efficacy measures applied in the context of burnout account for a broad range of work-related competences. For example, they cover workers' confidence that they can employ the skills necessary to deal with job-specific tasks, and ability to cope with job-specific challenges (Shoji et al., 2015). Yet, the systematic review by Shoji et al. (2015) did not identify a measure of self-efficacy that focused on these aspects of burnout. Previous research on burnout suggests developing and applying context-specific self-efficacy measures, because they better predict burnout and work-stress related outcomes (Salanova et al., 2002). Therefore, to gain a better insight into the relationships between burnout components research should apply a measure of self-efficacy focusing on dealing with burnout-related issues.

Theoretical models explaining burnout consistently propose that control beliefs (including self-efficacy) and social support constitute critical resources that are important to consider (cf. job demands-control-support [DCS] model, Karasek and Theorell, 1990; the conservation of resources [COR] theory; Hobfoll, 1989). Low levels of these resources lead to negative individual and organizational consequences, such as exhaustion and depersonalization (Karasek and Theorell, 1990). Cross-sectional and longitudinal research has confirmed that baseline levels of self-efficacy and social support independently explain disengagement (or engagement) and exhaustion (Llorens et al., 2007; Xanthopoulou et al., 2007; Huynh et al., 2013; Yu et al., 2015). The key limitations of models such as DCS is that resources are depicted as static. Consequently, studies inspired by these models examined baseline levels of resources rather than changes in resources. A notable exception is COR theory that takes a dynamic approach including resource change as a central mechanism (Hobfoll, 1989; Hobfoll et al., 2003).

COR theory (Hobfoll, 1989, 2011) suggests that a loss or depletion of a broad range of resources (e.g., emotional exhaustion and reduced motivation to engage in various challenging tasks) may cause further loss of personal resources (such as self-efficacy and social support). Hobfoll refers to this as a loss spiral. For example, the state of exhaustion may be used as a starting point for depicting the loss sequence between burnout and resources. Exhaustion can be viewed as one facet of resource depletion. The subsequent loss of personal resources in turn increases the likelihood of developing specific negative consequences (Hobfoll, 1989, 2011). Thus, it may be assumed that a high level of exhaustion captures a stage in the loss spiral that is followed by further losses of personal resources such as self-efficacy or perceived social support. Importantly, resources operate in sequence as "caravans" (Hobfoll, 2011), not as independent factors. People who exhaust their resources are most vulnerable to additional losses that lead to a further depletion of their resources (Hobfoll, 1989, 2011). Concluding, it may be assumed that exhaustion may be a precursor to a further loss of resources, causing a negative change in self-efficacy and a decline in perceived social support. This, in turn, would increase the likelihood of other negative consequences of work stress, such as disengagement (which may develop to prevent further loss of personal resources), absenteeism, and turnover.

We found one longitudinal study confirming that emotional exhaustion has an effect on self-efficacy and that self-efficacy may mediate the relationship between exhaustion and other burnout components (Brouwers and Tomic, 2000). A possible explanation of this effect is related to two sources of self-efficacy, namely mastery experiences and somatic/emotional states (Brouwers and Tomic, 2000). High levels of emotional exhaustion may lead to a reduction in mastery experiences. Moreover, aversive somatic and emotional arousal connected with exhaustion theoretically would also result in reduced self-efficacy beliefs (Bandura, 1997).

As suggested by Hobfoll (2011), resources do not operate in a parallel manner but rather they form "a caravan." Schwarzer and Knoll (2007) linked self-efficacy and social support by proposing the cultivation hypothesis. People with a higher levels of self-efficacy are more effective in finding, maintaining, and developing supportive social relationships, therefore, social support is maintained by self-efficacy. An alternative enabling hypothesis suggests that social support facilitates self-efficacy (Schwarzer and Knoll, 2007). Research conducted in the context of secondary traumatization among human services workers provided support for the cultivation hypothesis, but not for the enabling hypothesis (Shoji et al., 2014).

Our studies investigated the associations between two components of burnout, exhaustion and disengagement within the context of personal resources. We investigated the importance of changes in two primary personal resources, burnout self-efficacy and work related social support. The associations were tested in two longitudinal studies conducted among human services workers working in the U.S. and Poland with military and civilian clients. Specifically, it was hypothesized that exhaustion at Time 1 would predict disengagement at Time 2. Second, we hypothesized that the exhaustion—disengagement association would be sequentially mediated by changes in self-efficacy and changes in social support. These mediating

effects were tested after controlling for Time 1 disengagement. The hypotheses were tested controlling for years of work experience. This variable is one of the key determinants of burnout (Brewer and Shapard, 2004), producing similar effects across different cultures (Gill et al., 2012).

STUDY 1

Methods

Participants

Study 1 was a part of a larger study investigating secondary traumatic stress and job burnout among behavioral healthcare providers for U.S. military personnel. Inclusion criteria for this study included (a) working as a behavioral healthcare provider at least one year, (b) providing services for U.S. military personnel, and (c) being indirectly exposed to trauma through their work. Two hundred and ninety four participants (mean age = 48.87 years old [SD = 12.76], 66.3% women) completed the online survey at Time 1 (T1). Among those, 135 participants (mean age = 50.62 years old [SD = 12.58], 71.1% women) completed the online survey at Time 2 (T2). **Table 1** displays demographic information for completers (n = 135). At Time 1, participants reported various indirect traumatic experiences (i.e., secondary exposure through their work), including life-threatening illness or injury of a client or someone close (91.9%), combat exposure (91.1%), sudden unexpected death of someone close (90.4%), sexual assault (87.4%), physical assault (85.9%), transportation accidents (83.7%), natural disasters (68.9%), other serious accidents (63.7%), and other life threatening crimes (57.0%).

Measurement

Participants completed questionnaires assessing job burnout, self-efficacy for job burnout, social support, and demographics.

Burnout

Oldenburg Burnout Inventory (OLBI; Halbesleben and Demerouti, 2005) was used to assess emotional exhaustion and disengagement. Respondents rated the agreeableness for each statement regarding work-related distress on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Sample items included "Lately, I tend to think less at work and do my job almost mechanically" for the disengagement subscale and "After work, I tend to need more time than in the past in order to relax and feel better" for the emotional exhaustion subscale. Cronbach's alpha coefficients were 0.86 for disengagement at T1 and T2, 0.81 for exhaustion at T1, and 0.86 for exhaustion at T2.

Change in Burnout-Related Self-Efficacy

An 11-item Burnout Self-Efficacy Scale was applied to measure self-efficacy for dealing with job burnout (Lua, 2008). The scale was developed in line with Bandura's (1997) suggestion to construct self-efficacy measures with all items reflecting specific demands facing human services workers dealing with negative consequences of work stress. The initial research conducted among 252 Singaporean employees showed good reliability of the scale, with Cronbach's alpha of 0.93, and good discriminant validity, as shown by moderate correlations with other resource and burnout indicators (Lua, 2008). Each question begins with the stem "How capable am I to…," followed with items such as "deal with a feeling that this job wears me out" and "handle the feeling that my job is useless." The responses ranged from

TABLE 1 | Descriptive statistics for demographics for Study 1 (U.S. Data) and Study 2 (Polish Data).

Measure	Study 1: Time 1	Study 1: Time 2	Study 2: Time 1	Study 2: Time 2
Mean age in years (*SD*)	48.87 (12.76)	50.62 (12.58)	35.32 (8.48)	34.97 (8.06)
GENDER				
Female	66.3% (195)	71.1% (96)	76.1% (233)	79.3% (153)
Male	33.7% (99)	28.9% (39)	22.9% (70)	19.2% (37)
INTIMATE RELATIONSHIP				
In a long-term relationship	76.2% (224)	72.6% (98)	73.9% (226)	77.7% (150)
Not in a long term relationship	21.4% (63)	25.2% (34)	25.5% (78)	21.8% (37)
HIGHEST DEGREE				
High school	0.3% (1)	0 (0%)	20.6% (63)	18.1% (35)
Associate's degree	0.3% (1)	0 (0%)	–	–
Bachelor's degree	2.0% (6)	1.5% (2)	21.6% (66)	20.2% (39)
Master's degree	45.2% (133)	51.1% (69)	56.6% (172)	60.1% (116)
Doctorate degree	52.0% (153)	47.4% (64)	1.0% (3)	0.5% (1)
PROFESSION				
	116 CP (39.5%)	50 CP (37.0%)	148 HCP (48.4%)	89 HCP (46.1%)
	74 counselors (25.2%)	39 counselors (28.9%)	115 SW (37.6%)	78 SW (40.4%)
	57 SW (19.4%)	28 SW (20.7%)	38 others (12.4%)	23 others (11.9%)
	28 HCP (9.5%)	9 HCP (6.7%)		

Sample size for Study 1 was 294 for Time 1 and 135 for Time 2. Sample size for Study 2 for Time 1 was 306 and 193 for Time 2. Some percentages did not add up to 100% because of missing data. Long-term relationship included married couples and couples in a committed relationship. CP, clinical psychologist; HCP, health care provider; SW, social worker.

1 (*very incapable*) to 7 (*very capable*). In the present study Cronbach's alpha coefficient was 0.91 at T1 and T2. Standardized residual values were used as the index of change. To obtain the standardized residual values T2 self-efficacy was entered in the regression analysis as a dependent variable and T1 self-efficacy was entered as a predictor. A higher value of the index means a higher increase of self-efficacy whereas a lower value means a greater decrease of self-efficacy. A similar approach was used previously (Benight et al., 2008).

Change in Perceived Social Support

The Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988) was used to assess perceived social support. Respondents rated the agreeableness for each statement regarding their perception of social support from family, friends, and significant others on a 7-point scale ranging from 1 (*very strongly disagree*) to 7 (*very strongly agree*). The original instruction was modified to reflect support from family, friends, and significant others (including co-workers, and supervisors), enabling participants to cope with difficulties at work. Sample items included "I can talk about my problems with my family," "My friends really try to help me," and "There is a special person who is around when I am in need." Cronbach's alpha coefficient was 0.94 at T1 and T2. Similar to self-efficacy for job burnout, residual change scores were calculated as the index of change.

Demographics

We collected demographic information regarding the number of years of work experience, participants' age, gender, level of education, relationship status, occupation, and experiences with indirect exposure to traumatic events through their work.

Procedures

The Institutional Review Board at the authors' institution in the U.S. approved this study. The details of the procedures were described elsewhere (Cieslak et al., 2013a; Shoji et al., 2014). Potential participants received the invitation email containing the online survey link. They indicated whether they agreed to participate in the study on the online informed consent form. Those who agreed to take part in T2 assessment received the invitation email with the online survey link 6 months after the T1 survey. The mean time elapsed between T1 and T2 was 195.77 days ($SD = 20.00$).

Analytical Procedures

We used the maximum likelihood estimation method to impute missing data for 135 completers using IBM SPSS Amos (version 22). Measurement items for burnout, change in social support and self-efficacy were included in the full information maximum likelihood imputation. The assumption of this approach to data imputation is that the missing data must be missing at random (MAR). To assess MAR, Little's missing completely at random (MCAR) tests, which is more restrictive than MAR, were conducted in IBM SPSS (version 22) using gender, profession, and intimate relationship status as references. Results of the Little's MCAR tests showed missing data were MCAR for items for MSPSS at T1, $\chi^2_{(12)} = 8.09$, $p = 0.78$, items for self-efficacy for job burnout at T1, $\chi^2_{(11)} = 8.75$, $p = 0.65$, items for OLBI at T1, $\chi^2_{(30)} = 32.67$, $p = 0.34$, items for MSPSS at T2, $\chi^2_{(12)} = 8.87$, $p = 0.71$, items for self-efficacy for job burnout at T2, $\chi^2_{(12)} = 2.29$, $p = 0.99$, and items for OLBI at T2, $\chi^2_{(12)} = 27.37$, $p = 0.39$. In total, 0.08% of missing data were replaced (0.04% at Time 1 and 0.11% at Time 2). Mardia's coefficient indicated a slight deviation from multivariate non-normality (critical ratio of 3.43). We examined bootstrap confidence intervals of coefficients for consistency of results.

We tested the cultivation hypothesis in the sequential mediation analysis using Mplus (see **Figure 1**). We used exhaustion at T1 as the independent variable and disengagement at T2 as the dependent variable. Disengagement at T1 and years of work experience were used as covariates. In this model, the relationship between exhaustion at T1 and disengagement at T2 was sequentially mediated by the change index of self-efficacy and the change index of social support. Each indirect effect was tested using 95% bootstrap confidence intervals with 10,000 bootstrap samples. We used three fit indices to assess model-data fit. We used a cutoff point <0.10 for the root mean square error of approximation (RMSEA; Browne and Cudeck, 1993), a cutoff point >0.90 for the comparative fit index (CFI; Hu and Bentler, 1999), and a cutoff point <0.08 for the standardized root mean residual (SRMR; Hu and Bentler, 1999).

Results

Table 1 depicts the descriptive statistics for the demographic variables. **Table 2** displays correlation coefficients, means, and standard deviations for the study variables. Attrition analyses showed that dropouts had significantly higher disengagement at T1 than did completers, $t_{(292)} = 2.51$, $p = 0.01$, and completers were significantly older than dropouts, $t_{(288)} = 2.17$, $p = 0.03$. There were no significant differences between dropouts and completers in emotional exhaustion at T1, $t_{(292)} = 1.87$, $p = 0.06$, self-efficacy at T1, $t_{(292)} = 1.15$, $p = 0.25$, social support at T1, $t_{(292)} = 0.30$, $p = 0.70$, gender, $\chi^2_{(1)} = 2.56$, $p = 0.11$, profession, $\chi^2_{(3)} = 4.12$, $p = 0.25$, intimate relationship status, $\chi^2_{(1)} = 2.07$, $p = 0.15$, or education, $\chi^2_{(4)} = 5.01$, $p = 0.29$. Women and men did not differ significantly across the study variables (p-value range: 0.14–0.88).

Repeated measures analysis of variance indicated that burnout self-efficacy did not change significantly from T1 to T2, $F_{(1, 134)} = 0.44$, $p = 0.509$, $\eta^2 = 0.003$. Similarly, the levels of perceived social support remained similar across the measurement points, $F_{(1, 134)} = 1.63$, $p = 0.205$, $\eta^2 = 0.012$. In line with those findings a correlation analysis indicated relatively high stability across study variables, with T1 and T2 correlation coefficients ranging from 0.56 (self-efficacy) to 0.82 (social support). High correlations between T1 and T2 indicators of self-efficacy and social support may result in low variance of raw change scores and, therefore, limit the usefulness of such scores. Instead of raw change scores we applied residualized change scores. Residualized scores are weakly associated with T1 scores and maintain high reliability even when the correlations between T1 and T2 are high (Allison, 1990).

The examination of the hypothesized model assuming a sequential mediation effect of self-efficacy change and social support change in the relationship between exhaustion at T1 and

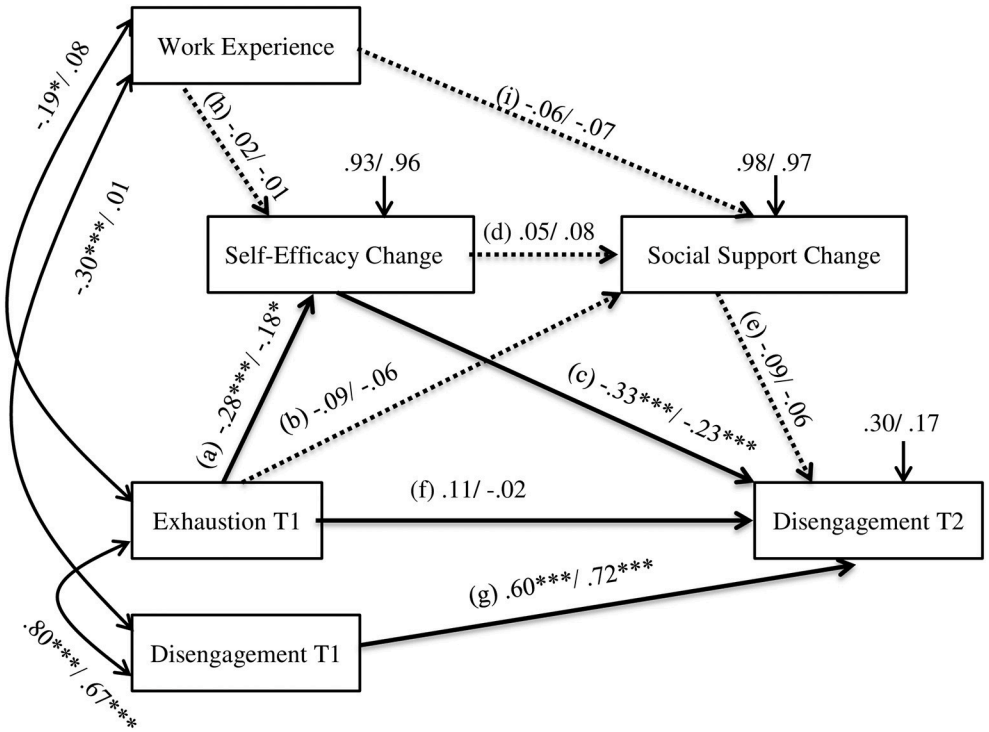

FIGURE 1 | Cultivation model with the sequential mediation effect of self-efficacy change and social support change in the relationship between exhaustion and disengagement. Values before the slash indicate standardized coefficients for Study 1. Values after the slash indicate standardized coefficients for Study 2. Dotted arrows indicate the pathways constrained to be zero in the analysis of nested models. Coefficients for unconstrained model in the test of invariance: **(A)** −0.28/−0.18, **(B)** −0.09/−0.06, **(C)** −0.32/−0.02, **(D)** 0.05/0.08, **(E)** −0.09/−0.06, **(F)** 0.10/−0.02, **(G)** 0.61/0.72, **(H)** −0.02/−0.01, **(I)** −0.08/−0.06. Coefficients for the final model with significant pathways and residuals constrained to be equal: **(A)** −0.22/−0.22, **(B)** −0.09/−0.06, **(C)** −0.25/−0.28, **(D)** 0.05/0.08, **(E)** −0.10/−0.06, **(F)** 0.02/0.02, **(G)** 0.71/0.66, **(H)** −0.01/−0.01, **(I)** −0.08/−0.06. ***$P < 0.001$, *$P < 0.05$.

disengagement at T2 showed that the model had adequate model-data fit, RMSEA = 0.032 (90% CI [0.000, 0.152]), CFI = 0.997, Tucker-Lewis Index (TLI; Tucker and Lewis, 1973) = 0.990, SRMR = 0.018. **Figure 1** shows standardized coefficients for each parameter in the model. Bootstrap confidence intervals and p values were consistent. Based on bootstrap confidence intervals, the pathway through the residuals of self-efficacy is significant (95% bootstrap CI [0.035, 0.187]). However, neither the pathways through the social support change (95% bootstrap CI [−0.016, 0.032]) nor the pathways through the self-efficacy change and subsequently social support change (95% bootstrap CI [-0.004, 0.006]) were significant. These results indicated that high levels of exhaustion at T1 predicted a greater decrease in self-efficacy, which in turn led to higher levels of disengagement at T2.

Additionally, we tested a nested model with nonsignificant pathways (from self-efficacy change to social support change, from T1 exhaustion to social support change, and from social support change to T2 disengagement) constrained to zero. Results showed that the nested model was not significantly different from the hypothesized model, $\chi^2_{(3)} = 4.79$, $p = 0.19$. Thus, this nested model may be accepted.

Discussion

The results of Study 1 did not support the cultivation hypothesis among behavioral healthcare providers working for U.S. military personnel. However, we found an indirect effect of a decline in self-efficacy in the relationship between exhaustion at T1 and disengagement at T2. In Study 2, to replicate these findings, the same model was tested among Polish professionals working with people suffering from an exposure to traumatic events.

STUDY 2

Methods

Participants

Study 2 was a part of larger study examining work-related resources and demands among human services professionals who were indirectly exposed to traumatic events through their work. Inclusion criteria for this study were (a) working at least 1 year as a healthcare or social service provider, (b) providing services for civilians who were exposed to traumatic events, and (c) indirectly experiencing traumatic events through their work. Three hundred and six participants (mean age = 35.32 [SD = 8.48], 76.1% women) completed the online survey at T1. Of those, 193 participants (mean age = 34.97 [SD = 8.06], 79.3% women) completed the online survey at T2. **Table 1** displays demographics for 193 completers for Study 2. At T1, they were exposed to a number of indirect traumatic events, including illness or injury to clients or loved one (89.6%),

TABLE 2 | Means, standard deviations, pearson's correlations among study variables for Study 1 (below the diagonal) and Study 2 (above the diagonal), and comparisons between data from two studies (Time 2).

Measure	1	2	3	4	5	6	7	8	9	Mean (*SD*) Study 1	Study 2	*t*	*d*	95% CIs
1. Disengagement T1		0.74***	0.67***	0.57***	−0.61***	−0.58***	−0.19***	−0.18*	0.01	2.35 (0.70)	2.71 (0.64)	4.92	0.53	0.22–0.51
2. Disengagement T2	0.77***		0.49***	0.66***	−0.45***	−0.58***	−0.12	−0.19**	−0.05	2.40 (0.75)	2.77 (0.65)	3.64	0.53	0.13–0.43
3. Exhaustion T1	0.80***	0.67***		0.69***	−0.69***	−0.61***	−0.22***	−0.15*	0.08	2.54 (0.70)	2.82 (0.69)	4.72	0.40	0.21–0.52
4. Exhaustion T2	0.64***	0.76***	0.77***		−0.57***	−0.60***	−0.21**	−0.22**	0.06	2.53 (0.76)	2.81 (0.60)	3.51	0.41	0.13–0.42
5. Self-efficacy T1	−0.58***	−0.35***	−0.52***	−0.38***		0.70***	0.23***	0.22**	−0.04	5.89 (0.89)	5.24 (0.98)	6.26	0.69	0.44–0.86
6. Self-efficacy T2	−0.55***	−0.62***	−0.52***	−0.61***	0.56***		0.23***	0.24***	−0.05	5.94 (0.81)	5.22 (0.95)	7.31	0.82	0.52–0.91
7. Social support T1	−0.32***	−0.31***	−0.29***	−0.23**	0.21*	0.17		0.31***	0.03	5.80 (1.08)	4.93 (1.58)	5.99	0.64	0.57–1.18
8. Social support T2	−0.29***	−0.34***	−0.29***	−0.30***	0.18*	0.1*	0.82***		−0.06	5.73 (1.16)	5.12 (1.36)	4.37	0.48	0.33–0.89
9. Work experience T1	−0.30***	−0.27***	−0.19*	−0.23**	0.34***	0.22*	0.03	−0.01		17.07 (11.36)	12.92 (9.18)	3.52	0.40	1.92–6.39

*Correlations in the lower diagonal region show values for U.S. data (Study 1). Correlations in the upper diagonal region show values for Polish data (Study 2). t-tests were conducted for each variable between Study 1 and Study 2. Sample sizes were 135 for Study 1 and 193 for Study 2. T1, Time 1; T2, Time 2. All t-scores were significant at p <0.001. **p <0.001, **p <0.1, *p <0.05.*

physical violence (88.1%), sudden unexpected death of loved one (84.5%), transportation accidents (72.0%), other serious accidents (64.2%), natural disasters (31.1%), sexual violence (51.3%), other serious life threatening crime (39.9%), combat (7.3%), other traumatic events (35.2%).

Measurement

We used the Polish version of the same measurements as in Study 1 to assess burnout, self-efficacy changes, social support changes, and demographics. Back translation was used to establish accurate translation from English to Polish. Cronbach's alpha coefficients were 0.80 for disengagement at T1,0.81 for disengagement at T1,0.83 for exhaustion at T1,0.78 for exhaustion at T2,0.91 for self-efficacy at T1 and T2, and.96 for MSPSS at T1 and T2. As in Study 1, residuals between self-efficacy at T1 and T2 and residuals between social support at T1 and T2 were used as the change indices.

Procedures

The Internal Review Board at the authors' institution in Poland approved this study. The details of the procedures were described elsewhere (Cieslak et al., 2013a,b; Shoji et al., 2014). The message for invitation to the study was posted on social networking websites for professionals who were potentially exposed to indirect traumatic events. After completion of the T1 assessment, those who agreed to take part in the T2 assessment received the invitation email. The mean time elapsed between T1 and T2 was 162.12 days ($SD = 39.39$).

Analytical procedures

The same analytical procedures and software were used as in Study 1 on 193 completers of the study. The Little's MCAR tests showed that missing data were MCAR for items for OLBI at T1, $\chi^2_{(76)} = 119.44$, $p = 0.45$, items for MSPSS at T1, $\chi^2_{(76)} = 89.69$, $p = 0.14$, items for self-efficacy for job burnout at T1, $\chi^2_{(64)} = 61.99$, $p = 0.55$, items for OLBI at T2, $\chi^2_{(136)} = 161.14$, $p = 0.07$, and items for MSPSS at T2, $\chi^2_{(55)} = 55.73$, $p = 0.45$. However, items for self-efficacy for job burnout at T2 were not MCAR, $\chi^2_{(76)} = 112.18$, $p < 0.01$. Items for self-efficacy at T2 contained only 0.22% of missing data; therefore, these items were imputed with other missing data. In total 0.56% of data (0.52% at Time 1, 0.62% at Time 2) were imputed as missing data. The same analytic approach was utilized as in Study 1 to test our primary hypotheses. Mardia's coefficient indicated a slight deviation from multivariate non-normality (critical ratio of 4.39). We examined the consistency between significance of coefficients and 95% bootstrap confidence intervals.

Results

Table 2 displays means, standard deviations, and Pearson correlations for 193 participants for Study 2. Attrition analysis showed that there were no significant differences between completers and dropouts in disengagement at T1, $t_{(304)} = 1.07$, $p = 0.29$, exhaustion at T1, $t_{(304)} = 0.16$, $p = 0.87$, self-efficacy at T1, $t_{(304)} = 0.44$, $p = 0.66$, social support at T1, $t_{(304)} = 0.92$, $p = 0.36$, age, $t_{(304)} = 0.92$, $p = 0.36$, gender, $\chi^2_{(1)} = 3.78$, $p = 0.05$, profession, $\chi^2_{(2)} = 1.77$, $p = 0.41$, and

education, $\chi^2_{(3)} = 4.51$, $p = 0.21$. Those who were in a long-term relationship tended to dropout more frequently, $\chi^2_{(1)} = 3.91$, $p = 0.05$. Emotional exhaustion at T1 was significantly higher among women ($M = 2.86$) than among men ($M = 2.59$), $t_{(188)} = 2.17$, $p = 0.03$. Women reported significantly higher social support at T2 ($M = 5.23$), compared to men ($M = 4.66$), $t_{(188)} = 2.31$, $p = 0.02$.

Repeated measures analysis of variance showed that burnout self-efficacy did not change from T1 to T2, $F_{(1, 192)} = 0.10$, $p = 0.752$, $\eta^2 = 0.001$. The levels of perceived social support remained similar across the measurement points, $F_{(1, 192)} = 2.35$, $p = 0.127$, $\eta^2 = 0.127$. Correlation analysis confirmed moderate-to-high stability across study variables, with T1 and T2 correlation coefficients ranging from 0.23 (social support) and 0.31 (self-efficacy), to 0.74 (disengagement). As in Study 1, we applied residualized change scores as the indicators of change in self-efficacy and social support.

Results of the sequential mediation analysis of self-efficacy change and social support change in the relationship between exhaustion at T1 and disengagement at T2 showed that the model had adequate fit, RMSEA = 0.080 (90% CI [0.000, 0.162]), CFI = 0.980, TLI = 0.919, SRMR = 0.034. Significance levels of all coefficients were consistent with results of 95% bootstrap confidence intervals. **Figure 1** displays standardized coefficients for parameters in the model. Bootstrap confidence intervals indicated that the pathway through self-efficacy change was significant (95% bootstrap CI [0.004, 0.079]). The pathway through social support changes (95% bootstrap CI [−0.003, 0.024]) as well as the pathway through self-efficacy change and social support change (95% bootstrap CI [0.000, 0.007]) were not significant.

As in Study 1, a nested model with constraints and the hypothesized model with no constraints were compared. In the nested model, three pathways were constrained to zero: from self-efficacy change to social support change, from social support change to T2 disengagement, and from T1 exhaustion to social support change. Results indicated that the nested model was not significantly different from the hypothesized model, $\chi^2_{(3)} = 3.96$, $p = 0.27$, therefore it may be accepted.

Test of Invariance of Associations Across Study 1 and Study 2

The invariance of the findings across the two studies was tested using a two-group model (see **Table 3**). The two-group hypothesized unconstrained model (Two-Group Model 1) was compared with the nested models. The Two-Group Model 2 had three pathways constrained to be equal across groups. These were the pathways that were significant in the one-group model analyses (from T1 exhaustion to self-efficacy change, from self-efficacy change to T2 disengagement, and from T1 exhaustion to T2 disengagement). These pathways were constrained to be equal (Model 2). In the next nested model (Two-Group Model 3), all structural covariances were constrained to be equal. Finally, the residuals of disengagement at T2 and residuals of self-efficacy change indices were constrained to be equal in the last nested model (Two-Group Model 4). Results showed that the Two-Group Model 2 and Two-Group Model 4 were not significantly different from the hypothesized model (Two-Group Model 1; see **Table 3**). Based on these findings, the nested model with significant pathways and residuals constrained to be equal across the two groups (Two-Group Model 5) was compared to the hypothesized model. Results indicated that (Two-Group Model 5) was not significantly different from the hypothesized unconstrained model (Two-Group Model 1). Thus, the nested model with significant pathways and residuals constrained to be equal across the two groups (i.e., participants of Study 1 and Study 2) may be accepted.

Test of Invariance of Associations Across Subsamples of Men and Women

Additional analyses aimed at testing invariance of the nested models across subsamples of men and women were conducted. The hypothesized two-group model without constraints was compared with the two-group nested models with constraints, assuming equal effects for both genders. The nested model developed for the test of invariance between Study 1 and Study 2 (cf. Two-Group Model 1) tested the invariance among men and women.

The two-group model with path coefficients constrained to be equal in men and women was not significantly different from the two-group model without constraints, $\Delta\chi^2 = 6.17$, $p = 0.10$. In addition, the two-group nested model with residuals constrained to be equal was not significantly different from the two-group model without constraints, $\Delta\chi^2 = 3.84$, $p = 0.15$. However, the two-group nested model with covariances constrained to be equal was significantly different from the two-group model without constraints, $\Delta\chi^2 = 20.58$, $p < 0.01$. Therefore, the two-group nested model with path coefficients and residuals constrained to be equal was compared to the two-group model without constraints. Results showed that these models were not significantly different, $\Delta\chi^2 = 9.40$, $p = 0.09$; thus, the two-group nested model, assuming equal paths and residuals among men and women may be accepted as the final model. The results indicated that pathways in the tested model were similar in the subsamples of men and women.

Differences in Mean Levels of the Study Variables: Comparing Study 1 and Study 2

The comparisons conducted for data obtained in Studies 1 and 2 indicated that there were significant differences in the mean levels of the study variables (see **Table 2**). The Polish sample had significantly higher scores for burnout indicators at T1 and T2 than did the U.S. sample. The U.S. sample, in comparison, had significantly higher scores for self-efficacy at T1 and T2, social support at T1 and T2, and indicated more work experience than did the Polish sample.

Discussion

The results obtained in Study 2 were consistent with the Study 1 findings. Specifically, high levels of exhaustion at T1 led to a larger decline in self-efficacy, which in turn resulted in a higher level of disengagement at T2. Furthermore, the two-group model analyses indicated that the associations between the key investigated variables were similar across Study 1 and Study 2.

TABLE 3 | Tests of Invariance for the Hypothesized Model between Study 1 and Study 2.

Model	Model description	χ^2	χ^2/df	NFI	$\Delta\chi^2$	ΔNFI
Two-Model Group Model 1	Hypothesized model	10.03	1.67	0.984	–	–
Two-Model Group Model 2	Significant pathways constrained to be equal	16.75	1.86	0.974	6.71	0.011
Two-Model Group Model 3	Covariances constrained to be equal	33.54	2.80	.947	23.51***	0.037
Two-Model Group Model 4	Residuals constrained to be equal	10.14	1.27	.984	0.11	0.000
Two-Model Group Model 5	Significant pathways and residuals constrained to be equal	16.88	1.53	0.974	6.85	0.011

*The model-data fit for the unconstrained model was acceptable, RMSEA, 0.045 (90% CI [0.000, 0.093]); CFI, 0.993; TLI, 0.967; SRMR, 0.034. The $\Delta\chi^2$ indicates a change in a χ^2 from the modified hypothesized model. A significant $\Delta\chi^2$ value indicates that the model was significantly different from the modified hypothesized model. N = 135 for Study 1 and 193 for Study 2. ***p < 0.001.*

GENERAL DISCUSSION

The findings obtained in two samples collected in different cultures provide novel evidence for the direction of the relationship between exhaustion and disengagement in the context of change in personal resources. Both samples demonstrate that exhaustion predicted disengagement approximately 6-months later. Additionally, the effects of exhaustion on disengagement were mediated by an index of change in self-efficacy beliefs where higher exhaustion led to a larger decline in self-efficacy across 6 months, which in turn resulted in higher disengagement levels.

The present study confirms the assumptions formulated in the process models advocated by Leiter and Maslach (1988) and Lee and Ashforth (1993). Besides confirming earlier findings (Toppinen-Tanner et al., 2002; Taris et al., 2005; Diestel and Schmidt, 2010) our two-study investigation points out that these associations are invariant (i.e., similar in strength) across two distinct samples of human services workers, differing in terms of country of employment, type of clients (civilian vs. military), or type of occupation. Furthermore, the associations are similar although the levels of burnout components or work experience vary across the samples.

Our investigation attempted to test for the underlying mediating mechanisms which may explain why exhaustion predicts disengagement. Therefore, it goes beyond previous theoretical and empirical approaches that assumed and tested the direct effects of exhaustion on disengagement (Leiter and Maslach, 1988; Lee and Ashforth, 1993; Toppinen-Tanner et al., 2002; Taris et al., 2005; Diestel and Schmidt, 2010). The findings are also in line with meta-analyses indicating that self-efficacy is relatively strongly related to burnout components across occupation groups, countries, and professionals' age and gender (Shoji et al., 2015). In line with the COR theory and the theorized loss spiral (Hobfoll, 1989, 2011), it appears that an individual's state of exhaustion may trigger a decline in personal resources (a negative change in self-efficacy beliefs), which in turn leads to greater disengagement. Thus, besides results obtained by Brouwers and Tomic (2000) that suggested the mediating role of the *levels* of self-efficacy, and in line with COR we indicated that the mediation between exhaustion and disengagement referred to a *change* in self-efficacy. This process offers a much richer appreciation for the coping dynamics involved with burnout. One could argue that the increase in disengagement is a specific coping response to a sense of increasing personal vulnerability comprised of physical fatigue and increasing self-doubt concerning one's capability to manage work related demands.

The effects of exhaustion on disengagement may be further explained by changes in other mediating mechanisms (e.g., personal growth) triggered by stressful events. So far, the mediating roles of evaluations of personal change (or self-evaluations other than self-efficacy) have been addressed in the context of indirect exposure to traumatic material at work (i.e., via traumatized client; cf. Shoji et al., 2014). Future research investigating exhaustion—disengagement association among various types of human services workers could utilize this approach and look for the mediating mechanism of spiral losses/negative changes in self-evaluations and beliefs such as identifying priorities in life or meaning in life (Arnold et al., 2005; Park, 2010).

In contrast to the "resource caravan" hypothesis (Hobfoll, 2011), we did not find that a change in self-efficacy and a change in perceived social support operated in sequence. Furthermore, we did not confirm the cultivation hypothesis, suggesting that self-efficacy prompts social support, which in turn affects workers' well-being (Schwarzer and Knoll, 2007). The effect of exhaustion on disengagement was explained only by self-efficacy changes. Our findings are partially in line with earlier research by Schaufeli et al. (2009). They found no evidence for the existence of a loss cycle that included social support loss (Schaufeli et al., 2009).

A lack of effect of social support on disengagement may result from the fact that this variable operates indirectly, via other resources. For example, social support may directly affect perceived personal growth (Shoji et al., 2014) and perceived personal growth may in turn be directly related to well-being outcomes. Thus, social support might have a potential to contribute to a spiral gain of other resources, reducing disengagement. Future, studies need to investigate if social support may operate in concert with other stress-related cognitions, contributing either to spiral loss or spiral gain of resources.

Burnout and personal resources are relatively stable. Longitudinal research conducted over periods ranging from 4 months to 7 years indicated that approximately one-third of variance of burnout and about a half of variance of resources

may be stable over years (for overview see Seppälä et al., 2015). Studies 1 and 2 applied relatively short follow-ups, but stability of analyzed constructs was similar to stability found in earlier research (Seppälä et al., 2015). The relatively high stability of resources and burnout may reduce the likelihood of finding the effects of change of resources (such as social support) on burnout components.

The present study has its limitations. Our approach to burnout focuses on its two dimensions, which are included into some but not all burnout models (cf., Melamed et al., 2006). Therefore, any conclusions referring to the internal structure of burnout should be treated with caution and not generalized beyond exhaustion and disengagement. We controlled for the number of years of work experience and observed the effects of work experience similar to those found in earlier research (for meta-analysis see Brewer and Shapard, 2004). However, we did not control for other potential confounders, such as job demands, job control, or other indicators of job stress.

Although, both of our studies were longitudinal, there were only two measurement points. A four-wave investigation would be optimal to test a sequential multiple mediation model with two mediators and we plan to conduct this type of investigation next. Regarding a methodological limitation related to a longitudinal design, the research procedures did not allow us to explain reasons for dropouts at T2. Relatively high attrition rates limit the generalizability of the findings. Although for a majority of variables we found no systematic dropout patterns, we observed trends indicating a systematic character of dropout for two variables in Study 1 and one variable in Study 2. In Study 1, participants with high disengagement (T1) were lost at the follow-up. Therefore, the findings of Study 1 may better reflect the effects observed for those whose burnout was lower at T1. Importantly, the findings of Study 1 and Study 2 revealed similar patterns of associations, and there was no systematic dropout for burnout indicators in Study 2.

Another limitation refers to the choice of self-efficacy measure. Although our findings suggested that the scale had good reliability and shared less than 38% of variance with other constructs, confirming its discriminant validity, future research testing the validity of the burnout self-efficacy scale are needed.

The study is also limited in that we tested only one direction from exhaustion to disengagement, which is in line with previous findings (e.g., Toppinen-Tanner et al., 2002; Taris et al., 2005; Diestel and Schmidt, 2010). Testing competing models could provide additional conclusions, however, the best test for the directions of the relations between exhaustion and disengagement could be obtained in multi-wave natural experiment studies observing workers from the first days of their employment throughout their professional career. Furthermore, we did not test competing hypotheses, such as job resources (e.g., self-efficacy and social support) predicting job burnout components or that job burnout components could explain job resources. Longitudinal studies carried over several years indicate that these relationships may be bidirectional (Seppälä et al., 2015). Future, research should further investigate the directions of the relationships among burnout components, self-efficacy, and social support.

Finally, in line with earlier findings (e.g., Shoji et al., 2014), we only tested the cultivation hypothesis. Future, research should consider alternative models to understand how self-efficacy and other personal resources (e.g., perceived social support) and environmental conditions (e.g., work related constraints) may interact when explaining burnout components. Accounting for other resources referring to social environments or self-beliefs would enrich our understanding of the mechanisms explaining how exhaustion influences disengagement.

In sum, this is the first longitudinal two-study cross-cultural investigation on how changes in personal resources mediate between exhaustion and disengagement, measured 6 months apart. Both studies consistently indicate that reductions in job burnout self-efficacy were determined by exhaustion and facilitated greater disengagement. Future research that includes the intersection of personal resources and environmental factors in untangling the negative components of burnout will help move this literature forward informing critical interventions. In particular, the findings may have some implications for prevention of the escalation of burnout. Interventions aiming at a reduction of negative consequences of work stress may target workers with higher levels of exhaustion and work to enhance their self-efficacy beliefs specifically related to the negative consequences of work stress.

AUTHOR CONTRIBUTIONS

CB, RC served as the P.I.'s on the project providing significant conceptual and design contribution and significantly contributing to drafting the manuscript. CB, RC, AR, CY were involved in data acquisition. KS, RC, AL, were involved in the statistical analyses for the projects. CB, RC, KS, AR, CY, AL AK were involved in manuscript preparation and final approval of the paper. CB, RC, KS, AR, CY, AL, AK agree to be accountable for all aspects of the work specifically to responding to questions related to the accuracy or integrity of any part of the work.

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REVIEW
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A Meta-Analysis on Antecedents and Outcomes of Detachment from Work

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Detachment from work has been proposed as an important non-work experience helping employees to recover from work demands. This meta-analysis (86 publications, $k = 91$ independent study samples, $N = 38{,}124$ employees) examined core antecedents and outcomes of detachment in employee samples. With regard to outcomes, results indicated average positive correlations between detachment and self-reported mental (i.e., less exhaustion, higher life satisfaction, more well-being, better sleep) and physical (i.e., lower physical discomfort) health, state well-being (i.e., less fatigue, higher positive affect, more intensive state of recovery), and task performance (small to medium sized effects). However, average relationships between detachment and physiological stress indicators and work motivation were not significant while associations with contextual performance and creativity were significant, but negative. Concerning work characteristics, as expected, job demands were negatively related and job resources were positively related to detachment (small sized effects). Further, analyses revealed that person characteristics such as negative affectivity/neuroticism (small sized effect) and heavy work investment (medium sized effect) were negatively related to detachment whereas detachment and demographic variables (i.e., age and gender) were not related. Moreover, we found a medium sized average negative relationship between engagement in work-related activities during non-work time and detachment. For most of the examined relationships heterogeneity of effect sizes was moderate to high. We identified study design, samples' gender distribution, and affective valence of work-related thoughts as moderators for some of these aforementioned relationships. The results of this meta-analysis point to detachment as a non-work (recovery) experience that is influenced by work-related and personal characteristics which in turn is relevant for a range of employee outcomes.

Keywords: detachment, meta-analysis, recovery, rumination, stress, work reflection

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INTRODUCTION

Early research on employee recovery from work indicates that stressful work characteristics can negatively affect physiological unwinding after work (Frankenhaeuser, 1981). However, it was the study of Etzion et al. (1998) that turned scholars interest to the specific role of *psychological* after-work recovery processes by introducing the concept of *detachment from work* (Sonnentag and Fritz, 2007). In a recent narrative review, Sonnentag and Fritz (2015) summarized relationships between work stressors, detachment, and employee well-being in the so-called "Stressor-Detachment Model" (SDM). Building on the SDM, our meta-analysis will examine antecedents and outcomes

of detachment. While Sonnentag and Fritz (2015) focus on job stressors as antecedents and strain and well-being as outcomes, our meta-analysis will expand their work in several ways. First, we go beyond the narrative approach of Sonnentag and Fritz (2015) by *statistically synthesizing* previous empirical data which allows a more precise interpretation of relationships between variables (Borenstein et al., 2009). Second, in addition to examining job demands and stressors as work-related antecedents of detachment we also include *job-related resources* which have been proposed as further antecedent (Kinnunen et al., 2011). Third, in our study, we also investigate the associations between detachment and person characteristics such as *demographic* factors (i.e., age, gender) and *psychological individual differences* (i.e., negative affectivity/neuroticism, heavy work investment). Moreover, fourth, we will explore the relationship between employees' work-related activities during non-work time and detachment. Fifth, in additional to well-being and strain, we also examine work motivation and job performance as outcomes of detachment. Finally, we statistically examine the potential moderating role of various study-related, individual, and conceptual variables for the functional relationships of detachment from work.

Detachment Concept

Etzion et al. (1998) introduced the term detachment to describe "the individual's sense of being away from the work situation" (p. 579). Sonnentag and Bayer (2005) describe psychological detachment as a state of distancing oneself mentally from job-related thoughts during non-work time. Thus, by definition employees are no longer occupied with work-related tasks neither in a physical nor in a mental way. Moreover, psychological detachment is an important recovery experience (Sonnentag and Fritz, 2007). Recovery is a process in which psychophysiological systems that were activated due to effort expenditure return to their baseline levels after work demands are removed (Meijman and Mulder, 1998). As a result, recovery from work can improve employees' mental and physical well-being, as it reduces physiological activation and increases work motivation as well as job performance by replenishing individuals' mental and physiological resources (Sonnentag and Geurts, 2009; Zijlstra et al., 2014). Below we discuss constructs similar to psychological detachment to create a broader conceptualization for this meta-analysis: detachment from work.

Dimension

In contrast to psychological detachment, which focusses on mental disengagement from or absence of work-related thoughts, other concepts like work rumination (Cropley and Zijlstra, 2011) or work reflection (Fritz and Sonnentag, 2005) point to the presence of work-related thoughts during non-work time. In our review, we regard them as opposite ends of one dimension of mental distancing from work during off-job time.

Context of Detachment

Detachment is a recovery process that occurs during non-work time (Sonnentag and Fritz, 2007). Geurts and Sonnentag (2006) contrast internal recovery (i.e., within working time) and external recovery (i.e., after finishing daily work). Thus, detachment can occur during work breaks (Coffeng et al., 2015), in the afternoon (Sonnentag and Bayer, 2005), in the evening (Sonnentag and Fritz, 2007), at the weekend (Fritz et al., 2010a), or in a longer recovery period like vacation (de Bloom et al., 2013). In our study, we only focus on detachment from work during *daily* non-work time (afternoon, evening) as it is most frequently studied in this research domain (Sonnentag and Fritz, 2015).

Valence of Work-Related Thoughts

According to Geurts (2014), recovery is characterized by three interrelated processes: behavioral reactions (no exposure to work demands) and cognitive processes (no work-related thoughts)—both are included in the definition of psychological detachment (Sonnentag and Fritz, 2015). The third type of process—affective reactions—refers to a decrease in negative and an increase in positive affect. Sonnentag and Fritz (2007, 2015) consider psychological detachment as an affectively neutral concept (Sonnentag and Fritz, 2015). However, if one cannot detach from work, the affective valence of work-related thoughts might determine the outcomes of recovery. For example, some authors propose that thinking about positive work events (positive work reflection: Binnewies et al., 2009; positive rumination: Frone, 2015) increases meaningfulness of work and self-efficacy, and helps to reevaluate work stressors and to develop new goals and plans. Thus, positively thinking about work during non-work time may even improve well-being, and performance capacity. Some research has pointed to negative affective processes (negative rumination: Frone, 2015; affective rumination: Cropley and Zijlstra, 2011; negative work reflection: Binnewies et al., 2009). More specifically, negative thoughts about work during non-work time might hamper recovery as they foster prolonging physiological activation and may reduce self-efficacy, control, and attentional capacity (Binnewies et al., 2009). Thus, we follow Sonnentag and Fritz's (2015) recommendation to examine the potential moderating role of valence of work-related thoughts during non-work time.

Recovery Process vs. Cognitive Irritation

While Sonnentag and colleagues (Sonnentag and Bayer, 2005; Sonnentag and Fritz, 2007, 2015) define detachment as a recovery process, Mohr et al. (2005) discuss problems in switching-off mentally from work as a mid-to-long-term strain reaction (cognitive irritation). In our research, we examine detachment as a daily recovery process that antecedes strain outcomes (i.e., health, well-being, motivation, and performance). Thus, we will not include studies that examine cognitive irritation according to the concept of Mohr et al. (2005).

Outcomes of Detachment

Recovery from work can affect psychological, physiological, and behavioral outcomes (Sonnentag and Geurts, 2009). For example—in the case of detachment—if an employee cannot detach from work in the evening, sleep might be impaired which could translate into adverse psychological (e.g., feeling fatigued), physiological (e.g., lower nocturnal recovery of blood pressure), and behavioral (e.g., shorter sleeping time) reactions. At work

the next morning, symptoms of fatigue and exhaustion might linger and, consequently, attention deficits occur which could result in more errors or lower work speed. In such situations, employees might also use adaptive strategies such as more effort investment to prevent a decline in work performance (Hockey, 1997). However, psychological and physiological costs of this strategy accumulate with time and at a certain point, work performance will decrease and more severe health problems will occur.

Considering the multi-symptomatic consequences of detachment from work, our meta-analysis will investigate the following outcome variables: *mental* (e.g., exhaustion, general well-being, life satisfaction) and *physical* (e.g., physical discomfort, dysregulation of physiological parameters) *health*, *state well-being* (e.g., fatigue, positive affect), *work motivation* (e.g., job engagement, intrinsic motivation), and *job performance* (e.g., task performance, contextual performance).

The Effort-Recovery Model (ERM; Meijman and Mulder, 1998) is helpful in explaining how detachment affects those four groups of variables. At work employees mobilize physical and psychological resources for goal-attainment (Quinn et al., 2012). Throughout the workday, these (limited) resources are depleted (Quinn et al., 2012) and adverse immediate load reactions develop with time-on-task. However, such consequences are reversible if resources are replenished during times in which demands are removed. The ERM further proposes, that if recovery is impaired repetitively, negative short-term load reactions will accumulate to adverse long-term consequences over time, especially when strategies like compensatory effort investment additionally decrease the remaining resources. For instance, Brosschot et al. (2005, 2006) argued that perseverative cognition about stressors prolong stress experiences and physiological stress reactions which was confirmed in a recent meta-analysis (Ottaviani et al., 2016). Thus, detachment from work is a useful recovery strategy to stop this chain of processes, because it separates employees mentally from further work demands and, thus, facilitates resource replenishment.

Some scholars have also noted that effects of detachment on these outcomes might be translated indirectly by other variables. For instance, high detachment was found to be positively related to a healthier life style (eating behavior: Cropley et al., 2012; alcohol use: Frone, 2015). In addition, detachment is positively related to non-work experiences like relaxation, mastery, or control (Sonnentag and Fritz, 2007) that further improve recovery from strain.

Based on this literature, we expect that detachment from work will be positively related to health, state well-being, work motivation, and job performance.

Antecedents of Detachment

Within the meta-analysis, we consider two broad groups of antecedents that have gained scholarly interest in research on detachment from work: *work-characteristics* and *person characteristics*. Moreover, we will focus on the role of *work-related activities during non-work time* covering both categories.

Work Characteristics

The SDM (Sonnentag, 2011; Sonnentag and Fritz, 2015) assumes job stressors as core negative antecedents of psychological detachment. Job stressors are factors in the work environment that lead to strain reactions. More broadly, Bakker and Demerouti (2007) define *job demands* as work characteristics that require sustained physical and/or psychological effort and, thus, are associated with physiological and/or psychological costs. Job demands can turn into job stressors if recovery from load reactions is impaired (Meijman and Mulder, 1998). In contrast, physical, psychological, or organizational factors that promote goal achievement, reduce job demands or their strain-related consequences, and stimulate personal growth, learning, and development are called *job resources* (Bakker and Demerouti, 2007). Kinnunen et al. (2011) proposed a *Job Demands-Resources-Recovery-Model* in which job demands are negatively and job resources are positively related to recovery (e.g., detachment) from work. Cognitive and affective processes may link work characteristics and detachment from work. Smit (2016) argues that low detachment might result from unfulfilled work goals that remain active and accessible even after work. On the one hand, high job demands might induce severe goal-discrepancies, which then result in problems cognitively disengaging from work (Martin and Tesser, 1996). On the other hand, by definition, job resources promote goal attainment (Bakker and Demerouti, 2007) and, therefore, should be positively related to detachment from work. Referring to affective processes, an experimental study Radstaak et al. (2011) showed that participants reported more severe problems to detach from a stressful work condition after inducing negative emotions than after an affectively neutral condition. In a more naturalistic work setting, Bono et al. (2013) showed that negative work events were related to lower detachment from work in the evening whereas positive work events were related to higher detachment. A recent study by Ohly and Schmitt (2015) revealed that positive and negative work events might arise from specific work characteristics such as higher job resources in the first case and higher job demands in the second case. Thus, specific affective work events and coupled positive or negative emotions might drive the relationship between work characteristics and detachment from work. We expect that detachment from work will be negatively related to job demands and positively related to job resources.

Work-Related Activities during Non-work Time

New information and communication technology (e.g., internet, smartphones, and laptops) makes work more flexible but also leads to increased employee availability during non-work time (Duranova and Ohly, 2016). The ERM (Meijman and Mulder, 1998) predicts that work-related activities during non-work time will increase strain reactions because they further deplete resources and shorten time for resource replenishment. Moreover, employees who engage in work-related activities during non-work time will report lower detachment from work as the physical and mental presence of work increases. Therefore, we expect that engagement in work-related activities during

non-work time will be negatively associated with detachment from work.

Person Characteristics

Research has pointed to the potential role of person characteristics in recovery processes (Geurts and Sonnentag, 2006; Sonnentag and Fritz, 2007, 2015). Such factors might be *attitudinal* in nature or more *biologically* determined. In our review, we focus on two important groups of attitudinal factors. First, among the well-known big five factors, emotional instability showed the highest negative correlation to detachment (Sonnentag and Fritz, 2007). *Neuroticism and negative affectivity* have been both defined as individuals' stable tendency to be more sensitive to experience negative emotions across time and situations (Watson et al., 1988; Costa and McCrae, 1992). We expect persons high in neuroticism and negative affectivity to report lower detachment as they experience work demands more intensively (Bowling et al., 2015). Second, some scholars discuss effects of work-related personality constructs that are all related to a general tendency of *heavy work investment* (Snir and Harpaz, 2012; workaholism: Oates, 1971; overcommitment: Siegrist et al., 2004; obsessive work passion: Vallerand and Houlfort, 2003). People high in heavy work investment spend more time and invest more energy in work-related activities. These behaviors reflect an inappropriate dependence on work activities. Thus, people high in heavy work investment should have more problems in becoming distracted mentally from work during non-work time and should report lower detachment from work.

For biological or demographic variables like age and gender there is to our knowledge no reason on the basis of existing literature to assume direct relationships with detachment from work. Therefore, we examine the relationships between detachment and both variables in an exploratory manner.

Moderator Variables

Detachment from work has been studied in various contexts, with different study designs, and with different samples over the years (Sonnentag and Fritz, 2015). Therefore, we examine possible moderating effects of *study location*, *study design*, and *demographic sample characteristics* (mean age, percentage of females) on all analyzed relationships. As mentioned above, Sonnentag and Fritz (2015) point to the *valence of work-related thoughts* during non-work time as potentially important moderating variable for the relationship between detachment and employee outcomes. Low detachment from work may not always be detrimental to employee outcomes (Cropley and Zijlstra, 2011). Based on these assumptions, we expect that recovery will be impaired the most if employees cannot detach from negative work-related thoughts during non-work time. Thus, we expect the strongest correlation between affectively negative measures of detachment and employee outcomes. In contrast, thinking about positive aspects of work during non-work time might even have positive effects on employee outcomes. Thus, we expect weaker correlations between detachment from work and employee outcomes here. For studies that measure detachment as affective neutral concept, we expect correlations that lie in-between.

Research Framework

We have summarized our general conceptual research model in **Figure 1**.

METHODS

Literature Search and Study Inclusion

Studies had to meet the following criteria to be included in our meta-analysis: (a) quantitative data reported, (b) employee sample, (c) assessment of absence (e.g., detachment) or presence (e.g., rumination, work reflection) of work-related thoughts during non-work time after a work shift (i.e., studies measuring work-related thoughts during time-intervals longer than 1 day or during work were excluded), (d) statistical association (*r*s, regression coefficients) reported between detachment from work and variables measuring work characteristics, or physical and mental health, or state well-being, or work motivation, or work performance, or person characteristics (age, gender, negative affectivity, neuroticism, heavy work investment), or time for daily work-related activities during non-work time, (e) publication in a scientific journal, and (f) article written in English.

We conducted a systematic and stepwise literature search according to the PRISMA statement (Moher et al., 2009) to identify such studies. The PRISMA study flow diagram is shown in **Figure 2**.

Identification of Studies

First, we screened several literature databases (PsycINFO, PsycARTICLES, and PubMed) with the following search string: (detachment OR switch-off OR off-job engagement OR ruminat* OR work reflection) AND (work* OR occupation* OR job* OR employ*) for the years 1998 (first publication on detachment from work, Etzion et al., 1998) to December 2014. Second, we used a forward search for the first publication of the major measurement instrument in this type of research (Recovery Experience Questionnaire; Sonnentag and Fritz, 2007). Third, we checked the references of the last systematic and narrative review on psychological detachment (Sonnentag and Fritz, 2015) for additional publications. This initial search yielded 2210 studies. After removing duplicates 1921 potential studies remained.

Screening

We excluded 1730 studies after screening titles and abstracts (no thematic fit: $k = 1722$, no English publication: $k = 6$, no scientific journal publication: $k = 2$).

Eligibility

We checked $k = 191$ full-text articles for inclusion. We excluded $k = 120$ studies for the following reasons: (a) no quantitative study ($k = 15$), (b) no employee sample ($k = 11$), (c) measure of detachment from work was inappropriate (trait measures, no work-related detachment, detachment from work during rest breaks or non-work periods longer than 1 day, $k = 80$), (d) no

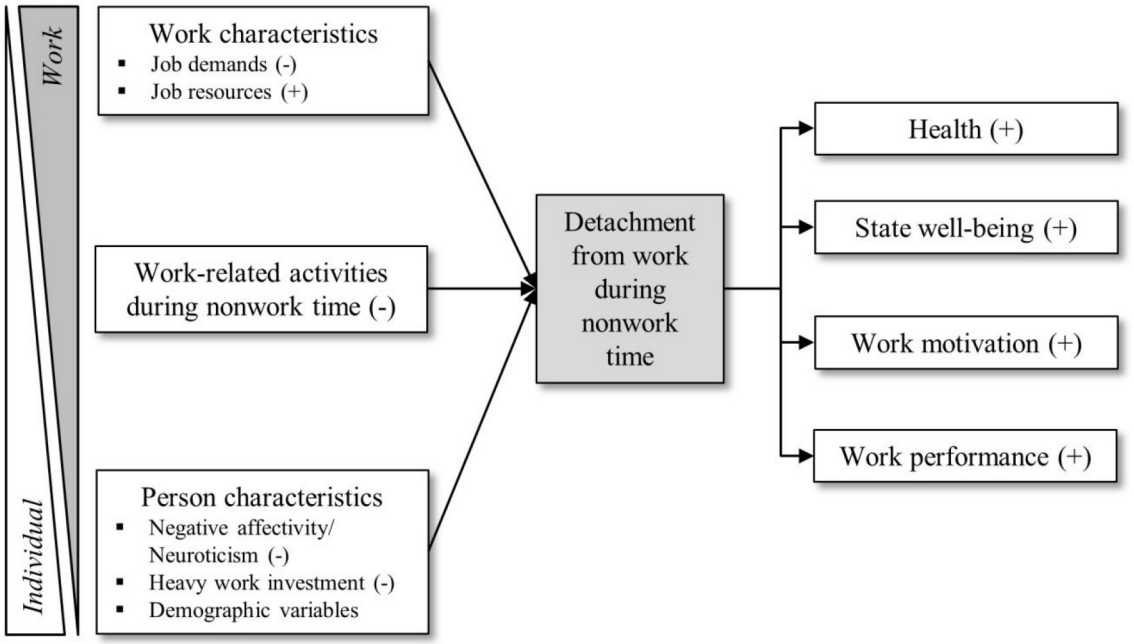

FIGURE 1 | Conceptual research model for relationships between detachment from work during non-work time and selected antecedents and outcomes (direction of assumed relationships in brackets).

associations to our core independent and dependent variables reported ($k = 11$), (e) double publication of data ($k = 3$).

Inclusion

The sample for inclusion consisted of 71 publications with $k = 75$ independent study samples. After this original search and a first run of analyses, we updated our literature search for the period 01/2015 to 12/2015 according to the scheme described above. This yielded 15 further publications for study inclusion. The final sample in our meta-analysis consisted of data from 86 publications with $k = 91$ independent study samples ($N = 38{,}124$ employees).

Study Coding

Detachment from Work

Detachment was operationalized as absence of work-related thoughts during daily non-work time. However, we also coded studies using inverse measures, thus, asking for the presences of work-related thoughts during non-work time (e.g., rumination, work reflection, problem solving pondering).

Outcomes of Detachment

We examined the following employee outcome variables: (a) physical and mental health, (b) state well-being, (c) work motivation, and (d) work performance. *Health-related variables* were physiological stress indicators (e.g., systolic and diastolic blood pressure, cortisol, heart rate variability), self-reported physical discomfort (e.g., negative physical symptoms and physical complaints), sleep (e.g., sleep quantity, sleep quality, sleep inconsistency, sleeping time), well-being (e.g., general well-being, psychological health, trait positive affect, mental complaints, anxiety, distress, depressive symptoms, trait negative affect), burnout (exhaustion, other dimensions as cynicism), and life satisfaction. As *state well-being* we coded measures as fatigue (e.g., fatigue, need for recovery), affect (e.g., state positive and negative affect; all coded in a positive affective direction), and self-reported state of recovery. *Work motivation* was represented by measures such as work engagement, intrinsic work motivation, and commitment. We coded three aspects of *work performance*: task performance (e.g., task or job or work performance, service rule commitment), contextual performance (e.g., personal initiative, organizational citizenship behavior), and creativity.

Antecedents of Detachment

Work characteristics

We coded correlations to two types of work characteristics according to the Job Demands-Resources Model (Bakker and Demerouti, 2007): job demands and job resources. We used the definitions of Bakker and Demerouti (2007) as well as the checklist of Schaufeli and Taris (2014) for categorization of measures in the primary studies. *Job demands* included measures of quantitative work demands (e.g., time pressure), social conflicts (e.g., bullying), role stressors (e.g., role conflicts), emotional demands, working hours, and others (e.g., shift work, situational constraints, cognitive demands, insecurity, self-control demands, illegitimate tasks, and physical demands). *Job*

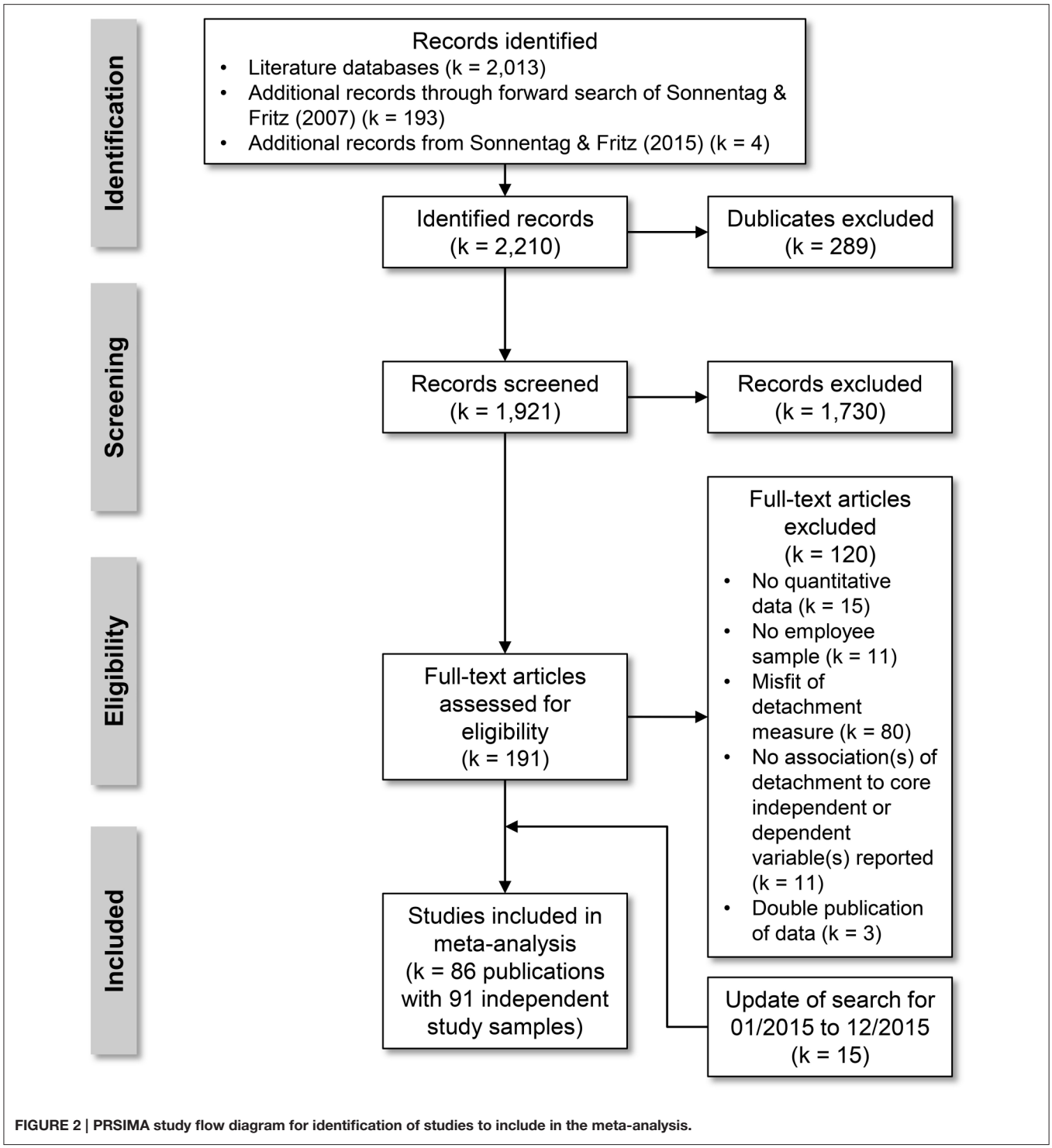

FIGURE 2 | PRSIMA study flow diagram for identification of studies to include in the meta-analysis.

resources included measures as job control (e.g., autonomy, control), social support (e.g., supervisor support, support from colleagues), and others (e.g., organizational justice, positive affective events, learning and developmental opportunities, cognitive resources, emotional resources, physical resources, task variety).

Work-related activities during non-work time

We assessed correlations to two measures of engagement in work-related activities during non-work time. First, self-reports about time employees use for work-related activities during non-work time and second, self-reports about media or technology use for work-related activities during non-work time (e.g.,

work-related smartphone use during non-work time, work-related technology use).

Person characteristics

As person characteristics, we investigated demographic variables and psychological traits. We coded age and gender (positive correlations for females) as *demographic variables.* As psychological traits, we coded measures of *negative affectivity/neuroticism* (e.g., negative affectivity, neuroticism, emotional instability) and *heavy work* investment (i.e., workaholism, overcommitment, work addiction, working compulsory).

Potential Moderator Variables

We assessed *study-related variables* as study location (Europe, USA/Canada, others) and study design (cross-sectional with one measurement occasion, diary study, and longitudinal) for each sample. Moreover, we recorded *demographic study differences* as the percentage of females and employees' mean age. In addition, as highlighted above, we examined the moderating role of *affective valence* concerning detachment. Thus, we coded the valence of work-related thoughts in these measures as neutral (e.g., detachment), negative (e.g., rumination, negative work rumination, negative work reflection, affective rumination), and positive (e.g., positive work reflection, positive work rumination, problem solving pondering).

Meta-Analytic Strategy

For each study, we assessed between-person correlation coefficients as measures of effect sizes. In one case (Coffeng et al., 2015) we used Comprehensive Meta-Analysis software 2.2 (Biostat, Inc, Englewood, NJ) to convert the reported unstandardized beta-weight into a correlation coefficient. We standardized the direction of correlation coefficients between studies to produce consistent meanings of effect sizes. For instance, associations of variables to inverse measures of detachment (e.g., rumination or work-related thoughts during non-work time) were recoded. We used prospective and lagged correlations in longitudinal studies and between-person associations of aggregated measures in diary studies. Moreover, we calculated composite effect sizes according to the formula of Hunter and Schmidt (2004) wherever multiple associations between constructs of interest were reported. This occurred in three cases: (a) correlations between multiple measures of psychological detachment (e.g., positive and negative work reflection) and the outcome, (b) correlations with multiple outcome variables of one construct (e. g, sleep latency and sleep quality), and (c) correlations with constructs that are measured several times (e.g., emotional exhaustion after 6 months and 1 year). This procedure is necessary given that independency of effect sizes is required to pool those (Borenstein et al., 2009).

We aggregated effect sizes according to the approach suggested by Hedges and Olkin (1985) and calculated sample size weighted mean correlations $\bar{r}$ with a random-effects model (Borenstein et al., 2009). For all relationships we report the number of studies k, the cumulative sample size N, the sample size weighted mean correlation $\bar{r}$ and its 95% confidence interval (CI). If the 95% CI excludes zero, the mean effect is significant with $p < 0.05$ (two-tailed). We used Cohen's (1992) rules of thumb for effect size evaluation ($r \geq 0.1$ small, $r \geq 0.3$ medium, and $r \geq 0.5$ large) and only interpreted pooled correlations based on ks ≥ 5.

We calculated I^2-statistics to estimate the heterogeneity of effect sizes. The I^2 indicates the proportion of the observed variance reflecting real differences in effect sizes and is a measure for the inconsistency of findings across the aggregated study effects (Borenstein et al., 2009). Values of $I^2 \geq 25\%$ indicate at least some (25% = low, 50% = moderate, 75% = high) heterogeneity, and thus point to the potential existence of moderator variables. In addition, we report 95% prediction intervals (PI; Borenstein et al., 2009; IntHout et al., 2016) indicating the distribution of true effects around the pooled mean effect. While the 95% CI is a measure for the precision of the mean effect, the 95% PI describes the range of effects that may be expected in future studies. We examined effects of categorical moderators with subgroup analysis (Q_{Between}-statistics). We applied mixed effects meta-regression modeling (unrestricted maximum likelihood method) for interval scaled moderators. We conducted moderator analyses only for variables with a sufficient number of studies (ks = 10) and interpreted categorical moderator effects only in cases of subgroup-ks ≥ 5. For significant moderator effects we also report the τ^2-based index R^2 indicating the amount of between-study variance that is explained by the moderator variable (Borenstein et al., 2009). As multiple comparisons in meta-analytical moderator analyses might inflate type I error rates (Cafri et al., 2010) these results should be interpreted with caution.

In addition, we present results from several analyses regarding the sensitivity of results and the impact of a potential publication bias.

All analyses were conducted with Comprehensive Meta-Analysis software 2.2 (Biostat, Inc, Englewood, NJ).

RESULTS

Description of Samples and Measures

The mean age of employees in the samples was 39.9 years and the mean percentage of females in the studies was 55%. Fifty-four studies (over 50%) were published between 2013 and 2015. Most samples were from Europe ($k = 63$). Study samples sizes were left skewed distributed with $Mdn = 143$ and $M = 419$ (range: 48–5210) participants.

Most of the studies assessed detachment from work as an affectively *neutral* type of absent work-related thoughts during non-work time ($k = 75$) and used the detachment scale of the Recovery Experience Questionnaire ($k = 67$; Sonnentag and Fritz, 2007). We found only a few studies that assessed detachment as absence or presence of negative (*negative valence*, $k = 17$) or positive (*positive valence*, $k = 8$) work-related thoughts during non-work time.

For all core constructs the measures' mean Cronbach's αs were > 0.75 ($\text{detachment}_{\text{negative}}$: 0.87, $\text{detachment}_{\text{neutral}}$: 0.86, $\text{detachment}_{\text{positive}}$: 0.87, physical discomfort: 0.80, sleep 0.76, life satisfaction: 0.87, exhaustion: 0.87, burnout-others:

0.80, well-being: 0.84, fatigue: 0.85, affect: 0.84, state of recovery: 0.92, work motivation: 0.88, task performance: 0.81, contextual performance: 0.82, creativity: 0.84, job demands: 0.81, job resources: 0.80, work-related activities during non-work time: 0.78, negative affectivity/neuroticism: 0.81, heavy work investment: 0.78).

Outcomes of Detachment

We aggregated data from $k = 75$ studies ($N = 29{,}587$; 319 effect sizes) to examine relationships between detachment and health, state well-being, work motivation, and work performance. **Table 1** presents the pooled effect sizes and heterogeneity statistics (forest plots are depicted in the Supplementary Material).

We found several significant mean correlations between detachment and health. In particular, detachment from work was positively associated with psychological (moderate effects with a range of $0.30 \leq |\bar{r}| \leq 0.36$: lower exhaustion, higher life satisfaction, higher well-being, better sleep; small effect with $r = -0.14$: lower other burnout symptoms) and physical health (small effect: $r = -0.23$: lower physical discomfort). Only three studies examined relationships between detachment and physiological stress indicators and the average effect was non-significant. Our analysis further revealed mean small to moderate positive correlations between detachment and state well-being (lower fatigue, better affect, and better state of recovery; range: $0.28 \leq |\bar{r}| \leq 0.42$). There was no significant mean correlation with work motivation. Moreover, our analysis revealed significant but small mean relationships with measures of work performance. As predicted, detachment was positively related to task performance. However, unexpectedly, we found, on average, significant *negative* correlations with contextual performance and creativity.

Except for physiological stress indicators, I^2-statistics indicated moderate (task performance, contextual performance, creativity) and high (exhaustion, life satisfaction, well-being, sleep, physical discomfort, burnout-others, fatigue, affect, state of recovery) heterogeneity of effect sizes (see **Table 1**). This large dispersion in effect sizes between studies is also reflected by 95% PIs crossing zero for most relationships. Only for relationships between detachment and exhaustion and detachment and well-being 95% PIs indicated that there is a chance of 95% that a new study will report a negative or rather positive correlation. However, we note that on the primary study level (see the forest plots in the Supplementary Material) the direction of effects were fully (e.g., exhaustion, life satisfaction, well-being, physical discomfort, fatigue, contextual performance) or predominantly (e.g., sleep, burnout others, affect, state of recovery, task performance, creativity) consistent for most of the examined relationships.

Antecedents of Detachment

Work Characteristics

We aggregated data from $k = 61$ studies ($N = 28{,}588$; 197 effect sizes) to examine relationships between work characteristics and detachment. **Table 2** presents the pooled effect sizes and heterogeneity statistics (forest plots are depicted in the Supplementary Material).

Results indicated that detachment from work correlated, on average, significantly negatively with job demands and significantly positively with job resources. Both pooled effect size estimates were of small magnitude (range: $0.10 \leq |\bar{r}| \leq 0.25$) and differed significantly [$Q_{\text{Between}}(1) = 91.03$, $p < 0.001$]. Specifically, the average correlation between job demands and detachment was significantly stronger than between job resources and detachment (no overlap of 95% CIs for absolute values of both *r*s). Furthermore, these average correlations were also significant, when using more proximal indicators of both types of work characteristics (see **Table 2**).

Contrast analyses revealed that average correlations to detachment differed significantly between different types of job demands [$Q_{\text{Between}}(4) = 14.57$, $p < 0.01$] and job resources [$Q_{\text{Between}}(1) = 11.74$, $p = 0.001$]. For job demands, we found that the average correlation between detachment and quantitative demands was significantly stronger than between detachment and working hours [$Q_{\text{Between}}(1) = 10.82$, $p = 0.001$] and role stressors [$Q_{\text{Between}}(1) = 9.23$, $p < 0.01$]. Moreover, the average correlation between detachment and emotional demands was significantly stronger than between detachment and role stressors [$Q_{\text{Between}}(1) = 4.48$, $p < 0.05$]. For job resources, we found that detachment was, on average, stronger positively related to social support than to job control [$Q_{\text{Between}}(1) = 11.72$, $p = 0.001$]. The I^2-statistics indicated a moderate to large heterogeneity of effect sizes (all I^2s > 67%) for all relationships between work characteristics and detachment from work. This large between-study dispersion of effect sizes is also reflected by 95% PIs crossing zero for most relationships. Only for relationships between quantitative demands and detachment and emotional demands and detachment the 95% PIs indicated a high chance that future studies will report negative correlations. Again, we found rather consistently reported directions of effects for different kinds of job demands and also for social support as job resource (see forest plots in the Supplementary Material).

Work-Related Activities during Non-work Time

We aggregated data from $k = 17$ studies ($N = 4736$; 21 effect sizes; a forest plot is depicted in the Supplementary Material). Most of these studies used single-item measures ($k = 11$). We found an average moderate and negative correlation between engagement in work-related activities during non-work time and detachment from work ($\bar{r} = -0.31$, 95% CI [−0.38, −0.23]). Study effect sizes were heterogeneous ($I^2 = 82.31\%$) but all aggregated primary studies reported negative correlations. The 95% PI [−0.56, 0.00] indicated a high chance of finding negative correlations to detachment in future studies.

Person Characteristics

We aggregated data from $k = 63$ studies ($N = 21{,}208$; 137 effect sizes) to estimate the associations between person characteristics and detachment from work (forest plots are depicted in the Supplementary Material). Age ($k = 43$, $N = 14{,}408$, $\bar{r} = -0.02$, 95% CI [−0.06, 0.01], 95% PI [−0.19, 0.15], $I^2 = 68.21\%$) and gender ($k = 44$, $N = 14{,}598$, $\bar{r} = 0.03$, 95% CI [−0.01,

TABLE 1 | Meta-analytic correlations between detachment from work and different outcomes.

Variable	*k*	*N*	$\bar{r}$	95% CI		95% PI		I^2
				LL	*UL*	*LL*	*UL*	
HEALTH								
Burnout (exhaustion)	23	7007	−0.36	−0.42	−0.30	−0.60	−0.07	85.76
Life satisfaction[a]	5	1236	0.32	0.11	0.50	−0.46	0.82	91.96
Well-being	16	11,133	0.32	0.26	0.37	0.01	0.57	84.72
Sleep	18	12,028	0.30	0.22	0.38	−0.09	0.61	94.55
Physical discomfort[a]	6	5544	−0.23	−0.31	−0.15	−0.12	0.53	86.70
Burnout (others)[a]	7	1867	−0.14	−0.28	−0.01	−0.56	0.33	88.53
Physiological activation[a,b]	3	219	0.03	−0.12	0.17	−0.80	0.82	13.26
STATE WELL-BEING								
Fatigue	17	12,510	−0.42	−0.52	−0.30	−0.78	0.17	97.86
Affect	24	5145	0.28	0.21	0.34	−0.03	0.53	79.99
State of recovery[a]	7	2824	0.31	0.18	0.43	−0.14	0.66	88.76
WORK MOTIVATION								
Work motivation	11	6083	0.04	−0.06	0.13	−0.30	0.36	90.29
WORK PERFORMANCE								
Task performance[a]	8	4551	0.09	0.03	0.14	−0.05	0.22	42.72
Contextual performance[a]	5	2106	−0.13	−0.21	−0.05	−0.36	0.12	58.58
Creativity[a]	5	2398	−0.11	−0.19	−0.04	−0.33	0.11	62.48

k, number of independent effect sizes; N, sample size; $\bar{r}$, sample size weighted mean correlation; CI, confidence interval of $\bar{r}$; PI, prediction interval of $\bar{r}$; LL, lower limit of the 95% CI/PI; UL, upper limit of the 95% CI/PI; I^2, ($Variance_{Between}/Variance_{Total}$) × 100%.

[a]*Analysis of moderator variables rejected for k < 10.*

[b]*Direct effect should be interpreted with caution as it is based on a low study sample size (k < 5).*

TABLE 2 | Meta-analytic correlations between work characteristics and detachment from work.

Variable	*k*	*N*	$\bar{r}$	95% CI		95% PI		I^2
				LL	*UL*	*LL*	*UL*	
JOB DEMANDS								
Composite measure	60	28,507	−0.25	−0.29	−0.22	−0.49	0.02	89.34
Quantitative demands	33	16,687	−0.28	−0.32	−0.23	−0.49	−0.02	86.89
Social conflicts	12	7233	−0.25	−0.36	−0.14	−0.62	0.20	95.31
Emotional demands[a]	7	9534	−0.22	−0.28	−0.15	−0.40	−0.02	83.55
Working time	30	10,464	−0.17	−0.21	−0.12	−0.38	0.07	79.31
Role stressors[a]	9	5684	−0.12	−0.18	−0.07	−0.28	0.04	67.74
JOB RESOURCES								
Composite measure	24	15,010	0.10	0.04	0.17	−0.20	0.39	91.71
Social support[a]	7	8871	0.21	0.13	0.28	−0.06	0.45	89.51
Job control	20	11,570	0.06	0.02	0.10	−0.10	0.21	70.85

k, number of independent effect sizes; N, sample size; $\bar{r}$, sample size weighted mean correlation; CI, confidence interval of $\bar{r}$; PI, prediction interval of $\bar{r}$; LL, lower limit of the 95% CI/PI; UL, upper limit of the 95% CI/PI; I^2, ($Variance_{Between}/Variance_{Total}$) × 100%.

[a]*Analysis of moderator variables rejected for k < 10.*

0.07], 95% PI [−0.18, 0.24], I^2 = 76.90%) were, on average, unrelated to detachment from work. However, the moderate to large heterogeneity (I^2) and dispersion of effect sizes (95% PIs crossing zero) point to the existence of additional moderator variables.

Detachment was, on average, significantly negatively associated with negative affectivity/neuroticism (k = 17, N = 9372, $\bar{r}$ = −0.22, 95% CI [−0.35, −0.08], 95% PI [−0.69, 0.39], I^2 = 97.46%; small effect) and heavy work investment (k = 5, N = 2.801, $\bar{r}$ = −0.32, 95% CI [−0.39, −0.25], 95% PI [−0.49, −0.19], I^2 = 58.31%; moderate effect). Again, we found a substantial amount of heterogeneity for both relationships. Only for the relationship between heavy work investment and detachment the range of the prediction interval indicated a high chance that future studies will report negative correlations. This is also underlined on the primary study level as all five studies

reported significant negative correlations (see forest plot in the Supplementary Material).

Moderator Analyses

For most of the investigated relationships between detachment and possible outcomes and antecedents, we found a substantial amount of heterogeneity and dispersion in effect sizes. Therefore, we examined potential moderating effects of several study-related (i.e., study location, study design) and demographic variables (i.e., mean age and gender distribution in the samples), as well as affective valence of work-related thoughts during non-work time. **Table 3** provides an overview of results. Note that in several cases moderator analyses were not possible because of an insufficient number of studies (low total *k*s or subgroup-*k*s; see also results above in **Tables 1, 2**).

Detachment-Outcomes Relationships

Due to the small number of subgroup samples, it was not possible to examine the moderating role of *study location*. An insufficient number of longitudinal studies also restricted moderator analyses for *study design*. However, we found that the average correlations between detachment from work and sleep, as well as detachment and fatigue were significantly stronger in cross-sectional studies with one measurement occasion (sleep: $\bar{r} = 0.40$, 95% PI [−0.01, 0.69]; fatigue: $\bar{r} = -0.50$, 95% PI [−0.84, 0.10]) than in diary studies (sleep: $\bar{r} = 0.17$, 95% PI [−0.07, 0.39], $Q_{\text{Between}}(1) = 7.36$, p=0.007, $R^2 = 0.19$; fatigue: $\bar{r} = -0.25$, 95% PI [−0.66, 0.27], $Q_{\text{Between}}(1) = 6.20$, $p = 0.013$, $R^2 = 0.09$). Average effect sizes were significant under both study designs for both outcomes and heterogeneity of effect sizes was lower in diary studies. The relationship between detachment and affect was not moderated by study design. At least for relationships to well-being and exhaustion, the average correlations in longitudinal studies were significant.

Samples' mean age did not significantly moderate the relationships between detachment and sleep, well-being, exhaustion, fatigue, affect, and work motivation. We found that *samples' percentage of females* only moderated the relationship between detachment and work motivation. The mean positive relationship between both variables increased with more females in the samples ($b = 0.015$, $SE = 0.004$, $Z = 4.21$, $p < 0.001$, $R^2 = 0.74$).

Due to the small number of samples (low subgroup-*k*s < 5), we could only analyze the moderating role of *valence* for sleep, fatigue, and affect as outcomes. In addition, for sleep and fatigue as outcomes fewer than five studies assessed detachment as absence from positive work-related thoughts. In both cases, we only could contrast results from studies assessing detachment as an affectively neutral construct and those assessing detachment as absence from negative work-related thoughts. The average positive correlation between detachment and sleep was significantly stronger in studies assessing detachment as absence from negative work-related thoughts during non-work time ($\bar{r} = 0.42$, 95% PI [0.02, 0.69]) than assessing it as an affectively neutral concept ($\bar{r} = 0.22$, 95% PI [0.00, 0.42], $Q_{\text{Between}}(1) = 7.69$, $p = 0.006$, $R^2 = 0.28$). However, heterogeneity only decreased for the neutral type of detachment.

TABLE 3 | Summary of results for moderator analyses.

Moderator		*k*	*ES*	95% CI		*Q*	I^2
				LL	*UL*		
OUTCOMES							
Sleep							
Location							
Europe	*r*	16	0.31	0.22	0.40	0.40[a]	94.65
USA/Canada	*r*	2	0.23	−0.02	0.46		0.00
Study design							
Longitudinal	*r*	1	0.29	−0.05	0.57	7.37*[a]	0.00
CS-one time	*r*	9	0.39	0.29	0.49		96.54
CS-diary	*r*	8	0.17	0.04	0.30		33.70
Mean age (years)	*b*	17	0.02	−0.01	0.04	2.20	
Females (%)	*b*	18	0.00	−0.01	0.00	2.36	
Affective valence							
Negative	*r*	8	0.41	0.32	0.50	9.00*[a]	96.30
Neutral	*r*	11	0.22	0.12	0.32		56.03
Positive	*r*	1	0.14	−0.16	0.41		0.00
Well-Being							
Location							
Europe	*r*	11	0.31	0.23	0.37	2.65[a]	67.51
USA/Canada	*r*	2	0.46	0.28	0.61		94.33
Others	*r*	3	0.31	0.18	0.43		92.01
Study design							
Longitudinal	*r*	2	0.19	0.05	0.32	10.62**[a]	78.56
CS-one time	*r*	11	0.30	0.24	0.36		79.53
CS-diary	*r*	3	0.49	0.37	0.60		87.27
Mean age (years)	*b*	14	−0.01	−0.02	0.01	0.78	
Females (%)	*b*	16	0.00	0.00	0.01	2.41	
Affective valence							
Negative	*r*	1	0.31	0.07	0.52	0.01[a]	0.00
Neutral	*r*	15	0.32	0.25	0.39		83.97
Burnout (Exhaustion)							
Location							
Europe	*r*	18	−0.38	−0.44	−0.32	2.29[a]	82.27
USA/Canada	*r*	3	−0.27	−0.42	−0.09		91.48
Others	*r*	2	−0.31	−0.47	−0.12		28.75
Study design							
Longitudinal	*r*	4	−0.34	−0.47	−0.19	0.25[a]	79.28
CS-one time	*r*	15	−0.37	−0.44	−0.30		89.50
CS-diary	*r*	4	−0.34	−0.49	−0.17		38.67
Mean age (years)	*b*	21	−0.01	−0.02	0.00	1.23	
Females (%)	*b*	23	0.00	0.00	0.01	1.50	
Affective valence							
Negative	*r*	3	−0.53	−0.64	−0.39	6.29*[a]	93.12
Neutral	*r*	21	−0.35	−0.41	−0.28		84.78
Positive	*r*	1	−0.25	−0.50	0.04		0.00

(Continued)

TABLE 3 | Continued

Moderator		k	ES	95% CI		Q	I^2
				LL	UL		
Fatigue							
Location							
Europe	r	16	−0.43	−0.54	−0.31	0.92[a]	97.93
USA/Canada	r	1	−0.17	−0.62	0.37		0.00
Study design							
Longitudinal	r	1	−0.34	−0.71	0.18	4.37[a]	0.00
CS-one time	r	10	−0.50	−0.62	−0.37		98.58
CS-diary	r	6	−0.25	−0.45	−0.02		67.32
Mean age (years)	b	16	0.01	0.00	0.05	0.53	
Females (%)	b	17	0.00	−0.01	0.01	0.09	
Affective valence							
Negative	r	5	−0.56	−0.70	−0.39	4.16[a]	99.17
Neutral	r	13	−0.36	−0.48	−0.23		89.58
Positive	r	1	−0.25	−0.64	0.24		0.00
State Affect							
Location							
Europe	r	19	0.28	0.21	0.35	3.51[a]	81.99
USA/Canada	r	4	0.18	0.08	0.28		0.00
Others	r	1	0.48	0.35	0.60		0.00
Study design							
CS-one time	r	5	0.35	0.22	0.48	1.75	90.17
CS-diary	r	19	0.25	0.17	0.33		74.98
Mean age (years)	b	24	−0.01	−0.02	0.01	0.41	
Females (%)	b	23	0.00	0.00	0.01	1.60	
Affective valence							
Negative	r	6	0.38	0.26	0.50	17.05***	87.51
Neutral	r	19	0.29	0.22	0.36		61.74
Positive	r	5	−0.02	−0.18	0.13		92.60
Work Motivation							
Location							
Europe	r	9	0.10	0.02	0.17	13.00**[a]	64.63
USA/Canada	r	1	−0.24	−0.42	−0.04		0.00
Others	r	1	−0.08	−0.25	0.09		0.00
Study design							
Longitudinal	r	2	0.06	−0.16	0.28	1.14[a]	0.00
CS-one time	r	6	0.00	−0.14	0.13		94.25
CS-diary	r	3	0.13	−0.09	0.34		83.22
Mean age (years)	b	9	0.00	−0.02	0.01	0.13	
Females (%)	b	11	0.02	0.01	0.02	17.69***	
Affective valence							
Neutral	r	11	0.04	−0.06	0.13	0.00	90.29
ANTECEDENTS							
Job Demands							
Location							
Europe	r	44	−0.25	−0.30	−0.21	0.02	88.01
USA/Canada	r	7	−0.25	−0.36	−0.13		43.96
Others	r	9	−0.26	−0.35	−0.17		91.08
Study design							
Longitudinal	r	3	−0.32	−0.47	−0.15	1.11[a]	90.59
CS-one time	r	35	−0.26	−0.31	−0.21		92.31
CS-diary	r	22	−0.23	−0.30	−0.16		74.64
Mean age (years)	b	55	0.00	−0.01	0.01	0.02	
Females (%)	b	59	0.00	0.00	0.00	0.83	
Affective valence							
Negative	r	12	−0.32	−0.40	−0.24	4.80[a]	93.18
Neutral	r	49	−0.24	−0.29	−0.20		80.81
Positive	r	4	−0.14	−0.29	0.01		98.57
Quantitative Demands							
Location							
Europe	r	23	−0.29	−0.35	−0.24	1.49	83.46
USA/Canada	r	5	−0.21	−0.33	−0.09		69.29
Others	r	5	−0.26	−0.36	−0.16		85.99
Study design							
Longitudinal	r	3	−0.37	−0.50	−0.22	3.55[a]	85.52
CS-one time	r	20	−0.28	−0.34	−0.23		90.49
CS-diary	r	10	−0.21	−0.30	−0.11		47.86
Mean age (years)	b	29	−0.01	−0.02	0.00	3.23	
Females (%)	b	33	0.00	0.00	0.00	0.25	
Affective valence							
Negative	r	5	−0.33	−0.45	−0.20	1.88[a]	69.41
Neutral	r	28	−0.27	−0.33	−0.21		81.55
Positive	r	3	−0.18	−0.35	0.01		98.94
Social Conflicts							
Location							
Europe	r	7	−0.24	−0.38	−0.08	0.30[a]	96.70
USA/Canada	r	2	−0.23	−0.50	0.08		65.69
Others	r	3	−0.31	−0.51	−0.08		93.04
Study design							
CS-one time	r	7	−0.27	−0.40	−0.12	0.13	96.77
CS-diary	r	5	−0.23	−0.40	−0.04		90.70
Mean age (years)	b	12	0.01	−0.01	0.03	1.74	
Females (%)	b	11	0.00	0.00	0.01	0.06	
Affective valence							
Negative	r	3	−0.47	−0.56	−0.37	22.35***[a]	94.15
Neutral	r	9	−0.16	−0.24	−0.08		60.28
Working Time							
Location							
Europe	r	24	−0.18	−0.23	−0.13	0.91	72.46
USA/Canada	r	6	−0.13	−0.22	−0.04		81.80
Study design							
Longitudinal	r	3	−0.19	−0.33	−0.04	2.12[a]	91.71

(Continued)

TABLE 3 | Continued

Moderator		k	ES	95% CI		Q	I^2
				LL	UL		
CS-one time	r	17	−0.14	−0.20	−0.08		80.70
CS-diary	r	10	−0.22	−0.30	−0.13		63.16
Mean age (years)	b	29	0.01	0.00	0.02	1.08	
Females (%)	b	30	0.00	0.00	0.00	0.02	
Affective valence							
Negative	r	4	−0.09	−0.21	0.03	1.76[a]	0.00
Neutral	r	28	−0.17	−0.22	−0.13		80.03
Positive	r	2	−0.20	−0.34	−0.04		52.45
Job Resources							
Location							
Europe	r	14	0.08	0.00	0.16	2.03	66.64
USA/Canada	r	5	0.09	−0.05	0.22		94.17
Others	r	5	0.18	0.06	0.29		89.73
Study design							
Longitudinal	r	2	0.13	−0.09	0.34	0.22[a]	0.00
CS-one time	r	18	0.11	0.03	0.18		93.69
CS-diary	r	4	0.07	−0.11	0.24		42.63
Mean age (years)	b	21	0.00	−0.01	0.01	0.19	
Females (%)	b	23	0.00	0.00	0.00	0.74	
Affective valence							
Negative	r	5	0.15	0.05	0.24	6.72*[a]	0.00
Neutral	r	19	0.07	0.02	0.13		77.75
Positive	r	3	0.25	0.12	0.37		97.09
Job control							
Location							
Europe	r	13	0.06	0.00	0.12	4.27[a]	60.31
USA/Canada	r	3	−0.07	−0.21	0.07		0.00
Others	r	4	0.10	0.01	0.19		89.79
Study design							
Longitudinal	r	2	0.04	−0.09	0.18	0.94[a]	71.45
CS-one time	r	16	0.07	0.02	0.11		74.74
CS-diary	r	2	−0.03	−0.21	0.16		9.21
Mean age (years)	b	17	0.00	−0.01	0.01	0.00	
Females (%)	b	20	0.00	0.00	0.00	0.44	
Affective valence							
Negative	r	3	0.11	0.00	0.21	1.29[a]	77.22
Neutral	r	17	0.05	0.00	0.10		72.76
Positive	r	2	0.11	−0.05	0.25		0.00
Work Related-Activities							
Location							
Europe	r	14	−0.28	−0.35	−0.20	3.05[a]	80.41
USA/Canada	r	3	−0.42	−0.54	−0.28		39.49
Study design							
CS-one time	r	7	−0.34	−0.44	−0.23	0.78	91.96

(Continued)

TABLE 3 | Continued

Moderator		k	ES	95% CI		Q	I^2
				LL	UL		
CS-diary	r	10	−0.27	−0.37	−0.17		38.32
Mean age (years)	b	17	0.01	−0.01	0.01	0.03	
Females (%)	b	17	0.00	−0.01	0.00	1.13	
Affective valence							
Negative	r	2	−0.29	−0.49	−0.06	0.03[a]	85.71
Neutral	r	15	−0.31	−0.38	−0.23		83.18
Age							
Location							
Europe	r	31	−0.03	−0.07	0.01	0.64[a]	59.19
USA/Canada	r	9	−0.01	−0.08	0.06		72.22
Others	r	3	0.01	−0.09	0.11		0.00
Study design							
Longitudinal	r	1	−0.04	−0.23	0.16	0.12[a]	0.00
CS-one time	r	21	−0.02	−0.06	0.03		77.24
CS-diary	r	21	−0.03	−0.09	0.03		49.99
Mean age (years)	b	42	0.00	−0.01	0.00	0.48	
Females (%)	b	41	0.00	0.00	0.00	1.09	
Affective valence							
Negative	r	6	0.05	−0.02	0.11	7.89*[a]	48.80
Neutral	r	37	−0.03	−0.06	−0.00		50.53
Positive	r	4	0.05	−0.02	0.12		31.37
Gender							
Location							
Europe	r	32	0.02	−0.03	0.06	2.61[a]	74.80
USA/Canada	r	9	0.04	−0.04	0.12		71.37
Others	r	3	0.13	0.00	0.24		0.00
Study design							
Longitudinal	r	1	0.13	−0.13	0.37	1.09[a]	0.00
CS-one time	r	23	0.02	−0.03	0.07		85.89
CS-diary	r	20	0.05	−0.02	0.12		33.99
Mean age (years)	b	42	0.00	−0.01	0.01	0.44	
Females (%)	b	43	0.00	0.00	0.00	0.63	
Affective valence							
Negative	r	4	−0.03	−0.16	0.10	1.15[a]	91.83
Neutral	r	40	0.03	−0.01	0.08		75.76
Positive	r	3	−0.02	−0.16	0.13		92.27
Negative Affectivity/Neuroticism							
Location							
Europe	r	11	−0.26	−0.41	−0.11	1.00[a]	97.34
USA/Canada	r	5	−0.14	−0.37	0.10		0.00
Others	r	1	−0.08	−0.54	0.43		0.00
Study design							
Longitudinal	r	3	−0.19	−0.46	0.12	4.51[a]	89.10
CS-one time	r	6	−0.38	−0.55	−0.18		98.90
CS-diary	r	8	−0.09	−0.28	0.10		0.00

(Continued)

TABLE 3 | Continued

Moderator		k	ES	95% CI		Q	I^2
				LL	UL		
Mean age (years)	*b*	17	−0.01	−0.04	0.01	1.68	
Females (%)	*b*	16	0.01	0.00	0.01	4.58*	
Affective valence							
Negative	*r*	7	−0.40	−0.50	−0.29	27.32***[a]	96.65
Neutral	*r*	12	−0.16	−0.25	−0.05		68.90
Positive	*r*	4	0.13	−0.04	0.29		0.00

CS, cross-sectional; r, correlation coefficient; b, unstandardized regression weight of the slope (meta-regression); k, number of independent effect sizes; ES, effect size; 95% CI, 95% confidence interval of ES; LL, lower limit of the 95% CI; UL, upper limit of the 95% CI; Q, results of the Q-test for moderator effects; I^2, ($Variance_{Between}/Variance_{Total}$) × 100% (only for subgroups of moderators).

**$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$.*

[a]Moderator effects should be not interpreted or with caution as there are fewer than five studies in one or more subgroups of the moderator.

Under both conditions 95% prediction intervals indicate a high chance that future studies will report positive correlations for the relationship between detachment and sleep. There was some indication that the negative relationship between detachment and fatigue was stronger in studies assessing detachment as absence from negative work-related thoughts ($\bar{r} = -0.56$, 95% PI [−0.92, 0.29]) than as affectively neutral concept ($\bar{r} = -0.36$, 95% PI [−0.68, 0.07]). However, this moderator effect was not significant [$Q_{\text{Between}}(1) = 3.61$, $p = 0.056$, $R^2 = 0.11$]. Moreover, we found a significant moderator effect of valence for affect as outcome ($R^2 = 0.06$). Specifically, mean relationships between detachment and affect were stronger and only significant when accessing detachment as absence from negative work-related thoughts during non-work time ($\bar{r} = 0.38$, 95% PI [−0.12, 0.73]) and as affectively neutral concept ($\bar{r} = 0.29$, 95% PI [0.08, 0.48]) than as absence from positive work-related thoughts during non-work time ($\bar{r} = -0.02$, 95% PI [−0.59, 0.56]). Results of contrast analyses revealed both subgroup differences as significant [negative vs. positive: $Q_{\text{Between}}(1) = 9.01$, p=0.003; neutral vs. positive: $Q_{\text{Between}}(1) = 13.35$, $p < 0.001$; negative vs. neutral: $Q_{\text{Between}}(1) = 2.15$, $p = 0.142$]. Only for affectively neutral measures of detachment heterogeneity was reduced and the 95% PI indicated a high chance that future studies will report positive correlations for relationships between detachment and affect.

The relationship between detachment and sleep was significantly moderated by two variables: study design and valence. A further analysis showed that both variables were not significantly interrelated [$X^2_{(1)} = 1.17$, $p = 0.367$]. Therefore, it is less likely that both moderator effects are based on confounding and should be interpreted independently.

Antecedents-Detachment Relationships

Study-related (location, study design) and demographic (mean age, percentage of females) variables did not moderate the relationships between detachment and work-related antecedents (i.e., job demands and job resources). At least for job demands, quantitative demands, and working time we found significant mean correlations in longitudinal studies.

As expected, valence of work-related thoughts moderated the relationship between general job demands and detachment. Because of a low subgroup sample size for positive valence we only could contrast the negative and neutral condition [$Q_{\text{Between}}(1) = 3.94$, $p = 0.047$, $R^2 = 0.29$]. More specifically, mean correlations were stronger negative for detachment assessed as absence of negative work-related thoughts during non-work time ($\bar{r} = -0.32$, 95% PI [−0.43, 0.20]) than for affectively neutral measures ($\bar{r} = -0.24$, 95% PI [−0.45, −0.01]). We could not analyze the moderating impact of study location and valence for the relationship between work-related activities during non-work time and detachment. We found no moderating impact of study design, mean age, and percentage of females for this relationship. Study-related (location and design) and demographic (mean age, percentage of females) variables did moderate the relationships between detachment and age and gender. However, our analyses revealed that the average correlation between age and detachment was significantly negative for affectively neutral measures of detachment ($\bar{r} = -0.03$, 95% PI [−0.16, 0.10]) but insignificant for studies assessing detachment as absence of negative work-related thoughts ($\bar{r} = 0.05$, 95% PI [−0.11, 0.19], $Q_{\text{Between}}(1) = 4.43$, $p = 0.035$, $R^2 = 0.36$).

Moreover, we found that study design [$Q_{\text{Between}}(1) = 4.30$, $p = 0.038$, $R^2 = 0.17$], studies' gender composition ($R^2 = 0.58$), and valence of detachment [$Q_{\text{Between}}(1) = 9.50$, $p = 0.002$, R^2=0.49] moderated the relationship between negative affectivity/neuroticism and detachment. More specifically, the average correlation was only significantly negative in cross-sectional studies with one measurement occasion ($\bar{r} = -0.38$, 95% PI [−0.85, 0.42]) but not in diary studies ($\bar{r} = -0.09$, 95% PI [−0.32, 0.15]). The strength of negative relationship between negative affectivity/neuroticism and detachment decreased with more females in the study samples ($b = 0.008$, $SE = 0.004$, $Z = 2.14$, $p = 0.032$). Moreover, the average correlation between both variables was stronger negative in studies assessing detachment as absence of negative work-related thoughts during non-work time ($\bar{r} = -0.40$, 95% PI [−0.73, 0.07]) than assessing it as an affectively neutral concept ($\bar{r} = -0.16$, 95% PI [−0.46, 0.19]). We further analyzed a possible confounding of these significant moderating variables. However, intercorrelations were not significant (study design-females: $|r| = 0.33$, $p = 0.257$; study design-valence: $X^2_{(1)} = 0.64$, $p = 0.607$; gender-valence: $|r| = 0.15$, $p = 0.547$). This suggests interpreting the three moderator effects independently.

Sensitivity Analyses

We conducted sensitivity analyses to further examine the robustness of our results. At first, we aimed to analyze the impact of potential outliers in effect sizes. For none of the examined relationships we found evidence for such outliers (all primary study *r*s between ± 3 *SD* from the *M*). Second, we examined how average effect sizes would change if one study out of the whole set of studies for each relationship is excluded from the

analysis. Only for two relationships the significance of the average correlation would change (**Table 4**). Regarding the relationship between detachment and burnout (outhers), we found that the exclusion of each out of four studies (Els et al., 2015; Rivkin et al., 2015 Sample 1 and 2; Sonnentag and Fritz, 2007) would eliminate significance of the average correlation. However, the size of the average effects would be reduced only slightly. Regarding the relationship between gender and detachment, we found that the exclusion of each out of three studies (Moreno-Jiménez et al., 2009a; Kinnunen et al., 2010; Querstret and Cropley, 2012) would bring the average correlation to significance, however, only coupled with a small increase in the average effect size. Furthermore, regarding the relationship between detachment and life satisfaction an exclusion of two studies would largely reduce (Moreno-Jiménez et al., 2009a) or increase (Park and Fritz, 2015) the average effect size. Taken together, we conclude that our results are not biased by extreme outliers in effect sizes and that for most of the examined relationships the presented average effect size estimates are quite robust with regard to removing effect sizes of single studies from the overall analyses.

Publication Bias

As the accuracy of meta-analytic results might be impacted by a potential publication bias (Borenstein et al., 2009), we examined the results using three techniques: visual inspection of funnel plots (see Supplementary Material), Egger's regression test, and Duval and Tweedie's (2000) trim and fill method (Borenstein et al., 2009; see **Table 5** for the latter tests).

Regarding the funnel plots, to our interpretation (we only interpret funnel plots based on *k*s $>$ 9; Sterne et al., 2011), an asymmetrical distribution of effect sizes and their standard errors appeared for the variables sleep, fatigue, and negative affectivity/neuroticism. For sleep and negative affectivity/neuroticism this was also underlined by significant results of a statistical test procedure (Egger's test; **Table 5**). Moreover, results of Egger's test revealed an asymmetric effect size distribution for age. However, it has to be noted that funnel plot asymmetry might also arise from other sources than publication bias, for instance, high heterogeneity of effect sizes as in our sample of studies (Sterne et al., 2011). Thus, we stratified funnel plot analysis for the variables sleep, fatigue, and negative affectivity/neuroticism by the subgroups of two significant moderators: study design and affective valence of work-related thoughts (plots are not shown here). Funnel plot asymmetry disappeared for fatigue in these subgroups. We found no longer asymmetrical funnel plots for sleep and negative affectivity/neuroticism when analyzing them separately under the subgroups of study design. However, for both variables funnel plot asymmetry was still present under the condition that studies assessed detachment as absence of negative work-related thoughts during non-work time. Note that under this condition heterogeneity of effect sizes was high and likewise might have caused these results.

In the next step, we applied the trim-and-fill-method to estimate how average effect sizes would change if potentially missing study effect sizes, necessary for funnel plot symmetry, are included in the analysis (see **Table 5**). Results revealed that average effect size estimates only marginally changed and the direction and significance of effects remained stable.

To sum up, we found only minor evidence for a potential publication bias, most likely present for relationships between detachment and sleep and negative affectivity/neuroticism. However, these results might have been also caused by heterogeneity of effect sizes. Results of the trim-and-fill method showed that a potential publication bias is not a serious threat to the validity of most of the presented average effects.

TABLE 4 | Summary of results for the impact of removing one study out of the whole set of studies.

	Lowest $\bar{r}$			Highest $\bar{r}$		
		95% CI			95% CI	
	$\bar{r}$	*LL*	*UL*	$\bar{r}$	*LL*	*UL*
OUTCOMES OF DETACHMENT						
Health						
Exhaustion	−0.38	−0.43	−0.33	−0.35	−0.41	−0.29
Life satisfaction	0.24	0.07	0.39	0.39	0.21	0.54
Well-being	0.30	0.24	0.35	0.33	0.28	0.39
Sleep	0.28	0.21	0.35	0.32	0.23	0.40
Physical discomfort	−0.26	−0.36	−0.16	−0.19	−0.24	−0.13
Burnout (others)	−0.19	−0.31	−0.06	−0.10	−0.23	0.04
Physiological activation	−0.04	−0.20	0.12	0.08	−0.16	0.31
State Well-Being						
Fatigue	−0.43	−0.54	−0.31	−0.39	−0.46	−0.30
Affect	0.26	0.20	0.32	0.29	0.23	0.35
State of recovery	0.26	0.14	0.38	0.36	0.25	0.46
Work motivation	0.01	−0.09	0.10	0.07	−0.03	0.16
Work Performance						
Task performance	0.07	0.00	0.14	0.10	0.06	0.14
Contextual performance	−0.18	−0.24	−0.11	−0.10	−0.16	−0.03
Creativity	−0.13	−0.22	−0.05	−0.09	−0.16	−0.02
ANTECEDENTS OF DETACHMENT						
Job Demands						
Combined	−0.26	−0.30	−0.22	−0.25	−0.28	−0.21
Quantitative demands	−0.28	−0.33	−0.24	−0.27	−0.31	−0.22
Social conflicts	−0.29	−0.39	−0.18	−0.22	−0.33	−0.10
Emotional demands	−0.25	−0.29	−0.21	−0.20	−0.28	−0.12
Working time	−0.17	−0.22	−0.12	−0.15	−0.20	−0.11
Role stressors	−0.14	−0.20	−0.08	−0.12	−0.17	−0.06
Job Resources						
Combined	0.10	0.03	0.16	0.11	0.05	0.18
Social support	0.17	0.10	0.25	0.23	0.16	0.30
Job control	0.05	0.01	0.09	0.07	0.02	0.11
Work-related Activities	−0.32	−0.38	−0.26	−0.29	−0.36	−0.22
Person Characteristics						
Age	−0.03	−0.06	0.00	−0.02	−0.05	0.02
Gender	0.03	−0.01	0.07	0.04	0.01	0.08
Negative affectivity/neuroticism	−0.24	−0.37	−0.10	−0.18	−0.30	−0.07
Heavy work investment	−0.36	−0.46	−0.25	−0.29	−0.32	−0.25

$\bar{r}$, sample size weighted mean correlation; CI, confidence interval of $\bar{r}$; LL, lower limit of the 95% CI; UL, upper limit of the 95% CI.

TABLE 5 | Summary of results for statistical tests to detect a publication bias.

	Egger Test			Trim and Fill				
	b	*SE*	*t*	*n*	Side	$\bar{r}$	*LL*	*UL*
HEALTH								
Exhaustion	1.17	1.41	0.83	0				
Life satisfaction[a]	7.98	2.33	3.43*	0				
Well-being	1.02	0.97	1.05	0				
Sleep	−3.03	1.39	2.18*	4	Right	0.35	0.28	0.43
Physical discomfort[a]	−4.10	1.91	2.15	1	Left	−0.26	−0.35	−0.18
Burnout (others)[a]	5.82	3.18	1.83	0				
Physiological activation[a]	1.83	4.70	0.39	0				
STATE WELL-BEING								
Fatigue	3.74	2.54	1.47	2	Left	−0.45	−0.55	−0.35
Affect	−0.21	0.89	0.23	2	Left	0.25	0.18	0.32
State recovery[a]	1.72	2.19	0.79	0				
MOTIVATION								
Work motivation	0.71	1.75	0.41	0				
WORK PERFORMANCE								
Task performance[a]	−0.41	0.81	0.50	0				
Contextual performance[a]	−1.23	1.66	0.74	0				
Creativity[a]	−0.55	2.24	0.24	0				
WORK CHARACTERISTICS								
Job demands	0.61	0.68	0.88	0				
Quantitative demands	0.26	0.80	0.32	0				
Social conflicts	3.86	2.37	1.63	0				
Emotinal demands[a]	1.63	1.57	1.04	1	Right	−0.21	−0.27	−0.14
Working time	−0.67	0.84	0.79	2	Left	−0.18	−0.22	−0.13
Role stressors[a]	−2.19	0.89	2.46*	2	Right	−0.11	−0.16	−0.06
Job resources	−1.85	1.13	1.64	1	Right	0.11	0.05	0.17
Social support[a]	−0.08	2.36	0.03	0				
Job control	0.30	0.70	0.42	0				
Work-related activities	−0.48	1.09	0.45	0				
PERSON CHARACTERISTICS								
Age	−1.01	0.48	2.11*	0				
Gender (Females)	−0.72	0.58	1.25	5	Left	0.01	−0.03	0.05
Negative affectivity/ neuroticism	5.04	2.28	2.21*	4	Left	−0.28	−0.39	−0.16
Heavy work investment[a]	−1.70	1.10	1.55	0				

*b, unstandardized regression weight; SE, standard error; t, t-value with df, k−2; n, number of imputed effect sizes; $\bar{r}$, sample size weighted mean correlation after effect size imputation; LL, lower limit of the 95% CI of $\bar{r}$; UL, upper limit of the 95% CI of $\bar{r}$; *p < 0.05.*
[a]Results of Egger test for funnel plot asymmetry should not be interpreted as total k < 10 (Sterne et al., 2011).

DISCUSSION

After a period of work, recovery is required to replenish drained mental and physical resources (Meijman and Mulder, 1998). In the last years, detachment from work has been proposed as an important psychological recovery process that might explain how effects of work characteristics translate into employees' state well-being, physical and mental health, work motivation, and work performance (Sonnentag, 2012; Sonnentag and Fritz, 2015). The objective of the present meta-analysis was to examine the direction and strength of associations between theoretically proposed antecedents and outcomes of daily detachment from work and to investigate effects of potential moderator variables. Below we discuss our findings.

Outcomes and Antecedents of Detachment

Outcomes

In line with the SDM (Sonnentag and Fritz, 2015), we found that detachment from work is positively related to indicators of self-reported mental health and state well-being. Detachment was, on average, most strongly related to employees' fatigue, exhaustion, short- and long-term well-being, and sleep. Moreover, we found an average positive relationship between detachment and self-reported state of recovery. These results support the assumption that detachment from work is a strong indicator of psychological recovery from work during non-work time (Sonnentag and Fritz, 2015).

Notably, we found some preliminary evidence, albeit for a small sample of studies, that detachment from work might also be beneficial for recovery from work-related physical strain. Whereas, detachment at its core is a psychological construct, it is, by definition, also linked with a relief from physical job demands, which might explain these results.

Detachment from stress-related thoughts might also prevent prolonged physiological stress reactions (Brosschot et al., 2005, 2006). Results of a recent meta-analysis supported this assumption (Ottaviani et al., 2016). In contrast to this review, we used a more narrow focus concerning the conceptualization of detachment, the study samples, and the study context. Thus, we only found three studies that examined this hypothesis in a work context with employee samples. In our study, detachment did, on average, not significantly correlate with physiological stress indicators. However, the types of assessed indicators differed between the studies and might represent different physiological subsystems. This might explain dispersion of effect sizes in the primary studies. Moreover, desynchronization of physiological activation due to low detachment might be a more long-lasting process that needs to be studied over longer periods than covered here (see also results of Ottaviani et al., 2016).

In contrast to our assumptions, we found, on average, no significant linear relationship between detachment and work motivation. However, only recently Shimazu et al. (2016) showed that this relationship might be more complex. Accordingly, they found a curvilinear relationship between detachment and work engagement. Thus, work engagement was lowest under conditions of low and high detachment and highest at mean levels of detachment. While low detachment from work means

that recovery is impaired as resources are further drained even after work, situations of high detachment might turn into motivational problems as employees need longer to get back into "working mode" (Shimazu et al., 2016).

Similarly, we found unexpected patterns concerning the average relationships between detachment and work performance. As expected, detachment from work positively correlated with task performance. However, the effect size was small. Again, at least one study found an inverted u-shaped pattern between detachment and task performance (Fritz et al., 2010b). This might put our assumptions of linear relationships somewhat into question. Unexpectedly, we found that detachment significantly *negatively* correlated with measures of contextual work performance and creativity, which comprises activities that go beyond stipulated tasks as helping others at work or innovating behavior (Sonnentag et al., 2008c). In other words, persons that mentally engaged in work-related thoughts even during non-work time showed higher contextual performance and creativity. One might speculate about the reason for this relationship as well as about the causal mechanisms. On the one hand, contextual performance and creativity might involve additional work-related activities during non-work time, which hinders detachment from work. On the other hand, the valence of work-related thoughts might be important. For example, Binnewies et al. (2009) found that only positive but not negative work reflection positively predicted contextual performance and creativity 6 months later. Thus, low detachment might not always be detrimental for all types of work performance. In our study, it was not possible to disentangle the role of affective valence for the relationship between detachment and work performance measures due to a limited sample of studies. In conclusion, future studies should investigate motivational and performance-related outcomes of detachment with more fine-grained approaches. This concerns the expected patterns of relationships, i.e., also non-linear ones, the use of more objective indicators for different types of work performance, and the content of work-related thoughts during non-work time.

An important caveat on the interpretation of the *average* relationships discussed above regards the dispersion of effect sizes in the primary studies. Heterogeneity of effect sizes was mainly moderate to high (except for physiological activation as outcome) and only for exhaustion and well-being as outcomes the chance that future studies find effects in similar direction was high. Thus, mean effects should be interpreted with caution and also in the context of further moderating variables. We discuss the impact of moderators later in this paper.

Antecedents

In our meta-analysis, we examined three groups of variables as antecedents of detachment from work: work characteristics, work-related activities during non-work time, and individual variables.

First, we found that, on average, job demands negatively and job resources positively correlate with detachment from work. Mean effects were small sized. Our results support the assumption of the SDM (Sonnentag and Fritz, 2015) that job stressors impair detachment from work. Moreover, we found that qualitatively different types of job demands (i.e., quantitative work demands, social stressors, emotional demands, working time, and role conflicts) all significantly negatively correlated with detachment from work. However, further studies are necessary to confirm such relationships, including types of job demands, which to date are less well-researched in this field (e.g., shift work, job uncertainty, and illegitimate tasks). Furthermore, the pattern of our results supports prior assumptions that both cognitive (e.g., goal-discrepancies in cases of high quantitative demands) and emotional (e.g., negative affect in cases of social conflicts and emotional demands) processes might mediate these relationships. However, to our knowledge, there is still a gap concerning the causal mechanisms linking job demands and detachment. Thus, we encourage scholars to investigate this issue more systematically. Furthermore, Cavanaugh et al. (2000) have recently suggested considering appraisal processes when investigating strain effects of job demands. In line with these assumptions, two meta-analyses found higher positive correlations for hindrance (i.e., negative appraisal) than challenge (i.e., positive appraisal) stressors to strain outcomes (LePine et al., 2005; Podsakoff et al., 2007). Moreover, challenge stressors had a positive relationship and hindrance stressors a negative relationship to work motivation and work performance (Podsakoff et al., 2007). Thus, it might be promising to investigate the relationship between job demands and detachment according to stressor type. Our data suggests higher negative correlations for challenge (i.e., quantitative demands) than hindrance stressors (i.e., role stressors) to detachment from work which is in line with results of a recent cross-sectional study as well (Siu, 2013). However, affective valence of work-related thoughts might be a further moderating factor in this context. Thus, it would be interesting to see whether challenge stressors induce more positive work reflection and hindrance stressors induce more negative work-reflection, which might have different effects for recovery.

It is worth noting that we found, on average, a significant positive but small correlation between job resources and detachment. Kinnunen et al. (2011) recently suggested such a relationship according to their Job Demands-Resources-Recovery-Model. However, our results showed that the strength of this association is weaker than for relationships between job demands and detachment. Thus, increasing job resources might only have minor direct effects on detachment. Future studies should examine the mutual and interactive impact of job demands and job resources on detachment to better understand these linkages. On the one hand, job resources promote goal achievement (Bakker and Demerouti, 2007) which should prevent goal-discrepancies (Smit, 2016) and, in turn, a lack of detachment during non-work time. On the other hand, the relationship between job resources and detachment might be spurious and triggered by the often found small but negative relationship between job resources and job demands (for meta-analytic findings see Crawford et al., 2010; Nahrgang et al., 2011). According to the Job-Demands-Resources Model (Bakker and Demerouti, 2007) there might also be more complex interaction effects. Thus, as stated by Sonnentag and Fritz (2015), is possible that job resources moderate the relationship between

job demands and detachment in a way that negative effects of job demands on detachment will diminish when job resources increase.

A second finding was the average negative correlation between work-related activities during non-work time and detachment. Thus, the continued presence of work-related stressors during non-work time hampers mental disengagement from work. Noteworthy, the size of effect was similar to that for job demands. Intuitively, such a correlation might not be surprising, as engagement in work-related activities during non-work time increases the *mental and physical presence* of work during non-work time. However, beyond such possible artificial methodological variance, there is also some empirical evidence that engagement in work-related activities during non-work time is translated into higher strain and lower well-being (Sonnentag, 2001; Sonnentag and Natter, 2004; Sonnentag and Zijlstra, 2006) because of lower detachment from work (ten Brummelhuis and Bakker, 2012). Accordingly, our results suggest controlling for work-related activities during non-work time in future studies when investigating other possible antecedents and outcomes of detachment.

Finally, we examined the anteceding role of person characteristics for detachment from work. We found that, on average, detachment is unrelated to age and gender. A recent meta-analysis found a significant small and positive correlation between age and cognitive irritation ($r = 0.10$; Rauschenbach et al., 2013). As noted above, cognitive irritation has some conceptual overlaps to the detachment concept but reflects more general and long-term problems of mental disengagement from work (Mohr et al., 2006). However, results of both meta-analyses illustrate that direct effects of employees' age on detachment are rather small or negligible. This also concerns direct effects of gender. Prior studies found that females have more difficulties to physiologically unwind after work than males (Frankenhaeuser et al., 1989; Lundberg and Frankenhaeuser, 1999). One possible explanation for this finding is that females often take on greater responsibilities for household and childcare tasks during leisure time than males (Sonnentag and Bayer, 2005; Mojza et al., 2011; ten Brummelhuis and Bakker, 2012; Volman et al., 2013). However, concerning detachment from work such gender differences seem to be negligible.

We further examined the anteceding role of negative affectivity/neuroticism and heavy work investment. Both variables significantly negatively correlated with detachment from work. Recent meta-analyses found that people with higher values on these variables report more severe experiences of negative emotions (DeNeve and Cooper, 1998; Clark et al., 2016) and work stressors (Bowling et al., 2015; Clark et al., 2016). Thus, our results underline the assumption of Sonnentag and Fritz (2015) that person characteristics related to appraisal processes of the work situation might further influence detachment. Hence, future research should control for these factors when analyzing other antecedents and outcomes of detachment. However, we should not forget that average correlations between detachment and both individual difference variables were only small to moderate (about 5 to 10% explained variance in detachment). Thus, it is unlikely that detachment only reflects these individual differences. Furthermore, several studies found the expected relationships between higher detachment and lower demands (Mojza et al., 2010; Sonnentag et al., 2010a), lower strain and higher well-being (Sonnentag et al., 2008a, 2010a; Fritz et al., 2010b; Donahue et al., 2012; Querstret and Cropley, 2012; Sonnentag and Binnewies, 2013; Wang et al., 2013) even after controlling for negative affectivity/neuroticism and heavy work investment. Thus, such a common variance between detachment and both individual differences variables does not restrict the expected relationships to work-related antecedents and outcomes of detachment according to the SDM (Sonnentag and Fritz, 2015).

Again, we note that all average effects discussed above should be interpreted with caution as heterogeneity of effect sizes was at least moderate to high. Moreover, the range of prediction intervals reveals that similar directed effects can be expected only for quantitative demands, emotional demands, engagement in work-related activities during non-work time, and heavy work investment.

Moderator Variables

With one exception (the relationships between detachment and physiological stress indicators), we found for all analyzed relationships between detachment and its antecedents and outcomes a substantial moderate to high heterogeneity and dispersion of effect sizes. Thus, we examined several potential moderator variables to account for these variances. As noted above, multiple comparisons in moderator analyses problematically increase type I error rates (Cafri et al., 2010). Therefore, significant findings of these analyses should be interpreted with caution and as stimulating perspective for further research.

First, most studies in this field were conducted with European samples. Thus, a reliable comparison of effect sizes between different countries, which might uncover further cultural influences, was not possible for various variables (especially for outcomes of detachment). However, for several associations between detachment and work-related (job demands, quantitative demands, working time, job resources) and individual (age, gender, negative affectivity/neuroticism) variables we found no moderating impact of study location. Therefore, for most relationships the reported average effect sizes were rather robust in European and North American samples.

Second, study design moderated the associations between detachment and sleep, fatigue, and negative affectivity/neuroticism. This moderator variable explained between nine (fatigue) and 19% (sleep) between-study variance in effect sizes. More specifically, average between-person correlations with detachment were lower and less heterogeneous in diary studies than in cross-sectional studies with one measurement occasion. This finding might be explained by the more reliable measurement of variables in diary studies due to repeated measurement and a reduction of retrospective bias (Ohly et al., 2010). Moreover, the average negative association between negative affectivity/neuroticism and detachment was no longer significant in diary studies (and also in three longitudinal studies). This suggests that a potential bias of

correlations to detachment due to further influences of negative affectivity/neuroticism (Spector et al., 2000) might be less problematic in studies with repeated measures (i.e., experience sampling and longitudinal designs).

Third, regarding the moderating impact of demographic study differences, we found no impact of mean age in our sample of studies. However, examining age as moderator for relationships between detachment and its work-related antecedents and strain-related outcomes might be a promising avenue for future research as indicated by a couple of findings from occupational health psychology (Zacher and Schmitt, 2016). We found two interesting results concerning the moderating impact of samples' gender distribution. More specifically, the correlations between detachment and work motivation shifted toward positively directed effects whereas the negative correlations between negative affectivity/neuroticism and detachment decreased with an increasing percentage of females in the samples. Samples' gender distribution explained more than half of the between-study variance for both relationships. To our knowledge, gender-moderated effects of detachment have not been examined yet. We think that these effects are difficult to explain. For instance, with regard to the gender-moderated relationship between detachment and work motivation the extended stressor-detachment model (Sonnentag and Fritz, 2015) suggests that for persons with high proactive and problem-focused coping the relationships between detachment and strain outcomes will be reduced or annihilated. The meta-analysis of Tamres et al. (2002) revealed that females engage in both coping styles more than males. However, this would suggest an opposite pattern of results and, moreover, in our data we found no support that women would neither reflect more positive nor more negative about work during non-work time than men. Moreover, regarding the second effect, gender-moderated relationships between negative affectivity/neuroticism and detachment, it might be that females' higher engagement in coping (see Tamres et al., 2002) mitigates adverse influences of negative affectivity/neuroticism for detachment. However, as the detected moderator effects of gender base on between-study differences and not on within-study relationships, we suggest that future research should develop and examine more sophisticated hypotheses to explain these effects.

Fourth, we found a moderating impact of valence of work-related thoughts during non-work time for several relationships of detachment (i.e., sleep, affect, demands, age, and negative affectivity/neuroticism). Explained between-study variance of this moderating variable varied between six (affect) to 49% (negative affectivity/neuroticism). It is important to note that our analyses were restricted to a limited number of relationships to detachment as well as subgroups of valence (neutral vs. negative). We found that low detachment has, on average, more severe negative consequences for sleep and affect when employees cannot detach *from negative work-related thoughts*. This pattern also emerged for fatigue as outcome. However, the moderator effect was not significant here. These results support the assumptions of Cropley and Zijlstra (2011) and Sonnentag and Fritz (2015) that the content of work-related thoughts is important when predicting outcomes of detachment. More specifically, low detachment might become more problematic if work-related coping and reappraisal processes during recovery periods are linked with negative affective states that are translated into sustained physiological and cognitive activation and, in turn, impaired recovery and prolonged and accumulated strain (see also Brosschot et al., 2005; Meurs and Perrewé, 2011). In contrast, positive work reflection might be not detrimental for affect. Furthermore, we found that valence of work-related thoughts also moderated relationships between specific anteceding variables and detachment. For instance, average negative associations of overall job demands and negative affectivity/neuroticism to detachment were strongest when assessing detachment as absence of negative work-related thoughts. For job demands as antecedent this pattern is in line with assumptions from the extended stressor-detachment model (Sonnentag and Fritz, 2015). Building upon transactional stress theory this model states that low detachment will be more likely if employees evaluate job demands as threatening or harmful, thus, affectively negative. For negative affectivity/neuroticism the moderator effect of valence might be explained by a better match of measures. As persons rating high in negative affectivity and neuroticism are more sensitive to experience negative emotions across time and situations (Watson et al., 1988; Costa and McCrae, 1992) they should report poorer detachment when they are specifically asked for *affectively negative* work-related thoughts than for global ones. Albeit there was a moderator effect of valence for the relationship between age and detachment, mean subgroup correlations remained negligible.

In sum, our results suggest a strong need that future studies focus on potential moderating variables affecting relationships to detachment. As uncovered in this study and also in line with recent theoretical developments (Sonnentag and Fritz, 2015), the valence and content of work-related thoughts during non-work time (e.g., Binnewies et al., 2009; Cropley et al., 2012) seems to be a promising factor. Thus, we encourage scholars to assess detachment from work with more fine-grained approaches and also in combination with further impacting variables, i.e., appraisal and coping processes and combinations of work-related and person-related antecedents. This is important to better understand the conditions under which high detachment will develop and, in turn, impact health, well-being, work motivation, and work performance.

Limitations and Future Research Directions

Our study is not without limitations that should be considered when interpreting the results. First, we only included English written studies published in scientific journals. Therefore, pooled effect size estimates and heterogeneity of effect sizes might change when including Non-English and unpublished studies. However, we found only weak evidence for a possible publication bias (Borenstein et al., 2009) and simulation analyses revealed only a minor impact of such a bias for the presented average effects. Thus, the reported pooled effect size estimates seem to be relatively representative and robust. This is also underlined by the results of the presented sensitivity analysis. Nevertheless, future meta-analyses might extend the scope of literature search. This concerns not only the type of included publications but also the

role of detachment within other recovery periods (e.g., breaks, weekend, and vacation) than covered in the present study.

Second, our results are primarily based on individual-level and self-reported data (some exceptions are correlations to physiological data and sleep). Thus, correlations might be inflated by a common-method bias (Podsakoff et al., 2012). However, at least some of the included studies assessed predictors and dependent variables at different moments in time or used repeated cross-sectional assessments (diary studies) which both mitigate this problem. So far, longitudinal data is rare and should be assessed more often in future studies. At least for well-being and exhaustion as outcomes and job demands, quantitative demands, and working time as antecedent of detachment, we found similar average effects in a couple of longitudinal studies. Moreover, to our knowledge, experimental studies concerning antecedents and effects on detachment are scarce. While we found only two intervention studies investigating effects of manipulated work reflection during non-work time (Bono et al., 2013; Meier et al., 2016), there is a severe gap concerning the impact of work design interventions on detachment. Without any doubt, research on detachment from work would benefit from studies assessing objective and multi-source data, both for antecedents and outcomes, to further validate the core assumptions of the (extended) SDM.

Third, some of the work-related antecedents and outcomes of detachment are less well-examined. Thus, our combined measures of job demands and resources are at least to some extend biased by the higher proportion of frequently measured variables (e.g., quantitative demands, social conflicts, working time, job control). We tried to mitigate this problem by reporting separate correlations for meaningful groups of constructs. This was successful, given first insights for differential effect sizes. Nevertheless, future research should focus more frequently on constructs less investigated.

Another caveat might be that our results are biased by interdependence of constructs and measures stemming from one study which were treated as independent here. For instance, the meta-analysis of Clark et al. (2016) revealed workaholism to be significantly related to negative affectivity, job demands, job resources, and exhaustion. In our analysis, we only controlled for dependence of variables measuring the same construct (e.g., studies reporting separate correlations between detachment and different aspects of work engagement: vigor, dedication, and absorption). Future research might use meta-analytical multilevel structural equation modeling (Cheung, 2015) to face the problem of dependent effect size in a more sophisticated way.

Finally, future studies should concentrate more intensively on potentially moderating variables. Even after controlling for several study-related individual and conceptual moderator variables a substantial amount of variance in effect sizes remained unexplained for most of the examined relationships to detachment. However, we note that for some of these analyses sample sizes (also of subgroups) were small, limiting the statistical power of meta-analytical moderation analysis. We think that it is most likely to uncover this heterogeneity of effect sizes by investigating a more comprehensive and extended version of the SDM as recently suggested by Sonnentag and Fritz (2015). In addition, as indicated by our results, analyses should be adjusted for some of the most important confounding variables of detachment (i.e., negative affectivity/neuroticism, heavy work investment, and time for work-related activities during non-work time).

Practical Implications

Keeping in mind that detachment from work positively relates to employees' health, well-being, and performance, employees and organizations should seek successful interventions to improve detachment from work. Our results point to two general approaches.

The first strategy calls for *organizational-level interventions* (DeFrank and Cooper, 1987; Sonnentag and Frese, 2012). According to the results above, this would mean to minimize high quantitative demands (e.g., by adequate staffing), emotional demands and social conflicts (e.g., by organizational routines to prevent customer- and co-worker-conflicts), role stressors (e.g., by clear rules and structures about how to satisfy expectations for a single role), and an extension of working time above upper threshold values according to national regulation. Moreover, our data also suggests that promoting job resources as social support (e.g., by co-worker, supervisors, or the organization) and job control (e.g., timing control, scheduling control, control over supplies, and environmental control; Carayon and Zijlstra, 1999) might be helpful. So far, to our knowledge, there has been no intervention study examining effects of these job factors on detachment. Investigating a different job factor, Coffeng et al. (2014) probed a physical environment intervention in a sample of office workers. The intervention group's work environment was rearranged to stimulate different recovery behaviors and experiences (e.g., socializing by tables and chairs, plants, relaxing wall posters). However, detachment at work and after work did not significantly change in contrast to a control group after 6 and 12 months. This might suggest that it is more important to change task and organizational factors than workplace physical environment when aiming for an improved ability to detach from work.

Organizations should also promote boundary management by developing and communicating a clear and transparent policy regarding their expectations on availability and working during non-work time. This is important as new technological (e.g., smartphones and e-mail) and organizational (e.g., home-office) developments have increased availability of employees and work during non-work time. On the one hand, employees might enhance work-life balance by working outside the office. One the other hand, there is also some evidence that high quantitative demands (Derks et al., 2014b), low autonomy and low job control (Richardson and Thompson, 2012; Derks et al., 2014a), and longer working hours (Ohly and Latour, 2014) lead employees to spent more time with work-related activities during non-work time. Thus, organizations' boundary management activities should be based on healthy work-design to improve employees' recovery.

The second strategy focusses on *individual-level, person-centered interventions* (Sonnentag and Frese, 2012). Examples

are stress management programs (e.g., relaxation and cognitive-behavioral techniques, sleep training), trainings for competence and skill enhancement, and lifestyle change programs (e.g., exercise programs, well-being interventions). So far, several studies found positive effects of such interventions to improve detachment from work. For instance, Bono et al. (2013) revealed that daily positive work reflection improves detachment from work. Moreover, more complex recovery trainings showed small (Michel et al., 2014; Siu et al., 2014; Querstret et al., 2016) to large (Hahn et al., 2011; Thiart et al., 2015) positive effects on detachment from work. In addition to guided trainings, employees might also improve detachment by using powerful recovery activities during non-work time. More specifically, this concerns the distractive nature of social activities (Mojza et al., 2010, 2011; ten Brummelhuis and Bakker, 2012; Cropley et al., 2015) and physical activities (Sonnentag and Bayer, 2005; Mojza et al., 2010; ten Brummelhuis and Bakker, 2012; Cropley et al., 2015).

CONCLUSIONS

Balancing work and rest is, intuitively, necessary to live a healthy, happy, and productive life, and is, thus, a problem as old as humankind (Hockey, 2013). Hence, from a scholarly perspective, it is challenging to identify variables that shed light on this interplay. However, even in the last years, scholars identified detachment from work as one important psychological recovery process variable. Therefore, we quantitatively reviewed theoretically proposed outcomes and antecedents of detachment from work.

On a fundamental level, we found that detachment from work positively relates to mental and physical health, state well-being, and task performance. Moreover, improved work characteristics (i.e., lower job demands and higher job resources), less work-related activities during non-work time, and individual difference variables, such as a lower sensitivity to experience negative emotions or a working style characterized by less extensive work engagement, positively antecede detachment. However, our results reveal that the functional ties of detachment from work are probably even more complex. For example, we found that affective valence of work-related thoughts during non-work time might be a promising moderator variable that needs more attention.

We hope that this study stimulates future research to gain more insights into factors and processes of successful psychological recovery in the work-rest cycle.

AUTHOR CONTRIBUTIONS

JW and AL-H designed the study. JW and AL-H reviewed the articles. JW analyzed the data. JW wrote the first draft of the paper. Both authors discussed the results. AL-H commented on the manuscript.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: http://journal.frontiersin.org/article/10.3389/fpsyg.2016.02072/full#supplementary-material

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Psychological Detachment Mediating the Daily Relationship between Workload and Marital Satisfaction

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Scholars already demonstrated that psychologically detaching from work after workhours can diminish or avoid the negative effects of job demands on employees' well-being. In this study, we examined a curvilinear relationship between workload and psychological detachment. Moreover, we investigated the moderating influence of an employee's work-home segmentation preference on the relation between detachment and marital satisfaction. In addition, we applied and extended the stressor-detachment model by examining detachment as a mediator of the relation between workload and marital satisfaction. A total of 136 employees participated in our daily diary survey study during 10 consecutive working days. The results of the Bayesian 2-level path analyses revealed a negative linear and curvilinear relationship between workload and psychological detachment on a daily basis. Daily detachment positively related to marital satisfaction, with one's preference to segment work from home reinforcing this relationship. Moreover, psychological detachment fully mediated the daily relationship between workload and marital satisfaction. Implications for practice and suggestions for future research are discussed.

Keywords: workload, psychological detachment, marital satisfaction, work-home segmentation preference, diary study

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INTRODUCTION

Since the rise of the number of dual-earner couples, research examining the interaction between the work and home domain increased. By now it is well established that work experiences exert influences outside the work domain (e.g., Martinez-Corts et al., 2015). Paid work takes up a considerable amount of time in individuals' lives, during which they face different job demands (Landy and Conte, 2016). Workload is one important demand—referring to the amount of work employees have to handle within their time at work (Jex, 1998)—that results in mainly negative outcomes for the employee at work (e.g., exhaustion at work; Bakker et al., 2003) and at home (e.g., work-family conflict; Ilies et al., 2007).

According to the stressor-detachment model, an individual can obviate negative home outcomes resulting from job demands such as workload by recovering from work (Sonnentag, 2010). This can be done by cognitively and physically restraining from work-related activities and experiences during one's non-working time (i.e., psychologically detaching from work after workhours; Sonnentag and Bayer, 2005). In turn this capacity to "mentally switch off" from work has benefits for the individual, such as higher life satisfaction and less psychological strain (Sonnentag, 2012).

With this study we aim to fill current research gaps and as such contribute to the literature by extending and advancing the theoretical understanding of the current stressor-detachment model (Sonnentag, 2010; Sonnentag and Fritz, 2015). Previous between-person (Sonnentag et al., 2010b; Safstrom and Hartig, 2013; Potok and Littman-Ovadia, 2014) as well as within-person studies (Sonnentag and Bayer, 2005) provided support for a linear negative relationship between workload and psychological detachment. High levels of workload seem to—linearly—hinder an employee's ability to psychologically detach from work during the evening (Sonnentag and Bayer, 2005; Sonnentag and Kruel, 2006). In this study we respond to recent calls to explore possible non-linear relationships instead of assuming linear ones (Busse et al., 2016) and hypothesize that not only high but also low levels of workload (i.e., overload and underload) can interfere with the capacity to detach from work. As such, we aim to extend our current knowledge on the daily relationship between workload and psychological detachment, by examining the existence of a curvilinear relationship.

In addition, previous between-person (Moreno-Jiménez et al., 2009b) and within-person studies (e.g., Demerouti et al., 2012) almost exclusively examined health outcomes of detachment. By now it is well documented that psychological detachment relates negatively with strain and positively with well-being outcomes (Sonnentag and Fritz, 2015). However, the influence of detachment on relational outcomes remains unknown (e.g., no reference to relational outcomes such as marital satisfaction in the meta-analysis of Sonnentag and Fritz, 2015). We aim to add to the understanding of consequences of psychological detachment by focusing on marital satisfaction (i.e., relational outcome). Furthermore, research examining buffering or intensifying influences (i.e., moderators) on the link between detachment and outcome variables is limited to non-existing (Sonnentag and Fritz, 2015). To fill this void, we will examine whether employee's work-home segmentation preference—the stable preference to either segment work and private life or to integrate both life domains to a strong extend (Kreiner, 2006)—reinforces the daily relationship between detachment and marital satisfaction. The original stressor-detachment model postulated a moderating as well as a mediating role of detachment in the relation between job stressors and well-being outcomes (Sonnentag, 2010). So far, previous diary studies mainly focused on the moderating role (e.g., Sonnentag et al., 2010a) and—to our knowledge—only one study examined the mediating role of detachment (ten Brummelhuis and Bakker, 2012). We aim to extend the literature by examining whether detachment mediates the daily negative spillover from workload to an employee's marital satisfaction.

Scholars often used cross-sectional research designs to examine the stressor-detachment model (e.g., Sonnentag et al., 2010a), whereas recent empirical studies support a dynamic view on detachment (e.g., Demerouti et al., 2012). Sonnentag and Fritz (2015) called for more research to examine the short-term dynamics (i.e., within one workday) of the stressor-detachment model. In line, we performed a daily diary survey study, which allows us to capture the day-to-day variation.

Besides theoretically advancing the stressor-detachment model literature, we aim to formulate practical implications to help dual-earner couples in the juggle between their work and private life.

Stressor-Detachment Model

Nowadays employees work in highly competitive and stressful organizational settings where they encounter many job demands (e.g., workload, emotional demands, cognitive demands; Landy and Conte, 2016). These stressful work situations affect an employee's well-being by resulting in strain and fatigue symptoms (e.g., Bakker et al., 2003). To alleviate the negative consequences of experiencing high levels of job demands, an employee needs to recover from work (Sonnentag et al., 2010a). One strategy to recover from stressful work situations is by psychologically detaching from work. Mentally and physically restraining from work-related activities and experiences at home allows an employee to cease further taxation of resources (e.g., mood, time, energy) and provides opportunities to replenish drained resources (Sonnentag, 2010).

The stressor-detachment model is a theoretical framework that explains the moderating and/or mediating role of detachment in the relationship between job-induced stress and strain outcomes that stem from job stressors experienced at work (Sonnentag and Fritz, 2007a; Sonnentag, 2010). Triggered by the stressor-detachment model, scholars recently started paying more attention to detachment's mediating role instead of the predominantly examined moderating role of detachment (Sonnentag and Fritz, 2015). Here, we will conceptualize detachment as a possible mediator in the relationship between workload and marital satisfaction. Demanding job characteristics such as workload consume employees' personal resources (e.g., time, energy), often evoke negative emotions and keep them preoccupied with work, hindering them to detach (Sonnentag and Bayer, 2005; Bakker and Demerouti, 2007). Yet, research on recovery from work clearly shows that being able to detach from work and forget about the demanding job circumstances increases employees' well-being and reduces strain (Sonnentag and Bayer, 2005). Linking both findings suggests that psychological detachment acts as a mediator and as such explains how and why daily job stressors are related to strain. Moreover, there are also methodological reasons to approach detachment as a mediator. Previous studies only found very small increases in explained variance by adding the moderation by detachment (e.g., Sonnentag et al., 2010a). In addition, previous studies reported high correlations between job stressors and the ability to detach (e.g., Moreno-Jiménez et al., 2009b)—directing at its possible mediating role—, whereas this high correlation is not a prerequisite and might even be detrimental for detachment's moderating role. In contrast to ample research examining the moderating role (e.g., Moreno-Jiménez et al., 2009a), we will advance the stressor-detachment model by performing an empirical test and providing evidence for the existence of the proposed mediating influence of detachment. Moreover, we theoretically advance the stressor-detachment model by extending the

model by including moderators (i.e., work-home segmentation preference). In addition, unraveling psychological underlying processes (i.e., identifying a mediator) is especially relevant to develop intervention programs to alleviate the negative influence of job stressors on an employee's well-being (Baron and Kenny, 1986).

Curvilinear Relationship between Workload and Detachment

Job demands—such as workload—are conceptualized as work conditions that put a burden on an employee's capacities (Bakker and Demerouti, 2007). Recently, scholars who examined the job demands-resources theory differentiated job demands into challenge (e.g., workload) and hindrance (e.g., role ambiguity) demands (LePine et al., 2005). Challenge demands deplete and simultaneously stimulate energy whereas hindrance demands solely deplete energy (Van den Broeck et al., 2010). The dual potential to motivate employees to achieve personal growth and achieve goals as well as to drain an employee's energy suggests a curvilinear relationship between challenge demands and research outcomes (LePine et al., 2005). In different research areas, a non-linear inverted U-shaped relationship is framed in the light of the Yerkes-Dodson law suggesting an optimal mid-range level of arousal, with both extremes of the curve (i.e., very low and very high) leading to less favorable outcomes (Yerkes and Dodson, 1908). In addition, activation theory suggests that people who encounter very low levels of activation at work will be apathetic, increases in activation will energize employees, whereas further increases will drain resources and elicit feelings of inability to cope with the activation (Gardner, 1986; Gardner and Cummings, 1988).

Scholars already found support for a curvilinear relationship between workload and other outcome variables, such as physical health (i.e., cross-sectional study; Karanika-Murray et al., 2009) and task performance (i.e., diary study; Hofmans et al., 2015). In line with the Yerkes-Dodson law (Yerkes and Dodson, 1908) and activation theory (Gardner, 1986; Gardner and Cummings, 1988), scholars found that high, low and moderate levels of workload were in decreasing order related to negative health outcomes (Shultz et al., 2010). Stated differently, whereas the former results in stress due to overload, the second results in boredom due to underload and the latter displays an optimal fit between the work environment and an employee's capacities. Yet other scholars found that overload as well as underload arouse feelings of stress (Gardner, 1986; Fisher, 1991; Richter et al., 2008). Paradoxically, employees who encounter stress are most in need of detachment to stay energized, healthy and engaged, yet, the stressful circumstances make it hard for them to detach from work (Sluiter et al., 2003; Sonnentag et al., 2010a). Combining the abovementioned findings, having too little or too much work to handle is likely to impede with an employee's ability to detach on a daily basis. Underload (i.e., low levels of workload) can hamper the psychological detachment from work as employees feel apathetic, under-stimulated, frustrated and stressed, whereas overload (i.e., high levels of workload) can hamper detachment as employees feel overwhelmed, unable to cope with the stressor, exhausted and stressed (Gardner, 1986; Gardner and Cummings, 1988; Fisher, 1991; Zivnuska et al., 2002; Richter et al., 2008). The optimal mid-range of workload is demanding but workable and as such does not evoke feelings of inability to cope with the workload nor stress reactions (Yerkes and Dodson, 1908; Gardner, 1986; Gardner and Cummings, 1988). In conclusion, we suggest a curvilinear, inverted U-shaped relationship between workload and detachment, and hypothesize that:

Hypothesis 1: Employees' daily workload is negatively related to their daily ability to psychologically detach from work through a curvilinear/inverted U-shaped function.

Linear Positive Relationship between Detachment and Marital Satisfaction

Many scholars found support for a positive daily relationship between psychological detachment and health outcomes on one hand (e.g., more vigorous and less exhausted; Demerouti et al., 2012) and home outcomes on the other hand (e.g., less work-family conflict; Sanz-Vergel et al., 2011). However, studies linking employees' ability to detach from work to relational outcomes is limited or even non-existing (e.g., no reference to relational outcomes in the meta-analysis of Sonnentag and Fritz, 2015). Detaching from work-related activities and experiences at home allows an employee to cease further (threat of) loss of resources and provide opportunities to replenish drained resources (Sonnentag and Fritz, 2007a). According to conservation of resources theory (Hobfoll, 1988, 1989) individuals strive to preserve and protect already acquired resources, and furthermore gain additional resources. Moreover, individuals who actually lose or face the threat of losing resources are more prone to experience strain. As a consequence, employees who are unable to detach will experience a continuing taxation of resources and consequently negative outcomes, whereas an employee who is able to detach can replenish drained resources and as such alleviate negative outcomes (Hobfoll, 1989; Sonnentag and Fritz, 2015). Prior scholars found that in order to maintain positive relational functioning, communication and behavior, spouses need to rely on and invest resources (e.g., self-control; Neff and Karney, 2009; Randall and Bodenmann, 2009). Hence, the inability to detach from work will further tax the limited pool of resources and impair marital satisfaction, whereas detaching from work will replenish resources which will contribute to and benefit feelings of marital satisfaction. As such, we hypothesize that:

Hypothesis 2: Employees' daily ability to psychologically detach from work is positively related to marital satisfaction.

Moderating Role of Work-Home Segmentation Preference on the Daily Relation between Detachment and Marital Satisfaction

Individuals who combine work and family responsibilities can either prefer to segment the work and home domain or to

integrate both domains (Kreiner, 2006). The former refers to an employee's preference to maintain impermeable boundaries between work and home (i.e., keep both domains separated), whereas the latter refers to permeable work and home boundaries (i.e., both domains are blended). According to boundary theory, individuals can experience a violation of their work-home boundaries when their boundary preference does not align with how their boundaries are treated (Kreiner et al., 2009). Experiencing work-home boundary violation can result in negative home outcomes (i.e., work-home conflict; Kreiner et al., 2009). According to person-environment fit theories, individuals will experience more positive outcomes if they act congruent with their preference whereas a mismatch between individuals' acts and preferences will result in more negative outcomes (Kristof-Brown et al., 2005). As such, we argue that on days during which employees are not able to detach—that is, not able to keep work separated from the home domain—, the negative influence on their perceived marital satisfaction will be even stronger for those employees who generally prefer to segment work and home domains. Contrary, we assume that one's preference to segment work from home will strengthen the positive influence of detachment on marital satisfaction, since being able to psychologically detach from work aligns with an individual's preference to segment work and home boundaries. As such, we hypothesize that:

Hypothesis 3: An employee's work-home segmentation preference moderates the daily relationship between psychological detachment from work and marital satisfaction, such that detachment will lead to more marital satisfaction when the employee's preference to segment work and family life is high.

Mediating Role of Detachment in the Linear Relation between Workload and Marital Satisfaction

Meta-analytic findings suggest associations between the experience of workload at work and negative outcomes (e.g., psychological and physical well-being; Bowlinga et al., 2015). In addition, recent diary studies found that workload negatively related to an employee's marital life (Story and Repetti, 2006; Lavee and Ben-Ari, 2007). Nevertheless, these studies mainly focused on constructs related to marital satisfaction. However, marital satisfaction in itself is an important outcome as it predicts aspects of well-being (Proulx et al., 2007). According to the conservation of resources theory, at low levels of workload employees do not need to address their limited pool of resources (Hobfoll, 1989). Consequently, one could argue that this will positively impact an employee's marital satisfaction as they can employ these resources at home. However, moderate and high levels of workload require an employee to use resources in order to handle the workload (Hobfoll, 1989). As such, with increasing levels of workload and the taxation of resources that goes with it, we assume an employee's feelings of marital satisfaction will go down as the consumed resources are no longer available in the home domain to invest in one's relationship. In other words, we hypothesize that daily workload will interfere with marital satisfaction. However, previous research found that workload only indirectly—via mood—influenced one's marital life (i.e., dyadic closeness; Lavee and Ben-Ari, 2007). In a similar vein, we assume that the influence of daily workload on marital satisfaction operates through psychological detachment. More specifically, when an employee experiences low or high levels of workload this will intervene with his/her ability to detach (i.e., hypothesis 1). Not being able to detach will result in a prolonged influence of the job demands at home and as such in a decrease in marital satisfaction (i.e., hypothesis 2). One way to intervene in the negative spillover from work experiences to marital satisfaction, is by recharging one's batteries, i.e., not thinking nor working on job-related matters. As such, we hypothesize that:

Hypothesis 4: Employees' daily ability to psychologically detach from work mediates the negative relationship between workload and marital satisfaction.

The study hypotheses are graphically depicted in **Figure 1**.

METHODS

Procedure

We contacted individual Belgian employees from different sectors (e.g., healthcare, banking, education, and justice) by means of a convenience sampling approach (i.e., using the researchers' personal network and word-of-mouth communication). Respondents could not be self-employed, had to work at least 50% and had to be part of a dual-earner couple—cohabiting partners in a romantic relationship (either married or unmarried) of which both partners work at least part-time as paid employees in a variety of sectors—to participate in this study. During a personal conversation with each respondent, we explained the purpose of the study, stressing the discretionary nature of participation, the possibility to withdraw from the study at any time, and the confidential treatment of the data. In addition, each respondent received written information about the study and a personal code. This code assured respondents' anonymity and allowed us to match their general and diary surveys afterwards. Each respondent also received an envelope with this personal code, which we individually collected after completion. All respondents indicated their willingness to participate by signing an informed consent. No incentives were provided for participation in the research. The university's ethics committee granted ethical approval for the study (reference number ECHW_045).

We opted for this daily survey design as it reduces the retrospective bias of more traditional survey studies (Reis and Gable, 2000) and allowed us to account for the situational and temporal context when studying feelings, cognitions and behaviors (Reis and Gable, 2000). Moreover, we opted for a study period of two workweeks, since prior studies found that during this time period it should be possible to capture respondents' life representatively (Reis and Wheeler, 1991). We asked our respondents to complete a one-time general survey 1 week prior to completing the daily diary study for 10 consecutive

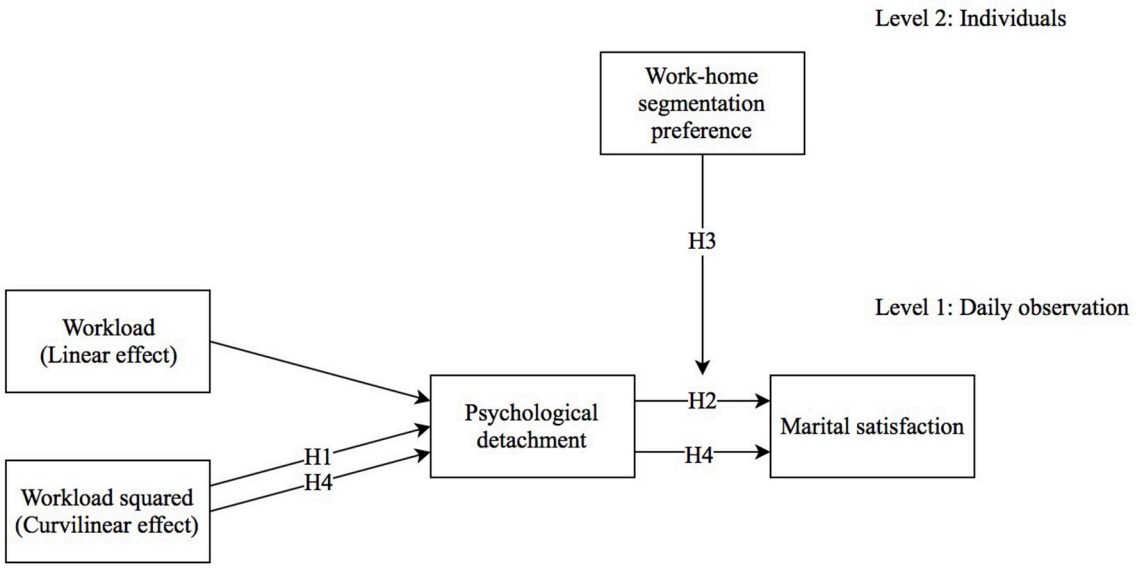

FIGURE 1 | The study hypotheses.

working days (i.e., not during weekends) starting on a Monday. All respondents had workweeks of 5 consecutive days, namely from Monday till Friday. Each workday, respondents needed to fill out the same questionnaire to rate the level of workload, psychological detachment and marital satisfaction experienced that day. We instructed our respondents to not look back to their answers of the previous day(s) and stressed the fact that there were no right nor wrong answers. To lower the burden of the respondents, we only collected data once a day, right before bedtime. For their convenience, we instructed them to keep their paper diary booklet on their nightstand at home. We emphasized that they were not required to fill out the daily diary survey on days they did not work, for example due to part-time working or illness. These days were treated as missings. We only included data of part-time and full-time employees who completed more than three out of ten daily diary surveys in a timely manner (i.e., completed on the requested day according to their self-reported time stamps) to minimize the effect of recollection bias. Overall we had 1144 observations (out of 1360, compliance rate = 84.12%).

Participants

A total of 136 Belgian employees working in different sectors participated in our study. About half of the respondents were women (48%) with an average age of 41.04 years ($SD = 10.72$, range: 21–59 years). All respondents obtained at least a secondary school degree and the majority were employed as white collar worker (90%). They exerted their current function on average for 11.46 years ($SD = 9.85$) and most of them worked full-time (79%; see Appendix A in Supplementary Material for the results of the multi-group comparison test between full-time and part-time workers). The majority of the respondents had at least one child (79%).

Note that due to the multilevel nature of the data, the unit of analysis equals "daily diary survey entries" rather than "respondents" (Conway and Briner, 2002) for the level 1 hypotheses (i.e., hypotheses 1, 2, and 4). As a result, the sample size contains 1144 observations (136 respondents x a maximum of 10 daily diary survey entries), or an average of 8.41 completed daily diary surveys per respondent. For the cross-level hypothesis (i.e., hypothesis 3), the unit of analysis equals "respondents," resulting in 136 respondents. In this respect, Maas and Hox (2005) found that level 2 sample sizes exceeding 30 (i.e., 136 in our study) are sufficiently large to produce unbiased estimates and accurate estimations of standard errors and fixed effects.

Measures

All items were rated on a five-point Likert scale ranging from "*Completely not agree*" (1) to "*Completely agree*" (5).

General Survey Measures

We used the general survey to collect demographic information and work-home segmentation preference. *Work-home segmentation preference* was measured using the four-item scale of Kreiner (2006) including items such as "I don't like to have to think about work while I'm at home." We operationalized this preference to segment or integrate work and home as a stable trait, in accordance with the existing literature (Kreiner et al., 2009) and therefore assume that this preference will not change over the course of two workweeks. We translated the original English items (i.e., developed in the United States) to Dutch, using the back-translation procedure (Brislin, 1980). Two bi-lingual (Dutch–English) translators who are familiar with the Belgian culture and the research topic independently translated the items. Afterwards two other bi-lingual translators checked the translations on inconsistencies, discussed these and

resolved any deviation between the original and translated items. In addition, these translators checked for cultural sensitivities, to avoid cultural inappropriate translations and the similarity in meaning between the original and translated items. Afterwards, before administrating the translated items, we field-tested the wording and meaning of the items with two respondents who were not familiar with the research topic. The alpha reliability coefficient of this scale with the current sample was 0.70.

Daily Survey (Before Bedtime)

Workload was measured with three items based on the Dutch version (Furda, 1995) of the Job Content Instrument (Karasek, 1985). We slightly modified the existing scale (by adding "today" to the item; for a similar approach see for example Ilies et al., 2007) to capture the daily time frame. The scale includes items such as "Today I had to work fast." The within-person omega reliability coefficient of this scale with the current sample was 0.88.

Psychological detachment was measured with the Dutch translation (Geurts et al., 2009) of the four-item Recovery Experience Scale of Sonnentag and Fritz (2007b), including items such as "After work, I could distance myself from my work." The within-person omega reliability coefficient of this scale with the current sample was 0.88.

Marital satisfaction was measured—in line with prior research (Buunk and Bakker, 1997)—with two Dutch items from the Relational Interaction Satisfaction Scale of Buunk (1990). We slightly modified the existing items to capture the daily time frame (e.g., adding "today" to the item). Although two-item measures are rarely used in traditional (i.e., cross-sectional) designs, in diary studies single- and two-item measures have a considerable history especially for concrete constructs. However, the potential downsides of the use of a shortened scale are the risks of low reliability and the inappropriateness to measure multi-dimensional constructs (Smith et al., 2000). Nevertheless, according to Anderson et al. (2009), marital satisfaction is a concrete, homogeneous and unidimensional construct. We selected the two items that correlated the highest with other relational satisfaction scales (Buunk and Bakker, 1997). A sample item is: "Today, I felt happy with my partner." The within-person omega reliability coefficient of this scale with the current sample was 0.94.

Data Analysis

Given the nested structure of our data (i.e., working days nested within employees), we performed two-level path analyses using Mplus version 7.3 (Muthén and Muthén, 2012), in which we separated within- and between-components (Preacher et al., 2010). Prior to testing our hypotheses, we conducted a multilevel confirmatory factor analysis (CFA) to examine the discriminant validity of our research variables. Prior to specifying the within-person part of the two-level path model, we person-mean centered the level 1 predictor variables (i.e., workload and squared workload) at an employee's individual mean to eliminate between-person variance (Hofmann et al., 2000). As such, for the hypotheses pertaining to the within-person level (i.e., hypotheses 1, 2, and 4) the predictor variables only contain within-person variability. Note that before squaring workload, we first person-mean centered this variable due to the high risk of multicollinearity otherwise. In addition, it is recommended to include the first order regression term (i.e., linear) as well, when examining a higher order regression (i.e., quadratic). Prior to specifying the moderated two-level path model, we grand-mean centered the cross-level moderator (i.e., work-home segmentation preference) at the overall mean.

First, we examined the intercept-only model to estimate the amount of variance attributable to the person (i.e., level 2) and day (i.e., level 1) level of the model. Next, we modeled relationships among within-person variables (workload, squared workload, detachment, and marital satisfaction) at level 1 by defining random slopes. We compared the balance between the number of parameters (i.e., model complexity) and the fit of the model to the data (i.e., Bayesian Information Criterion or BIC) of a full and a partial mediation model. According to the BIC values, the full mediation model yielded a superior fit to the data ($BIC_{\text{full mediation}} = 5092.61 < BIC_{\text{partial mediation}} = 5097.96$; Aiken and West, 1991). Consequently, we will rely on the full mediation model when discussing the results. We tested the cross-level moderation by examining the influence of work-home segmentation preference on the strength of the level 1 relationship (i.e., between detachment and marital satisfaction; Cohen et al., 2003).

To simultaneously test the non-linear mediation and cross-level moderation we rely on Bayesian two-level path modeling. The reason to opt for Bayesian estimation is threefold: (1) it can handle complicated models, (2) it can handle missing data (e.g., due to working part-time) well by using all observations to estimate parameters without imputing data, and (3) it is suited for hierarchical non-normal distributions, which is traditionally the case when testing multilevel mediation by the use of the product-of-coefficient approach. Bayesian analysis deviates from traditional frequentist analyses as it provides a posterior distribution (i.e., probability distribution of each parameter) and credibility intervals (i.e., 95% most credible parameter values) instead of a *p*-value and/or confidence intervals. We will rely on the credibility intervals (CI) to determine whether a parameter value is credible (Kruschke et al., 2012).

RESULTS

In the multilevel CFA, we examined our hypothesized four-factor measurement model in which we included our level 1 variables (i.e., workload, detachment, and marital satisfaction) at the within-person level and our level 2 variable (i.e., work-home segmentation preference) at the between-person level. Overall, this model had a good fit with the data (CFI = 0.96, TLI = 0.93, RMSEA = 0.07, and SRMR = 0.06; Kline, 2005). In addition, each item loaded significantly and in the expected direction onto its respective latent factor. Moreover, our hypothesized measurement model yielded superior fit compared to different alternative models (results available by request from first author). Combined, these research findings support the distinctiveness of our study constructs.

Descriptive Statistics

Table 1 reports the means, standard deviations, intraclass correlations, zero-order correlations (i.e., the correlation at the individual level) and person-centered correlations (i.e., the correlation at the day-level). On average, our respondents rated their daily level of experienced workload with a 3.11 out of 5, suggesting they perceived themselves as working in a demanding work environment. This result aligns with findings from a recent study that examined workload in the Flemish workforce (i.e., our sample background; Bourdeaud'hui and Vanderhaeghe, 2013). As all intraclass correlation coefficients at the day-level were higher than 0.05—indicating a considerable amount of the variability in these variables is due to within-person differences (Marcoulides and Schumacker, 2009)—we are confident that the variables fluctuated over time. Specifically, about 50% of the variation in each of our level 1 variables [i.e., workload (47%), detachment (45%) and marital satisfaction (54%)] was due to day-to-day fluctuations. Note that we only report the correlations at the zero-order level for work-home segmentation preference as this variable was only measured at the between-person level and thus renders the estimation of within-person correlation obsolete.

Hypothesis Testing

We tested a mediation model in which detachment was predicted by the linear and squared effect of workload and marital satisfaction was predicted by the linear effect of detachment while controlling for the direct effect of the linear and squared effect of workload on marital satisfaction. In addition, the mediation model contained the random slope of detachment on marital satisfaction that was regressed on an employee's preference to segment work and home domains. Our results indicate a negative linear (95% CI for $\theta = -0.37$ is -0.44 to -0.30) as well as squared (95% CI for $\theta = -0.07$ is -0.13 to -0.01) effect of workload on detachment on a daily-level, thereby supporting hypothesis 1. **Figure 2** represents the curvilinear relationship between workload and detachment. As can be seen in **Figure 2**, between (very) low and average levels of workload the negative impact on detachment is small and not significantly different, however as from the average level of workload every increase in workload leads to a stronger decrease in detachment.

Furthermore, we found a direct positive effect of detachment on marital satisfaction (95% CI for $\theta = 0.14$ is 9.09 to 0.18), thereby supporting hypothesis 2. We found a direct significant negative effect of linear workload on marital satisfaction (i.e., not mediated by detachment; 95% CI for $\theta = -0.07$ is -0.12 to -0.02), whereas our results did not indicate a significant relation between the squared effect of workload and marital satisfaction (95% CI for $\theta = 0.01$ is -0.03 to 0.05) on a daily-level.

In line with hypothesis 3, work-home segmentation preference positively moderated the relationship between detachment and marital satisfaction (95% CI for $\theta = 0.07$ is 0.03 to 0.12). Put differently, the positive relationship between detachment and marital satisfaction is stronger among employees who prefer to segment work from home. **Figure 3** represents the results of the moderated two-level path analysis used to test the third hypothesis. However, preferring to keep work and home segregated from each other has a direct negative effect on marital satisfaction (95% CI for $\theta = -0.33$ is -0.52 to -0.15).

The mediation effect specified in hypothesis 4, contains a curvilinear relationship between workload and detachment, as well as a linear relationship between detachment and marital satisfaction. To that end, we relied on the approach specifically developed to address non-linear mediation (Hayes and Preacher, 2010). As such, we evaluated the indirect non-linear mediation effect of workload on marital satisfaction via detachment for different values of workload (i.e., instantaneous indirect effect). The mediation effect does not only depend on the curvilinear relationship between workload and detachment, and the linear relationship between detachment and marital satisfaction, but is also conditional on the level of workload. To that end, the instantaneous indirect effect was tested for the average value of workload and for two and one standard deviation(s) below and above the average value of workload. Daily detachment fully mediated the relationship between workload and marital satisfaction for every predefined level of workload, thereby supporting hypothesis 4. We found that the instantaneous indirect effect through detachment is negative and significant when workload is two (95% CI for $\theta = -0.03$ is -0.05 to -0.00) and one (95% CI for $\theta = -0.04$ is -0.06 to -0.02) standard deviations below the mean, when workload is average (95% CI for $\theta = -0.05$ is -0.07 to -0.03) as well as when workload is one (95% CI for $\theta = -0.06$ is -0.09 to -0.04) and two (95% CI for $\theta = -0.07$ is -0.11 to -0.04) standard deviations above the mean, for employees scoring average on work-home segmentation preference. This mediation effect is depicted in **Figure 4** together with the 95% credibility intervals for employees with low (-1 *SD*),

TABLE 1 | Means, standard deviations, intraclass correlations, zero-order, and person-centered correlations among the focal variables.

	M	*SD*	ICC (person)	ICC (day)	1.	2.	3.	4.	5.
1. Workload	3.11	0.96	0.53	0.47		−0.03	−0.31***	−0.16***	–
2. Workload squared	10.51	5.90	0.53	0.47	−0.2		−0.04	0.01	–
3. Detachment	3.45	1.09	0.55	0.45	−0.05	−0.02		0.22***	–
4. Marital satisfaction	4.22	0.79	0.46	0.54	−0.08**	−0.06	0.01		–
5. Work-home segmentation preference	3.58	0.87	1.00	-	0.06*	0.06*	0.03	−0.07*	

*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$. Means and standard deviations were computed on the raw data. Zero-order correlations are presented below the diagonal ($N = 136$). Person-centered correlations are presented above the diagonal ($N = 1144$).

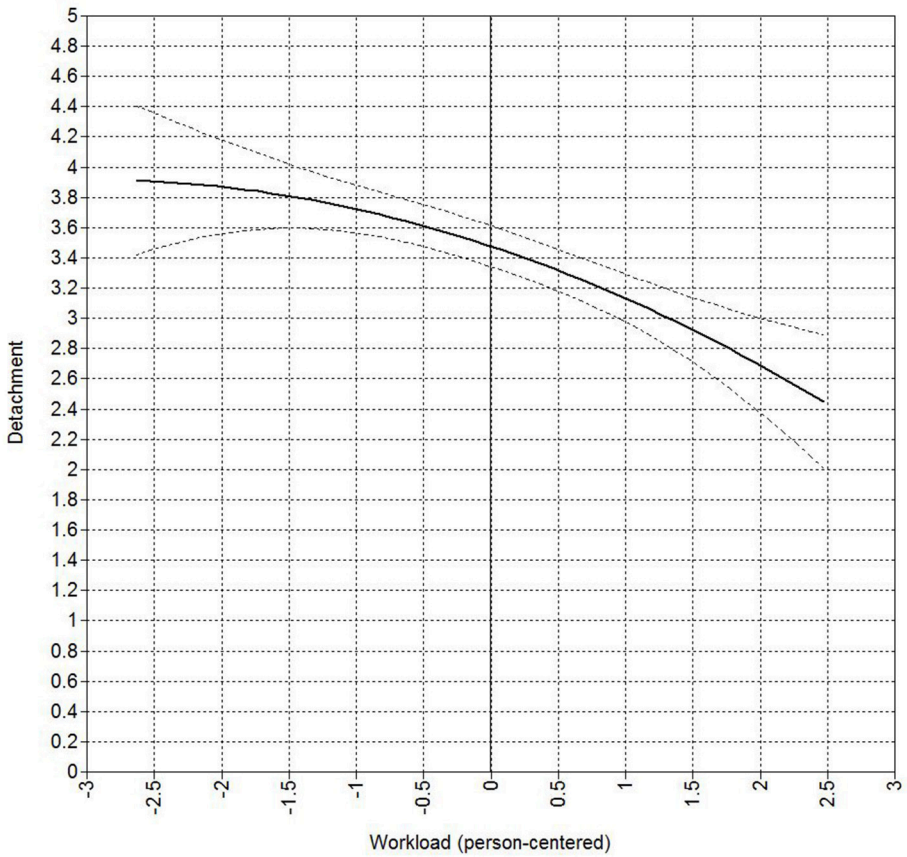

FIGURE 2 | Curvilinear relationship between workload and detachment on a daily basis. The black solid line represents the curvilinear relationship, whereas the black dotted lines represent a 95% credibility interval.

average and high (+1 *SD*) levels of work-home segmentation preference. Irrespective of the level of work-home segmentation preference, the instantaneous indirect effect is positive for very low levels of workload (i.e., −3 *SD*). In other words, at very low levels of workload, increases in workload will be beneficial for an employee's marital satisfaction via workload's influence on detachment. However, the instantaneous indirect effect of workload on marital satisfaction via detachment is negative for low (i.e., −2.5 *SD*) up to very high (i.e., +3 *SD*) levels of workload, irrespective of the level of work-home segmentation preference. In other words, further increases in workload lowers marital satisfaction via the negative effect of workload on detachment. The negative influence of workload on marital satisfaction via detachment becomes stronger (i.e., accelerating decreasing curve) for employees with a high (+1 *SD*) compared to low (i.e., −1 *SD*) work-home segmentation preference.

DISCUSSION

We demonstrated the existence of a curvilinear relationship—on top of the already acknowledged linear relationship—between workload and psychological detachment and a linear relationship between detachment and marital satisfaction, before examining and illustrating the mediating role of detachment—as defined in the stressor-detachment model—in the daily relationship between workload and marital satisfaction. Furthermore, our findings show that an employee's stable preference to segment the work and home domain strengthens the daily relationship between detachment and marital satisfaction. In doing so, our study contributes to the stressor-detachment and work-home interface literature.

Discussing the Results, their Implications, and Alternative Explanations

We found support for a negative linear as well as curvilinear relationship between workload and detachment. The linear relationship between workload and detachment denotes the general negative trend that was often illustrated in previous studies, being the more workload experienced at work, the less an employee will be able to detach that day (Sonnentag and Bayer, 2005). In addition, the negative curvilinear relationship provides a more nuanced picture of the relationship between workload and detachment. As the curvilinear relationship did not display the hypothesized inverted U-shape, there is no optimal moderate level of workload which allows employees to detach better.

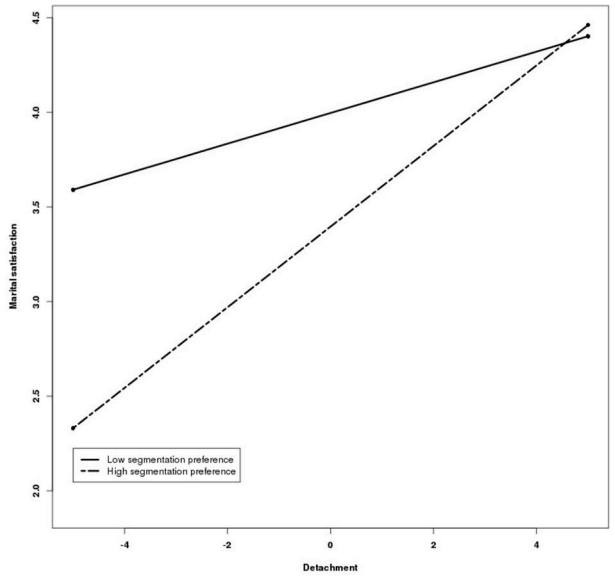

FIGURE 3 | Cross-level interaction of work-home segmentation preference.

Instead, we found that an equal increase in levels of workload did not lead to an equal decrease in the level of detachment. Specifically, from very low till moderate levels of workload, the increase in negative effects for detachment is not prominent. As such, our results suggest that the decline in the ability to detach is negligibly small in case an employee experiences very low, low or moderate levels of workload during his/her workday. However, once workload reaches a moderate level every further increase is likely to result in an accelerating decline of the ability to detach from work. In other words, whereas small increases in workload over workdays do not alter the ability to detach substantially when the experienced levels of workload are very low to moderate, every small increase in workload above moderate levels will further dwindle an employee's ability to detach from work substantially. Combining our results suggest that every increase in workload reduces an employee's ability to detach from work, with particularly detrimental effects for detachment once workload exceeds moderate levels. Although we hypothesized that the evoked stress of underload and overload would interfere with detachment (Sluiter et al., 2003; Sonnentag et al., 2010a), our research finding could be framed in the light of conservation of resources theory if we argue that detachment will be less likely in the absence of resources (Hobfoll, 1988, 1989). Very low to moderate levels of workload increasingly call upon resources, however the additional resources needed to handle these levels of workload seem to be manageable and as such only slightly interfere with detachment. However, confronted with moderate to very high levels of workload, an employee will increasingly need to consume resources to be able to cope with the workload at hand, possibly explaining the exponential negative effect on detachment. However, another alternative explanation for the absence of the hypothesized inverted U-shaped relationship between workload and detachment could be our focus on detachment during off-job time. Prior research indicated that detachment can take place after as well as during working time (Trougakos et al., 2008). Detaching at work could be especially relevant for employees who experience low levels of workload and potentially have more time available to devote to detachment activities during workhours[1]. As such, it could be valuable to examine how the curvilinear relationship between workload and detachment evolves and develops within one workday by assessing respondents' workload and detachment multiple times a day (e.g., by using an experience sampling design with multiple short questionnaires during the workday as well as at home). This would allow scholars to examine the influence of different levels of workload on detachment during off-job hours, while controlling for detachment during workhours as well as on the (combined) act of detaching during and after workhours. Nevertheless, our research finding opens up new avenues to examine potential non-linear relationships between job demands and one's ability to detach on a daily basis.

In addition, detachment positively influenced feelings of marital satisfaction. This effect could be ascribed to the resource replenishing and further resource taxation inhibiting characteristics of detachment. These replenished, available resources are necessary in order to engage in positive relational functioning, communication and behavior (Neff and Karney, 2009; Randall and Bodenmann, 2009). In line with the conservation of resources theory, detachment might conserve, protect resources and prevent further resource loss, which will positively impact an employee's feelings of marital satisfaction (Hobfoll, 1988).

Furthermore, an employee's stable preference to keep his/her work and home domain separated will enhance the positive influence of detachment on marital satisfaction. This finding aligns with person-environment fit theories that predict positive outcomes when an employee's behavior (i.e., ability to detach from work) and preference (i.e., work-home segmentation) are in line (Kristof-Brown et al., 2005). Alternatively, employees with a preference to segment work from home who are not able to detach can possibly experience boundary violation which will result in negative home outcomes (i.e., marital dissatisfaction; Kreiner et al., 2009). In addition, we found a negative effect of preferring to keep work and home life separated from each other on an employee's marital satisfaction. One possible explanation for this somewhat surprising finding could be that some of the individuals who like to segment work from home communicate less about work with their partner who's willing to talk about work. Another possible explanation could be that the partner who prefers to segment work from home is also less willing to listen when his/her partner wants to talk about work-related matters and as such feels less supported by his/her partner. It could be valuable to examine whether this negative effect between preferring to segment work from home and marital satisfaction is influenced by the (dis)congruency in work-home segmentation preferences between partners.

[1]We thank the reviewer for this suggestion.

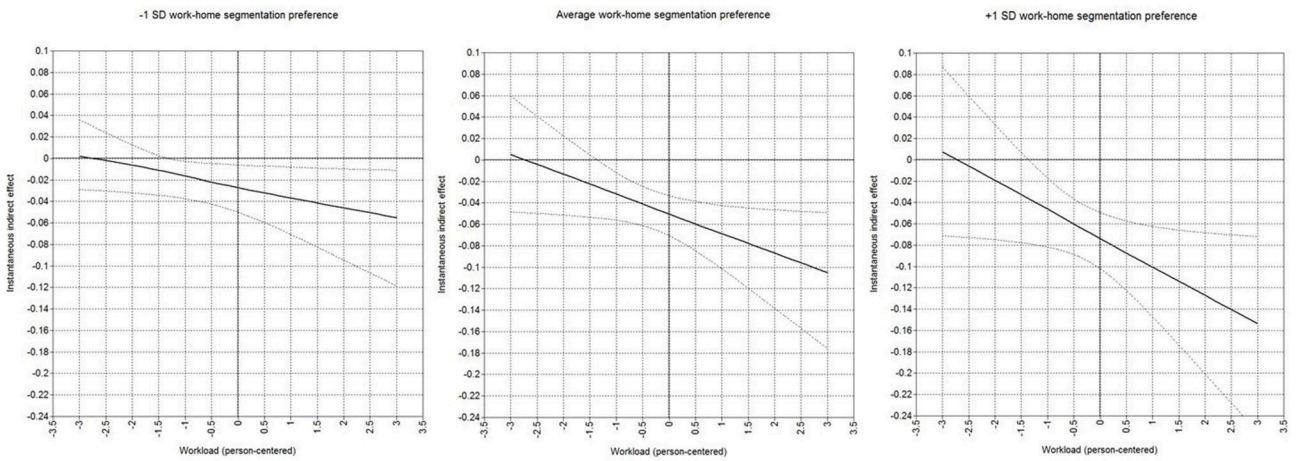

FIGURE 4 | The instantaneous indirect mediation effect of workload on marital satisfaction via detachment as a function of person-centered workload. The mediation effect is depicted for employees who scored 1 standard deviation below the average (left), average (middle), and 1 standard deviation above the average (right) on work-home segmentation preference. The black solid line represents the mediation effect, whereas the black dotted lines represent a 95% credibility interval.

Lastly, our results suggest an indirect effect of workload on marital satisfaction through an employee's ability to detach from work. In other words, we found that the negative influence of workload on marital satisfaction operates through the negative effect on detachment. This depleting effect becomes stronger when the initial level of workload increases as well as with an increase in employee's stable work-home segmentation preference. This finding is in line with the stressor-detachment model that states that detachment exerts a mediating role between work stressors and strain reactions (Sonnentag and Fritz, 2015). In addition, our study provides further evidence to examine the stressor-detachment model on a daily basis as about 50% of the variance in workload, detachment and marital satisfaction was located on the day-level.

Limitations

Notwithstanding the methodological and theoretical contributions of our study, we need to acknowledge some limitations. First, we assessed our variables with self-report measures, which might raise concerns about social desirability and common method variance (Podsakoff et al., 2003). However, we eliminated between-person variance and variance caused by individual response tendencies by person-mean centering the variables (Ilies et al., 2010) and since common method variance cannot explain nor alter interaction effects (i.e., significant cross-level interaction with work-home segmentation preference; Siemsen et al., 2010), we assume these biases only scarcely influenced our results. Moreover, to check for common method variance, we performed a Harman's single-factor test (Podsakoff et al., 2003; Krishnaveni and Deepa, 2013). This test examines whether the data provides a good fit with a one-factor model, which would suggest one underlying latent factor due to common method variance. However, the fit indices of the exploratory factor analysis were not satisfactory (see Appendix B in Supplementary Material for the test results). The absence of one common underlying latent factor is also supported by several small to zero correlations between our study variables, both at the within- and the between-person level (see Demerouti et al., 2007 for a similar reasoning). Combining the abovementioned arguments, we assume it is very unlikely that common method variance had a major impact on our results. Nevertheless, we advise further research to include other-ratings of workload in the light of the current organizational trend to rely on teamwork (e.g., direct colleague and/or supervisor reports; Ilgen and Pulakos, 1999). In addition, future research would benefit from the use of objective workload indicators such as amount of attained objectives, for example the number of outgoing phone calls for call center employees. Another way to objectify the measure of workload could be by relying on physiological measures such as heart rate variability. Moreover, the possibility of common method variance could be reduced even more by measuring the predictor and outcome variables separated in time, such as across two daily diary surveys (i.e., experience sampling design) were employees are instructed to fill out their experienced levels of workload at the end of the workday and the experienced levels of detachment and marital satisfaction right before bedtime (Podsakoff et al., 2003).

Second, we used self-reported time stamps in our paper- and pencil surveys. Studies examining the work-home interface often rely on paper- and pencil booklets to avoid attrition due to assessing variables at work as well as at home (for a similar approach see Volman et al., 2013). Although we chose this approach to allow respondents without work laptop or internet access at home to participate in the study and to avoid respondents to check their (potential work-related) emails late in the evening, we cannot verify the truthfulness of their indicated time stamps. However, we took some steps to minimize the potential that respondents

would untruthful indicate time stamps. That is, we instructed our respondents to leave the survey blank, instead of filling them out later that day or on the next day, in case they forgot to fill it out. As some respondents left some surveys blank while they did indicate that they went to work that day, we are relatively confident that the self-reported time stamps are trustworthy. Moreover, participation was strictly voluntary with no incentive contingent on completion of the surveys. Hence, respondents have little external motivation to retrospectively complete the surveys. However, to objectify the time and day of survey completion, we recommend future research to rely on electronic surveys with automatic time stamps.

Third, the impact of surveying employees in itself on their detachment level that day remains unknown[1]. In our study, we assessed all variables during an employee's private time. However, the act of completing the questionnaire might provoke work-related thoughts. To restrict the potential negative effect, we asked them to fill out the booklet right before going to bed. As such, we did not induce work-related thoughts between the time of arriving home and going to bed. Moreover, we instructed all respondents at the start of the study that they could withdraw at any time. In addition, when collecting the booklets, we checked whether the respondents had encountered any harm by completing the booklet. However, it would be a valuable area for future studies to examine whether the act of completing daily surveys concerning work- and home-related behavior, emotions and cognitions in itself impacts the respondent's well-being.

Lastly, we recruited respondents by means of a convenience sampling design, which potentially resulted in a sample that is not representative of the general population. However, recent meta-analytic findings (Wheeler et al., 2014) suggest slightly lower effect sizes and correlations in convenience samples compared to non-convenience samples, whereas the same overall conclusions could be drawn from both samples. Hence, the use of a convenience sample would have resulted in more conservative estimates of the relationships between the variables under study. In addition, convenience samples are less problematic in within-person studies since employees are compared with themselves rather than to others (see Debusscher et al., in press for a similar reasoning).

Suggestions for Future Research

The current study opens up new avenues for further research. Besides looking at the individual's within-person relationships, another direction for future research could be to look into crossover effects (i.e., transference of an individual's effect on another individual). An employee's experience of workload could depend on and/or influence the performance within his/her work group (i.e., between colleagues) and impact colleagues' ability to detach from work during job breaks. In a similar vein, within dual-earner couples (i.e., between partners) the workload an employee experiences at work may influence his/her partner's ability to detach from his/her work at home.

Furthermore, it would be valuable to find buffering effects for the negative influence of workload on detachment from work. Previous between-person studies found support for a buffering effect of social support on the relationship between workload and stress (Glaser et al., 1999). It is hence recommended for future research to investigate whether the hindering effect of workload on an employee's ability to detach, is diminished by having resources at his/her disposition on a daily basis.

Lastly, we extended the stressor-detachment model, by finding support for a curvilinear—on top of the frequently examined linear—effect of workload on detachment and empirically demonstrating the mediating role of detachment. It is worth mentioning that we operationalized workload in our study as quantitative workload (i.e., too many tasks to handle in too little time), whereas future studies could examine the effects of qualitative workload (i.e., too difficult/complex tasks to handle). In addition, we recommend to broaden the scope of the stressor-detachment model to also include the possibility of curvilinear relationships. For instance, the cognitive demands an employee experiences at work can have negative (too little or too much cognitive demands) as well as positive (moderate amount of cognitive demands) consequences for an employee's capacity to detach form work. In addition, more research needs to be done, to examine the nature of the mediation effect of detachment in the relationship between job stressors and relational, well-being and home outcomes.

Practical Implications

Given the importance of workload in today's work environment, understanding the temporal relationship with detachment and marital satisfaction provides policy makers with a powerful instrument.

Firstly, it is important to raise employees' awareness of the potential consequences of having to manage too much work. Our study highlights that encountering workload does not interrupt with the ability to detach from work substantially as long as the workload is not too high (i.e., exceeding moderate levels of workload). We emphasize that it's important for an employee to recognize the necessity to set boundaries and discuss them with the supervisor to prevent a high workload from damaging his/her family life by diminishing the capacity to mentally let go of work. Moreover, it's worthwhile to foster supervisors' acknowledgment to lead by example; that is managers should aim to handle work in a way that the workload remains manageable.

Secondly, detachment mediates the relationship between workload and marital satisfaction. In this respect, it is important to mention that the capacity to "mentally switch off" from work can be trained (Hahn et al., 2011). This training would be particularly interesting for employees who experience high workload at work as well as individuals who prefer to integrate work and life domains.

Thirdly, it is important that employees are aware of their own preference to segment or to integrate the work and home domain. Moreover, they should try to act congruent with their preference, recognize the preference of others and try to respect this preference and behave accordingly.

ETHICS STATEMENT

The Ethical Commission Human Sciences (Ethische Commissie Humane Wetenschappen) of the Vrije Universiteit Brussel granted ethical approval for the study (reference number ECHW_045).

AUTHOR CONTRIBUTIONS

LG and SD exchanged research ideas and designed the outline of the article together during several meetings. Afterwards, LG and SD each collected data based on the surveys they developed together. LG did the analyses and interpreted the results. LG drafted the article and SD revised/edited the article. LG and SD both made substantial contributions to the work reported in the article. LG will act as a corresponding author for the article.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: http://journal.frontiersin.org/article/10.3389/fpsyg.2016.02036/full#supplementary-material

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Is Work-Related Rumination Associated with Deficits in Executive Functioning?

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Work-related rumination, that is, perseverative thinking about work during leisure time, has been associated with a range of negative health and wellbeing issues. The present paper examined the association between work-related rumination and cognitive processes centerd around the theoretical construct of executive functioning. Executive functioning is an umbrella term for high level cognitive processes such as planning, working memory, inhibition, mental flexibility; and it underlies how people manage and regulate their goal directed behavior. Three studies are reported. Study I, reports the results of a cross-sectional study of 240 employees, and demonstrates significant correlations between work-related rumination and three proxy measures of executive functioning: cognitive failures (0.33), cognitive flexibility (−0.24), and situational awareness at work (−0.28). Study II (n = 939), expands on the findings from study 1 and demonstrates that workers reporting medium and high work-related rumination were 2.8 and 5 times, respectively, more likely to report cognitive failures relative to low ruminators. High ruminators also demonstrated greater difficulties with 'lapses of attention' (OR = 4.8), 'lack of focus of attention' (OR = 3.4), and 'absent mindedness' (OR = 4.3). The final study, examined the association between work-related rumination and executive functioning using interview data from 2460 full time workers. Workers were divided into tertiles low, medium, and high. The findings showed that high work-related rumination was associated with deficits in starting (OR = 2.3) and finishing projects (OR = 2.4), fidgeting (OR = 1.9), memory (OR = 2.2), pursuing tasks in order (OR = 1.8), and feeling compelled to do things (OR = 2.0). It was argued that work-related rumination may not be related to work demands *per se*, but appears to be an executive functioning/control issue. Such findings are important for the design and delivery of intervention programes aimed at helping people to switch off and unwind from work.

Keywords: work-related rumination, executive functioning, recovery, cognitive failures, psychological detachment

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INTRODUCTION

There are many definitions of the term rumination in the psychological literature but the general consensus is that rumination refers to the process of thinking deeply, meditating, pondering, or musing over something. The term rumination comes from the Latin 'ruminare,' meaning to 'turn over in the mind,' or to chew the cud. Within the occupational context, we define work-related

rumination as the process of perseverative thinking or dwelling about problems and issues relating to work (Cropley and Zijlstra, 2011). For example, a worker may ruminate about completing an important project on time, or stress over a future meeting, or they may ruminate about something negative that was said to them by their line manager or colleague. Workers tend to ruminate over tasks that are unfinished (Syrek and Antoni, 2014; Syrek et al., 2016). No matter what the initial stressor was, individuals continue to think and perseverate over the issue during their free time (Brosschot et al., 2007).

Thinking about work issues when not at work is quite common. Research suggests that many individuals find it difficult to unwind and continue thinking about work post work. Indeed it has been estimated that up to 70% of workers ruminate or worry at one time or another about work issues (Gallie et al., 1998). It doesn't really matter if people think about work post work, it really only becomes an issue if it starts to affect their health and wellbeing. On the one hand, thinking about work issues when not at work may be beneficial and could lead to new insights and solutions to problems at work; and or by simply reflecting about the positive aspects of the working day could lead to enhanced self-efficacy and mood (Meier et al., 2016). Thus, complete psychological detachment from work may not be necessary or even desirable, especially when thinking about work is under one's own volition (Cropley and Zijlstra, 2011). On the other hand, when thinking about work is unwanted and outside of one's control, this could compromise the recovery process and lead to ill health in the long-term (Querstret and Cropley, 2012; Sonnentag and Fritz, 2015).

In the occupational health literature it is now widely accepted that workers need to recover from the effects of work demands when not at work, in order to prevent long term health consequences (Zijlstra and Sonnentag, 2006). Recovery from work may be defined as the psycho-physiological unwinding after effort expenditure at work (Geurts and Sonnentag, 2006; Sonnentag and Fritz, 2007; Zijlstra et al., 2014). It is now thought that the recovery process appears to be largely influenced by the extent to which people manage to cognitively disengage (or disconnect) from their work demands and related thoughts when not at work (Sonnentag and Zijlstra, 2006; Sonnentag et al., 2008; Cropley and Zijlstra, 2011). Inadequate psychological recovery and work-related rumination, have been associated with a range of health problems, including cardiovascular disease (Suadicani et al., 1993), fatigue and sleep (Berset et al., 2011; Querstret and Cropley, 2012), and negative mood (Pravettoni et al., 2007). Studies, however, are needed to understand the cognitive mechanisms that influence the recovery process.

There are many theories as to why people ruminate, but less is known about the mechanisms involved. It has, however, been hypothesized that rumination may be associated with individual differences in executive functioning (Brinker et al., 2013). Executive functioning is a theoretical construct relating to a set of higher order cognitive processes that relate to how people manage and regulate their goal directed behavior. Executive functioning is an umbrella term for a wide range of cognitive processes and abilities including: planning, concentration, flexible thinking, problem-solving, self-awareness, and working memory (Miyake et al., 2000). Executive functioning is thought to involve communication across multiple brain regions and pathways and is primarily regulated by the prefrontal region of the brain, and rumination is reasoned to disinhibit these circuits (Brosschot et al., 2007; Esposito et al., 2014) by taking the prefrontal cortex temporarily 'offline' (Ottaviani et al., 2009). Executive control defines the mechanism or system that coordinates these various regions and processes to complete a particular task or problem.

Previous research suggests that rumination reduces cognitive flexibility, by placing additional demands on a system which has limited resources (Davis and Nolen-Hoeksema, 2000; Watkins and Brown, 2002). People who ruminate may find it difficult to maintain their concentration, their focus, and mental control. Indeed the association between ruminative thinking and cognitive impairments has been demonstrated in a number of clinical and experimental studies (Davis and Nolen-Hoeksema, 2000; Joormann and Vanderlind, 2014). Research has shown that people who ruminate show deficits in their cognitive inhibitory system by finding it difficult to maintain their attention on task-relevant information (Carson et al., 2003; Joormann, 2004; Mor and Daches, 2015). That is, people who ruminate tend to find it difficult to stay focused on the task at hand. The deficits in performance of tasks that require executive control is not necessary or primarily due to the effects of mood (Watkins and Brown, 2002; Whitmer and Banich, 2007).

Much of this work has been conducted within the laboratory and to our knowledge no study has examined the role of rumination and executive control in the occupational context. Planning, maintaining focus, problem solving are crucial skills in the modern workplace, and it is important to examine the association between work-related rumination and executive functioning. It may be particularly difficult for workers who ruminate to perform operations that require sustained attention, concentration, and control given that rumination consumes resources that could otherwise be directed to the task at hand. Due to deficits in the attention, performance, and vigilance, individuals who ruminate may be at an increased risk of missing deadlines, making mistakes or even being involved in accidents at work. It is therefore important to understand the association between rumination and executive control in the work context. The present paper reports three independent studies that examined the association between work-related rumination and activities related to central executive functioning.

STUDY 1: WORK-RELATED RUMINATION AND EXECUTIVE CONTROL

This initial exploratory study examined the association between work-related rumination and three proxy measures of executive control: cognitive failures, work situational awareness, and cognitive flexibility. Based on the theoretical rationale above, three tentative hypotheses were proposed.

> H1: Work-related rumination will be positively correlated with cognitive failures.

H2: Work-related rumination will be negatively correlated with cognitive flexibility.
H3: Work-related rumination will be negatively correlated with work situational awareness.

Method

Using the snowballing sampling procedure, 240 workers in full-time employment completed an online survey. To minimize the influence of job characteristics affecting the results, individuals were drawn from a variety of occupational settings. The total sample (n = 240; 70% Females) consisted of workers in full-time employment, and they completed a short online survey. The mean age for the sample was 34.3 years (range 17–64 years; SD = 13.95).

Measures

Work Related Rumination

The affective rumination subscale of the work related rumination questionnaire was used to assess people's level of work related thoughts outside of work (Cropley et al., 2012). Items are responded to on a 5-point Likert scale using the following response options; 1 = very seldom/never, 2 = seldom, 3 = sometimes, 4 = often, 5 = very often/always, e.g., "Are you troubled by work-related issues when not at work?." A mean score is calculated with higher scores indicating greater rumination. This measure has been used in a number of previous studies (Querstret and Cropley, 2012; Querstret et al., 2016), and it has good reliability and validity (Cropley et al., 2012; Syrek et al., 2016). The Cronbach's alpha reliability for this scale was 0.91.

Cognitive Failures

The cognitive failures questionnaire (CFQ; Broadbent et al., 1982) consists of 25 items relating to everyday cognitive failures that people may experience in their everyday life. Items are scored along a 5-point rating scale ranging from 1 = never, 2 = very rarely, 3 = occasionally, 4 = quite often, 5 = very often, e.g., "do you find yourself suddenly wondering whether you've used a word correctly?" The measure has good reliability and validity and is widely used (Broadbent et al., 1982; Merckelbach et al., 1999). The Cronbach's alpha reliability for this scale was 0.91.

Cognitive Flexibility

Cognitive flexibility was assessed using the cognitive flexibility inventory (Dennis and Vander Wal, 2010). The scale consists of 20 items with questions such as "I like to look at difficult situations from many different angles," and each item is rated on a 7-point scale; 1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = neutral, 5 = somewhat agree, 6 = agree, 7 = strongly agree. The alpha reliability for this measure was 0.86.

Work Situation Awareness

The work situational awareness scale (Sneddon et al., 2013), consists of 20 items relating to situational awareness at work, e.g., "I find it difficult to concentrate for long periods of time" and "I find it difficult to keep track of everything that is going on around me." Each item is scored on a 5-point rating scale; 1 = very often, 2 = quite often, 3 = occasionally, 4 = very rarely, 5 = never. The scale is reported to have good validity and reliability (Sneddon et al., 2013) and Cronbach's alpha within the present sample was 0.88.

Results and Discussion

Bivariate analysis revealed significant positive correlations between work-related rumination and cognitive failures (r = 0.33, $p < 0.001$) supporting H1, and indicating that as people ruminate about work, they also report making more cognitive failures. Also as expected, work-related rumination was negatively correlated with both cognitive flexibility (r = −0.24, $p < 0.001$), and situational awareness at work (r = −0.28, $p < 0.001$), supporting H2 and H3. Thus, the more people think and ruminate about work-related issues outside of work, the more they report less cognitive flexibility, and less awareness of what is going on around them at work. Together, these results support our proposition that work-related rumination is associated with executive functioning.

STUDY 2: WORK-RELATED RUMINATION AND EXECUTIVE CONTROL

The aim of the second study was to replicate the findings of study 1 but to examine within a larger data set the association between levels of work-related rumination and specific types of cognitive failures in more detail. It was predicted that:

H1: Work-related rumination will be positively correlated with cognitive failures. Moreover it was predicted that medium and high work-related rumination would be associated with an increased likelihood of reporting cognitive failures.

Sample and Participants

The sample was comprised of 939 working adults (Females = 53.3%) with an age range of 19–71 years (M = 42.91, SD = 9.66). The majority of participants (83.3%) worked full-time, and the average number of hours worked per week was 44.7 (SD = 9.64). Participants were represented from a range of occupations including: education, the emergency services, legal, nursing/health care, administration, management, medicine, and human resources. Participants were recruited via emails to organizations known to the research group. These public and private sector organizations spanned multiple industries including: pharmaceuticals, media, energy, banking, education, emergency services, and healthcare.

Measures

Work Related Rumination and Cognitive Failures Were Assessed with the Same Measures Used in Study 1

There have been some inconsistencies with respects to the factor structure of the CFQ. Indeed, this was noted in Broadbent et al.'s (1982) original paper, where the authors suggest that the

exact factor structure is highly dependent on the sample. This conclusion has been supported by others (e.g., Wallace et al., 2002). Therefore, a factor analysis was performed on the 25 cognitive failure items within the present sample. Three clear factors emerged with Eigen values greater than one, together accounting for 52.27% of the variance. A direct oblimin rotation was performed, variables were loaded on a single factor on the basis of the highest score. Items with a loading greater than 0.4 were retained. The first factor labeled 'Lapses of attention' contained six items (e.g., "Do you fail to notice signposts on the road") had an Eigen value of 9.42 and accounted for 37.7% of the variance. The internal consistency (Cronbach α) of this factor was 0.78. The second factor labeled 'Lack of focus of attention,' consisted of five items (e.g., "Do you fail to listen to people's names when you are meeting them?") had an Eigen value of 1.4, and accounted for 5.68% of the variance (Cronbach $\alpha = 0.78$) and the third factor, consisting of six items, labeled 'Absent mindedness' (e.g., "Do you find you forget why you went from one part of the house to the other") accounted for 4.63% of the variance, and had an Eigen value of 1.15 (Cronbach $\alpha = 0.83$). Four items were omitted as they had equal loadings across two or more factors. The factor structure broadly supported the findings of Wallace et al. (2002), although not exactly, as there were some differences.

Results and Discussion

Bivariate analysis revealed a significant positive correlation between work-related rumination and total cognitive failures (range $r = 0.34$–0.41, $p > 0.001$) supporting the findings of the first study. To glean a greater understanding work-related rumination was divided into tertiles (low, medium, high), and each of the cognitive failures factors were divided into low and high groups. This method allows an examination of a 'dose-response' type association between levels of rumination and cognitive failures. Odds ratios and 95% confident intervals (CI) were calculated for each stratum of work-related rumination using low ruminators as the comparator group. A second set of models were calculated controlling for the effects of age, gender, job demands, and hours worked. As can be seen in **Table 1**, the likelihood of reporting cognitive failures was greater in the medium and high work-related rumination group, relative to the low group, with the greatest odds ratio in the high rumination group. This finding was consistent for the three factors of cognitive failures. Total cognitive failures revealed the greatest ORs in the high compared to the low rumination group (ORs, 5.09, CI, 4.19–8.32). There was little change in the ORs after adjusting for age, gender, job demands, and hours worked. In summary, these findings lend further support to the notion that work-related rumination is consistent with executive functioning issues.

STUDY 3: WORK-RELATED RUMINATION AND EXECUTIVE CONTROL

In the final study, we analyzed interview data from The Adult Psychiatric Morbidity Survey (APMS) 2007 a household survey conducted in England to examine the association between work-related rumination and executive control. Six proxy executive control items, namely: (1) trouble wrapping up the fine details of projects, (2) difficulty getting things done in order when tasks require organization, (3) problems remembering appointments or things, (4) avoid or delay getting started, (5) fidget or squirm

TABLE 1 | Odds ratios for work-related rumination and cognitive failures.

Cognitive failures factor and rumination group	(%)	*N*	Cognitive failures group		Crude OR (95% CI)	Adjusted OR[a] (95% CI)
			Low	High		
Lapses of attention						
Low	34.4	323	241	82	1.00	1.00
Medium	29.6	278	142	136	2.81 (1.99–3.96)	2.83 (1.97–4.08)
High	36.0	338	128	210	4.82 (3.45–6.72)	4.81 (3.35–6.92)
Lack of focus of attention						
Low	34.4	323	247	76	1.00	1.00
Medium	29.6	278	162	116	2.37 (1.63–3.30)	2.33 (1.67–3.53)
High	36.0	338	164	174	3.44 (2.46–4.81)	3.63 (2.53–5.18)
Absent mindedness						
Low	34.4	323	245	78	1.00	1.00
Medium	29.6	278	165	113	2.15 (1.51–3.05)	1.93 (1.34–2.78)
High	36.0	338	142	196	4.36 (3.10–6.05)	3.96 (2.78–5.64)
Total cognitive failures						
Low	34.4	323	239	84	1.00	1.00
Medium	29.6	278	137	141	2.98 (2.08–4.12)	2.69 (1.87–3.88)
High	36.0	338	112	226	5.74 (4.10–8.03)	6.20 (4.28–8.90)

OR, odds ratio; CI, confidence interval.
[a]*Adjusted for age, gender, job demands, and hours worked.*

when have to sit for long time, and (6) feel overly active and compelled to do things, were examined.

> H1: Levels of work-related rumination will be positively associated with self-reported increased deficits in executive functioning as assessed by the six proxy items.

Methods

Between October 2006 and December 2007, the National Centre for Social Research (NatCen) conducted The Adult Psychiatric Morbidity Survey [APMS] (2007) to assess the prevalence of psychiatric morbidity in private households within England. In total 7461 interviews were conducted. Each questionnaire item is presented and replied to verbally, by each participant who are individually interviewed. For a full description of the survey McManus et al. (2009). Participants in the present study were a subset of 2460 adult workers from a range of occupations, who reported they were in full-time employment. Their age ranged from 16 to 70 years (mean 42, *SD*, 11.9), and 59.7% of the sample were male.

Measures

Executive functioning

Executive functioning at work was assessed using the six items reported above. Originally, the six items have been used to assess levels of ADHD, however, these items have been adapted to be used within the occupational environment to assess cognitive performance at work (Kessler et al., 2005, 2009). Items were rated as: 1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = very often.

Work related rumination

Following Cropley and Zijlstra (2011), work related rumination was computed from the over commitment items of the Effort-Reward Imbalance Questionnaire (Siegrist et al., 2004), using the following items: "As soon as I get up in the morning I start thinking about work problems;" "When I get home, I can easily relax and switch off work" (reversed), and "Work rarely lets me go, it is still on my mind when I go to bed"). Items were rated on a 4-point scale, 4 = strongly agree, 3 = slightly agree, 2 = slightly disagree, 4 = strongly disagree. A mean score was calculated where higher values indicated greater rumination. The internal consistency (Cronbach α) of the unwinding factor was 0.80.

Data Analysis

As in study 2, to demonstrate the association between different levels of rumination and executive control, work-related rumination was divided into tertiles (low, medium, high) and the six analog executive control items were divided at their respective median. Crude odds ratios were initially calculated and then age, gender, anxiety, and depression were included as covariates.

Results and Discussion

Table 2 summarizes the odds ratios for the six executive control items and work-related rumination. As can be seen, relative to low rumination, high rumination was associated with increased ORs for all six analog executive control items. These ORs ranged from 1.84 to 2.42, indicating that high ruminators were approximately twice as likely to experience poor issues of executive control. These findings were not overtly changed once the covariates were added. In the medium rumination group, four of the six proxy executive control items showed an increase ORs compared to the low rumination group, however, 'difficulty getting things done in order when task require organization,' and 'feel overly active and compelled to do things,' were no different to the low rumination group. Once the covariates were taken into account, 'fidget or squirm when have to sit for long time,' was reduced to non-significance.

GENERAL DISCUSSION

Attributes relating to executive functioning — attention, cognitive flexibility, and planning — are crucial qualities if workers wish to succeed in the workplace. Deficits in executive functioning can make it particularly difficult for workers to perform and complete tasks that require mental control. Across three independent studies this paper consistently demonstrated that work-related rumination is associated with deficits in executive functioning. Work-related rumination was positively and significantly associated with self-reported cognitive failures, and reduced situational awareness at work, and negatively associated with cognitive flexibility. In addition, work-related rumination was positively associated with trouble wrapping up the fine details of projects, difficulty getting things done in order when task require organization, problems remembering appointments or things, avoid or delay getting started, fidget or squirm when have to sit for long time, and the feeling of being overly active and compelled to do things. Thus, high ruminators show deficits in the key skills required for productivity and goal directed behavior in the workplace.

The majority of previous studies that have examined work-related rumination/psychological detachment from work, have done so in relation to health issues (Sonnentag and Fritz, 2015). To our knowledge, this is the first study that has investigated the effects of work-related rumination and executive functioning within an occupational context. While different methodologies – survey and interviews – were utilized in the present study, the findings are nonetheless based on self-report. Although ipso facto, rumination can only be assessed by self-report, it would be of interest to replicate the results using objective measures of executive functioning such as computer based cognitive programs or card sorting tasks (Monchi et al., 2001; Strauss et al., 2006). The self-report nature of the measures also leads to the possibility of reporting biases associated with common method variance. Within the context of these limitations, the results nonetheless, suggest that thinking about work outside of work, increases the risk of making errors or mistakes at work.

Our proposition is that rumination affects executive functioning, leading to a reduced cognitive capacity, and the findings are consistent with this. Ruminating about work could deplete executive resources leading workers to be less focussed and flexible in their thinking and cognition. That is, rumination consumes resources that would otherwise be

TABLE 2 | Odds ratios for work-related rumination and ADHD items.

ADHD items and rumination group	(%)	*N*	ADHD group		Crude OR (95% CI)	Adjusted OR[a] (95% CI)
			Low	High		
Trouble wrapping up the fine details of projects						
Low	27.8	682	542	140	1.00	1.00
Medium	38.0	935	684	251	1.42 (1.12–1.79)	1.39 (1.10–1.76)
High	34.2	841	517	342	2.42 (1.92–3.06)	2.21 (1.73–2.81)
Difficulty getting things done in order when task requires organization						
Low	27.8	683	584	99	1.00	1.00
Medium	38.0	935	781	154	1.16 (0.88–1.53)	1.10 (0.83–1.46)
High	34.2	841	641	200	1.84 (1.41–2.40)	1.50 (1.13–1.98)
Problems remembering appointments or things						
Low	27.8	683	543	140	1.00	1.00
Medium	38.0	936	683	253	1.43 (1.13–1.81)	1.35 (1.06–1.75)
High	34.2	841	529	312	2.28 (1.81–2.88)	2.01 (1.58–2.52)
Avoid or delay getting started						
Low	27.7	683	483	200	1.00	1.00
Medium	38.1	936	581	355	1.47 (1.19–1.82)	1.43 (1.16–1.78)
High	34.2	840	427	413	2.33 (1.88–2.89)	2.06 (1.65–2.57)
Fidget or squirm when have to sit for long time						
Low	27.8	683	397	284	1.00	1.00
Medium	38.1	935	490	455	1.27 (1.04–1.54)	1.21 (0.98–1.48)
High	34.1	836	351	485	1.93 (1.57–2.37)	1.76 (1.42–2.18)
Feel overly active and compelled to do things						
Low	27.8	683	469	214	1.00	1.00
Medium	38.0	934	604	330	1.19 (0.97–1.47)	1.16 (0.94–1.43)
High	34.2	840	437	403	2.02 (1.63–2.49)	1.87 (1.50–2.34)

OR, odds ratio; CI, confidence interval.
[a]*Adjusted for age, gender, anxiety, and depression.*

directed to the task at hand. It has been speculated that the act of ruminating appears to temporarily take the prefrontal cortex 'offline' thereby interfering with executive functioning (Ottaviani et al., 2009). Our findings, however, are also compatible with the notion that depleted executive resources increases the likelihood of ruminating. People who display less executive control could be more prone to making errors and mistakes at work, and therefore more likely to ruminate about them when not at work. Similarly, if people have depleted executive control, their mind is more likely to wonder and they will have difficulty concentrating and focussing on tasks. This finding is supported by the clinical literature (Watkins and Brown, 2002; Whitmer and Banich, 2007; Mor and Daches, 2015). We were not actually able to address the issue of causality in the reported studies. Although our findings are fully compatible with the notion that ruminating about work reduces executive functioning, or vice versa, we do not actually demonstrate this causally. The association between rumination and executive functioning could be caused by a third unknown variable, or indeed by workload/work pressure.

Future research needs to address whether executive functioning deficits precedes the onset of rumination or occurs as a result of rumination. It would also be of interest to examine whether executive functioning issues increases the likelihood of, or makes people vulnerable to rumination about work. Vulnerability may change, when work is particularly demanding, or when people become fatigued. Whether executive function issues persist after the remission of rumination is another important question and could be tested over-time in longitudinal study designs.

The present findings nonetheless may have implications for the design of intervention programes. Occupational health interventions are typically directed toward reducing work demands or aim to provide individuals with coping resources to help them deal with work demands. Creating a healthy working environment should lead to a reduction in depleted executive resources. In respect to work-related rumination for example, workers may be provided with techniques or strategies to help them unwind post work (Cropley, 2015). Interventions in the form of CBT training or mindfulness (Hülsheger et al., 2014; Querstret et al., 2015, 2016) have been shown to reduce the frequency and intensity of work related thoughts. The present findings suggest that future interventions aiming to reduce work-related rumination should also address the issues relating to central executive functioning. Although the evidence surrounding the efficacy of different methods for strengthening executive functioning is equivocal, there is strong evidence of the benefits of exercise in this respect (Guiney and Machado, 2013). Exercise interventions either work or home based could be a cost effective way of improving overall health and wellbeing but also for increased executive control. However, this is mere

speculation, and whether reductions in work-related rumination is actually mediated by improved executive functioning needs to be empirical tested in future research.

AUTHOR CONTRIBUTIONS

MC and FZ developed the original idea for this paper. DQ provided data for study 2, and SB developed the idea and conducted the background work for study one. MC and FZ drafted the paper with additional input and revisions/interpretation from DQ and SB. All authors have agreed the final version of the submitted manuscript and have all made an intellectual contribution.

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ORIGINAL RESEARCH
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Stress at School? A Qualitative Study on Illegitimate Tasks during Teacher Training

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What do I expect when stating that "I am going to be a teacher"? Social roles, including professional roles, often become part of people's identity and thus, of the self. As people typically strive for maintaining a positive sense of self, threats to one's role identity are likely to induce stress. In line with these considerations, Semmer et al. recently (e.g., Semmer et al., 2007, 2015) introduced "illegitimate tasks" as a new concept of stressors. Illegitimate tasks, which are defined as *unnecessary* or *unreasonable* tasks, threaten the self because they signal a lack of appreciation regarding one's professional role. Teacher training is a phase of role transition in which the occurrence of illegitimate tasks becomes likely. A holistic understanding of these tasks, however, has been missing up to now. Is there already a professional role identity during teacher training that is vulnerable to threats like the illegitimacy of tasks? What are typical illegitimate tasks in the context of teacher training? In order to close this research gap, 39 situations taken from 16 interviews with teaching trainees were analyzed in the present study on the basis of qualitative content analysis. Seminars and standing in to hold lessons for other teachers were identified as most prevalent illegitimate tasks. More specifically, unnecessary tasks could be classified as sub challenging, inefficient and lacking in organization (e.g., writing reports about workshops no one will ever read). Unreasonable tasks appeared overextending, fell outside responsibility, and lacked supervisory support. Training interventions focusing upon task design and supervisory behavior are suggested for improvement.

Keywords: illegitimate tasks, stress-as-offense-to-self, teaching trainee, qualitative content analysis, social context

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INTRODUCTION

Being a teaching trainee can be a difficult and stressful time. Negative health consequences, such as the development of burnout, have already been linked to the teacher training curriculum (e.g., Zimmermann et al., 2012). Similarly, stress and impaired health among teachers in general are prevalent. Stress-related disorders are observed more frequently in the teaching profession than in other professions and are a frequent cause for early retirement in this group (Lederer et al., 2003; Schaarschmidt and Kieschke, 2007). Theoretically based on the stress-as-offense-to-self-concept (SOS; Semmer et al., 2007), this study investigates a potential antecedent, namely teaching trainees' perception of having to execute tasks that should not be expected from them given their professional status. The perceptions that these allegedly *illegitimate tasks* are below

(or above) professional status can be demeaning and contradictory to the self-esteem of a teaching trainee and hence induce stress. Illegitimate tasks are *unnecessary* when they lack sense because of poor organization, previous mistakes, or lack of importance. They are *unreasonable* when they lie outside a person's responsibility considering the professional role. In the present study, relevant task characteristics, framework and social conditions of these illegitimate tasks should be identified in order to gain an in-depth understanding of these potentially stress-inducing tasks and provide new information for the reduction of stress and strain during the teaching trainee curriculum—a phase of role transition.

Negative health consequences for teachers and teaching trainees in particular are prevalent (Bauer et al., 2006; Unterbrink et al., 2007; Zimmermann et al., 2012). In a recent study, a comparison of teachers with other professions revealed that female teachers perceive a lower ability to work until retirement and show more psychological fatigue compared to women in other professions (Van Droogenbroeck and Spruyt, 2016). According to the German Federal Statistical Office, 13% of teachers retired early in 2013 due to occupational disability (German Federal Statistical Office, 2014). In line with this, Weber et al. (2005) revealed psychiatric and psychosomatic disorders as the most frequent causes for early retirement among school principals. Comparably, Zimmermann et al. (2012) showed that 44% of teaching trainees in a German sample reported impaired mental health and approximately half of the participants did not feel well-prepared for a teaching career. Similarly, Klusmann et al. (2012) investigated German teaching trainees and found an increase in emotional exhaustion in the course of 9 months. Consistent with these results, Goddard et al. (2006) revealed an increase in the three burnout dimensions (emotional exhaustion, depersonalization, and reduced personal accomplishment) in a sample of young teachers in Queensland who had graduated from university within the past 2 years. The absolute burnout levels exceeded those of a normative reference group. Moreover, participants consistently reported declined role clarity over the course of the 21-month measurement period in this study, which can be explained by teaching trainees' intermediate position during their curriculum.

To fully understand the context of teaching trainees, one has to take a closer look at the structure of the teaching trainee curriculum in Germany. Earning a teaching degree in Germany is a two-fold process. The first stage ends after approximately 5 years of studying with the First State Examination, including both written and oral examinations and a thesis (university degree). During the second stage, a prospective teacher is paid a trainee's salary, expected to work as a teaching trainee while also continuing studies. The second stage ends with the Second State Examination. Prospective teachers can be qualified to teach at different types of schools, such as primary or secondary school. Both structure and content may vary to some extent depending on the school type and across the 16 states of the Federal Republic of Germany. The second stage of the curriculum, which includes teaching in the classroom, takes one and a half to 2 years. It is divided into two main aspects. Firstly, teaching trainees spend a lot of time at school, attending other teachers' classes or teaching classes themselves, partly under supervision. It is important to note that preparation at home, evaluation and critical reflection of lessons belong to the job as well. Aside from teaching, the teaching trainees also take part in school activities and take responsibility for school related tasks, ranging from supervision in school breaks to counseling pupils. Stand-in classes are supposed to be taught only to a certain extent or on a voluntarily basis. In short, during the curriculum teaching trainees become a crucial part of the school staff. They accomplish the same tasks as full time teachers and meet them on an equal footing. In addition to the tasks that full time teachers are required to do, trainees are supposed to reflect on their lessons regularly. For this purpose, they get advice from supervisors and their lessons are graded from time to time. The second main aspect of the curriculum is the future teachers' participation in study seminars for one to one and a half days. The seminars provide a deepening subject-specific and interdisciplinary didactic education. There, the trainees prepare fictional lessons and worksheets, hold presentations and share their teaching experiences. The total curriculum is commonly split up into three parts: The *introduction phase* primarily consists of attending other teachers' classes. During the *main phase* teaching trainees teach lessons autonomously and under supervision but still sit in on other teachers' lessons. The *examination phase* equals the main phase only that teaching lessons are reduced, allowing the teaching trainees to prepare for their Second State Examination, which constitutes the completion of their training. Throughout the course of teacher training, lesson investigations are conducted periodically, where trainees' performances in designing a school lesson are evaluated and graded. Thus, teaching trainees face a challenging dilemma: On the one hand, they take over the role as full teachers. On the other hand, they are still studying and are not autonomous in their decisions yet. Especially when trainees are teaching a class on their own they are treated as equals by other teachers. Then again, lessons are evaluated and graded by these same teachers on a regular basis, putting trainees in a subordinate position.

Beginning teachers are in a transition phase from trainee to professional, which also means a transition into a fully appreciated member of a work group (Elfering et al., 2007). They have to position themselves in the school environment and make choices based on personal evaluations despite many regulations (Coldron and Smith, 1999). Struggling with classroom discipline, motivation and assessment of pupils, and dealing with parents are common challenges (Veenman, 1984). Responsibility increases rapidly (Elfering et al., 2007) and trainees begin to form their professional role: They adopt personal teaching styles, create relationship patterns with pupils, colleagues and supervisors, and develop general principles that serve as guidance for actions and help mastering new challenges (Coldron and Smith, 1999). In contrast to this high amount of responsibility and freedom to teach, trainees are graded and evaluated regularly in examination lessons and must obey to what other teachers or instructors want in certain situations (Flores and Day, 2006). Hence, they constantly switch from their role as a full teacher to their role as a trainee and vice versa, which explains resulting role-related tensions, such as declined clarity (Goddard et al., 2006) or

even role ambiguity (Pithers and Soden, 1998). In line with this, Pillen et al. (2013) identified several professional identity tensions beginning teachers typically experience. For example, many teaching trainees were confronted with ideas and methods on how to learn teaching that contradicted their own ideas. They also felt dependent on mentors or colleagues, which conflicted with their goals to apply own teaching styles. Moreover, the trainees reported that expectations of them as teachers were too high, which made them sometimes feel like students. In other situations, however, they were willing to take responsibility but were still treated like students. Trainees who are confronted with conflicting expectations have to choose which side to take and are therefore feeling role uncertainty (e.g., Wirtz et al., 2013). In sum, several authors (e.g., Goddard et al., 2006; Pillen et al., 2013) showed that the teaching trainee curriculum is a phase of transition, in which a professional identity of teaching trainees is developing, but not yet clearly defined for trainees themselves, but also for teachers, parents or pupils. Importantly, it is this ambiguity in particular that makes the curriculum an interesting and relevant context for the analysis of illegitimate tasks, since it increases the risk of their occurrence.

Now, why do illegitimate tasks matter in the teaching trainee curriculum? The answer to that is the self. People strive toward a positive feeling of self-worth (Thoits, 1991; Tesser, 2000; Epstein, 2006; Sedikides and Gregg, 2008). Being an accepted member of a social group is a strong human motivation (Baumeister and Leary, 1995) that is closely related to a person's self-esteem (Gruenewald et al., 2004; Leary, 2005). Moreover, the professional role is of importance for most people and represents a significant portion of the self (Stryker and Burke, 2000; Sluss and Ashforth, 2007). Hence, when an individual is treated disrespectfully because a subjectively illegitimate task has to be accomplished, the individual does not feel as an appreciated member of the work group. It is important to note that it is not the task itself, but the social message transmitted through the task that is crucial. Subjectively *unnecessary* or *unreasonable* tasks (e.g., Semmer et al., 2007) are interpreted as degradation for one's professional role identity: The person who assigned them, most likely a supervisor, must lack professional respect or else he or she would not have made the request. Tasks classify as *unnecessary* when they are perceived as senseless because they are poorly organized, previous mistakes were made or the task itself lacks importance. Creating documents that are hardly read by anyone constitutes such a task (Semmer et al., 2013). In the context of training teachers, this should not be demanded of a trainee because the task has no value and is avoidable. Thus, it poses a threat to the trainee's professional role. Teaching trainees in Pillen et al. (2013) reported feeling pushed to accomplish many additional tasks although they wanted to spend more time on teaching, which can cautiously be interpreted as a first hint on the existence of unnecessary tasks during teacher training.

For the second dimension, *unreasonable* activities, the teaching trainees' concept of their professional role is of great importance. By definition, these tasks exceed the level of responsibility that could normally be expected of an employee considering his or her status in the profession. Specifically, a task is perceived unreasonable when it falls outside the scope of the professional role in a given context. Moreover, tasks not in accordance with the experience or expertise level of an employee potentially create illegitimacy as well (Semmer et al., 2007). Hence, for an experienced full time teacher it can be perfectly legitimate to stand in for a sick colleague on short notice. However, a teaching trainee, who is new to the job and needs more preparation time to conduct a lesson, might perceive the same task as unreasonable because it falls out of his or her responsibility with respect to the newcomer position. Unreasonable tasks are assumed to be of relevance during teacher training. As described previously, roles are not always clearly defined during this phase of transition. Therefore, it is possible that the perceptions differ among trainees, supervisors and colleagues of whether the task is legit considering the trainee's professional status. The relevance of illegitimate tasks has been shown in studies with several psychological indicators for health and well-being (Stocker et al., 2010; Björk et al., 2013; Semmer et al., 2015), sleep quality (Pereira et al., 2014), and cortisol levels (Kottwitz et al., 2013). However, despite these results, research concerning illegitimate tasks is incomplete up till now. First, a holistic understanding of these tasks is missing. How are they constituted? In which situations do they occur? How do they relate to professional role perceptions? Certainly, answers to these questions are of special value not only in the SOS research framework but also in terms of practical considerations because only an in-depth understanding of illegitimate tasks can help the prevention of negative health consequences associated with them. Second, illegitimate tasks have never been analyzed in the context of teaching trainees so far. However, especially the teaching trainee curriculum is a phase of professional role transition for the prospective teachers, and thus, assumed to be a likely source of illegitimacy. Consequently, the curriculum is an interesting and relevant research context for illegitimate tasks.

Accordingly, the present study aims to answer the following research questions:

(1) How do teaching trainees define their professional role? (2) Which tasks are perceived as illegitimate during teacher training? (3) How are these tasks constituted, what are related framework and social conditions, and who is made responsible?

METHODOLOGY

Data Collection

Sample

In total, 24 teaching trainees who were completing their training at secondary schools from two states in Germany were interviewed for the study. The first trainees were approached by contacting schools and study seminars, and the following ones were recruited via word-to-mouth recommendation. Elementary school trainees were not included due to different work and curriculum structure. Participation was voluntary and informed consent was given prior to each interview. Eight interviews were excluded from the analysis in the present study, because participants reported that they were never assigned any illegitimate tasks during the curriculum. Accordingly, 16 interviews with teaching trainees (6 males, 10 females) with ages ranging from 24 to 30 years ($M = 27.5$, $SD = 2.03$)

were included in the analysis. All but one participant were in the main phase of their curriculum (one in the examination phase). The average amount of teaching at school was 55.4 lessons monthly (one lesson lasts 45 min) while the average time spent in study seminars was 24.1 h monthly. All but two participants taught at grammar schools (German Gymnasiums). Two participants taught at comprehensive schools. In total, 11 out of 16 participants rated being a teacher as their desired profession.

Content of Interview Guideline

A semi-structured interview guideline with a total of six open questions was used for qualitative information collection. This guaranteed intersubjective comparability (Lamnek, 2010) and nevertheless, gave freedom in formulations plus offered the opportunity to ask further in-depth questions if necessary (Hopf, 2013). The first two questions addressed teaching trainees' professional role definition. Specifically, they asked for typical role matching and not role matching tasks in the curriculum (How would you define your role as a teaching trainee? What are tasks that you include in your role? What are tasks that you don't include? Please describe your understanding of your role at school and in the study seminar.). The third question was whether the trainee ever felt unappreciated during the curriculum and trainees were asked for a description of the situation. Interviews were stopped if no such situation was reported. If a situation was described, two questions specifically addressing illegitimate tasks followed. One related to unnecessary tasks and reads, "Have you already been given a task or experienced a situation during the curriculum—either at school or in the study seminar—which you perceived as unnecessary?" and one related to unreasonable tasks: "Have you already been given a task during the curriculum—either at school or in the study seminar—that should have been conducted by someone else?" Teaching trainees were asked to describe the situations and further in-depth questions relating to reasons for the perceived illegitimacy, framework, and social conditions and involved persons followed. Finally, the trainees were encouraged to make suggestions for improvement of the reported situations. Demographic data (see sample section) were collected at the end of each interview.

Data Analysis Approach

Qualitative content analysis following Mayring (2015) was chosen as an adequate method for analysis. The strength of this procedure is that it follows a predefined process scheme. Analysis is strictly rule guided and continuous revisions are made in return loops. All these features guarantee a high degree of transparency, procedures are comprehensive and results are reproducible. Finally, intercoder reliability provides a further quality criterion (Hopf, 2013; Mayring, 2015). Central element of analysis is a category system that contains and structures all relevant information. In the present study, the computer software MAXQDA 10 (VERBI GmbH, 2013) served as a tool for the creation of categories and was used for the analysis of the interviews.

For a definition of the *professional role*, which constitutes the first major dimension in the category system, it was differentiated whether trainees defined themselves as teachers or trainees and *role matching* vs. *not role matching* tasks were distinguished according to research on illegitimate tasks (e.g., Semmer et al., 2015) and professional identity development in the teaching profession (e.g., Coldron and Smith, 1999; Pillen et al., 2013). Based on the curriculum structure and the two-dimensionality of illegitimate tasks (Semmer et al., 2007) the second major dimension *illegitimate task* was further divided in terms of task type and context (school vs. study seminar). Correspondingly, four structuring dimensions resulted: *Unnecessary task at study seminar*, *unreasonable task at study seminar, unnecessary task at school,* and *unreasonable task at school*. Whenever this distinction was not possible, it was coded into a fifth structuring dimension, namely *other illegitimate task*. For further characterization of illegitimate tasks, the main categories *the activity, task characteristics, framework conditions, social conditions,* and *person responsible* were created with reference to theoretical assumptions and research on illegitimate tasks (e.g., Semmer et al., 2007, 2015) and typically experienced tensions among teaching trainees (Veenman, 1984; Pillen et al., 2013). While social conditions can be understood as an umbrella term for categories that referred to direct social interaction, framework conditions referred to more structural elements that cannot be changed easily in a given situation (e.g., guidelines). After accomplishing a first theoretically guided draft of the category system, going through the material repeatedly resulted in further extension of the categories.

Coding of all interviews by a second rater revealed very good or good overlap in codings with reference to Wirtz and Caspar (2002): Cohen's Kappa values for all but one main category were >0.70 (*social conditions* for unnecessary tasks at school $K = 0.66$). Two subcategories, namely *lack of appreciation by a supervisor* during unnecessary tasks at school ($K = 0.48$) and *dependence on supervisor* during unreasonable tasks at school ($K = 0.48$) had lower Kappa values but were not excluded from the analysis due to recommendations by Wirtz and Caspar (2002) that values ranging from 0.40 to 0.60 can be tolerated.

RESULTS

To begin with, results addressing the first research question (how do teaching trainees define their professional role) are presented. Subsequently, results addressing the second and third research question that are related to illegitimate tasks are outlined: Which tasks are perceived as illegitimate during teacher training? How are these tasks constituted, what are related framework and social conditions, and who is made responsible?

Teaching Trainees' Professional Role Perception

While some trainees described their role as a student ("Regarding teaching you are still in training and someone always supervises you.") others already defined themselves as full teachers by stating, "The truth is that you are a full teacher [...]."

Consistent with these differences in role perception, trainees had different perspectives whether certain tasks are matching their professional role or not. Tasks typically reported by teaching trainees from their daily routine are illustrated by a pointed statement from one trainee who said, "I have to teach, I have to educate, I have to advise, and thus, also talk to parents." Moreover, personal development and reflecting on one's role as a teacher were considered important aspects of the curriculum, showing in statements such as "develop in my teacher role." As for these reported "core tasks," trainees agreed that administrative or cleaning tasks do not correspond to a trainee's role, but also not necessarily to a teacher's role. As one trainee stated, "Not included is every task that normal teachers should also not have to do. Although, I think there are teachers who are willing to exploit themselves [...]."

It is particularly interesting that there was disagreement whether participation in examinations or conferences, standing in for colleagues and supervision in school breaks are tasks corresponding to the role as a teaching trainee. Furthermore, some trainees perceived extra duties at school such as "offer[ing] a working group or [...] [being] active in school life in general" as part of their teacher training while others reported these kinds of activities as extra role tasks. Many trainees perceived the study seminar, which constitutes a central element in the German teaching trainee curriculum, as ancillary ("I think teaching is a typical task. The seminar is somewhat secondary.").

Perceived Illegitimate Tasks during Teacher Training

From a total of 39 reported situations relating to illegitimate tasks, 15 related to the study seminar (12 unnecessary, 3 unreasonable), 19 referred to situations at school (7 unnecessary, 12 unreasonable) and five situations could not be classified in terms of task type and context and fell into the structuring dimension *other illegitimate task*.

It was striking that the study seminar as a core structural element of the German teaching trainee curriculum was often described as unnecessary and thus illegitimate (see **Table 1**).

For example, a trainee stated, "Now and then, there are situations in the study seminar that lack sense (laughs)." In these situations, trainees often reported that the content of the seminar was *sub challenging* ("We all studied and learned these things at university.") or *not relevant for later practice* as one trainee said: "I am sure that in 80% of the cases I don't need these

TABLE 1 | Illegitimate activities in the school and study seminar context.

Categories	*N* (%)	*N* (%)	Example
Context study seminar	**Unnecessary**	**Unreasonable**	
M4.:The activity	**14 (37)**	**2 (5)**	
S4.1:administrative task			
S4.2:attendance and contribution at seminar	14 (37)	2 (5)	Now and then, there are situations in the study seminar that lack sense (laughs).
S4.3:performance assessment*			
S4.4:mastering of a problem situation*			
S4.5:substitution*			
S4.6:participation at conferences*			
S4.7:school development, extra duty*			
Context school	**Unnecessary**	**Unreasonable**	
M4.:The activity	**9 (24)**	**13 (34)**	
S4.1:administrative task	3 (8)	1 (3)	In every meeting at school teaching trainees are asked to keep the minutes.
S4.2:attendance and contribution at seminar	3 (8)		Sometimes these seminars at school that we have [are unnecessary].
S4.3:performance assessment*		2 (5)	I still have problems to grade and design examinations. But the job as teacher requires it.
S4.4:mastering of a problem situation*		4 (11)	One child has social-emotional special needs and once got mad. He was flailing arms and shouting that he was going to kill everyone.
S4.5:substitution*		6 (15)	On average, teaching trainees are supposed to stand in holding lessons for other teachers approximately three to 4 h. In February, I had eleven.
S4.6:participation at conferences*	1 (3)		It is required to participate because it is part of the teacher job. But characteristically, teachers talk a lot and it takes so much time.
S4.7:school development, extra duty*	2 (5)		We always get the impression [...] that it is necessary to engage in extracurricular activities to get a good grade from the school principal.
Type of task	**23 (61)**	**15 (39)**	
Total	**38 (100)**		

*M, Main category; S, Sub category; N, Frequency. (%), Frequency of coding in percentage (38 codings = 100%). Total N: 38 codings from 39 situations. For each situation a subcategory was only coded once. *These categories only apply to situations at school but not to situations in the study seminar.*

things." Aside from having the feeling *not to learn something* ("You don't have the impression to learn anything valuable that helps you as teaching trainee."), another major problem were *inefficiencies* in the seminar organization as described by one trainee: "We talked about the subject for more than 30 min [...]. It was dragged on too long." A possible reason why illegitimacy in terms of unnecessary tasks often occurred in the study seminar was given in explanations by trainees emphasizing the *heavy workload* during the curriculum. For example, one trainee reported that "parallel to all the other tasks such as lesson investigations, teaching, and so forth it is just a great deal of work." Moreover, *lack of planning and organization* ("I would have considered it more useful if that was done beforehand.") and inexperienced *instructors* ("It's the first time that my instructor holds [the seminar]. Maybe she lacks experience.") also seemed to be relevant in this context. For an overview of all characteristics and frequency distributions of unnecessary tasks in the study seminar see **Table 2**.

While many situations in the study seminar were reported as unnecessary, for some situations illegitimacy was also perceived because the seminar was unreasonable, and thus went beyond trainees' responsibility ("I have to prepare a workshop for a program, [...] however, in my opinion, it isn't my job to do this."). As the quote shows, this dimension of illegitimacy was perceived when instructors delegated tasks to trainees that they perceived as an additional effort. In line with this, one trainee for example described, "I think it's not enough to distribute topics [...]. I expect more from the instructor."

Although not directly asked in the interview questions, associations were made by trainees between illegitimacy and stress. For example, one trainee stated, "I see it as burden that you have to deliver that much in the study seminar." Another trainee clearly differentiated, "I think, my feelings are not due to bad quality work by the instructors but rather due to the enormous stress I'm under." A threat to the self as core element of the SOS-concept could be observed for a trainee who reported an illegitimate task and stated, "I felt like a fool (laughs)."

Referring to the school context, *administrative tasks* such as keeping the minutes were listed as unnecessary and unreasonable ("In every meeting at school teaching trainees are asked to keep the minutes."). Moreover, study participants identified some situations as unnecessary including *attendance at seminars* at school, the *participation at conferences*, and tasks related to *school development and extra duties* (see **Table 1**). Referring to extra duties at school, one trainee described, "We always get the impression [...] that it is necessary to engage in extracurricular activities to get a good grade from the school principal." In this context, the trainee also perceived a lack of respect ("almost disrespectful because no one knows what one does additionally on a voluntary basis apart from the school context, for example"). As for the study seminar, *lack of planning and organization* also constituted a problem related to unnecessary tasks at school ("[The program] had just started and was organized pretty poorly"). Moreover, *inefficiencies* were reported in the context of unnecessary tasks at school similar to unnecessary situations in the study seminar.

Compared to the study seminar, at school more situations were perceived as illegitimate because they were unreasonable. Thus, at school a major problem seems to be overstepping responsibilities, whereas lack of sense seems to be more prevalent in the study seminar. Tasks that were associated with illegitimacy in terms of unreasonableness at school are *performance assessment*, *substitution lessons,* and *administrative tasks* (**Table 1**). Moreover, the *mastering of problematic situations* evolved as a category which describes special school situations in which teaching trainees had to deal with classroom conflicts or were confronted with family conflicts or behavioral problems of pupils. As the description shows, these situations had an individual, exceptional character and were consistently perceived as unreasonable (see **Table 1**). A trainee described one situation that fell into this category: "[...] I was on my own. [...] One child has social-emotional special needs and once got mad. He was flailing arms and shouting that he was going to kill everyone." Another trainee reported: "I had a pupil in a senior class who was bullied by the others because he was allegedly gay. [...] The classroom climate was really bad. So I talked to the tutor of the class and again he denied noticing the issue. [...] In these situations you really wish for some more support." As the quotes illustrate, unreasonable tasks at school were often described as *outside the trainee's responsibility area.* They were *overextending*, with *qualitative* compared to *quantitative overextension* as a frequent problem. One trainee reported for example, "Any other teacher who knew the subject could have done a better job than me [...] having no clue what they are doing." Furthermore, *unpopular* was another attribute that characterized unreasonable tasks at school. As an example, one trainee described, "They tell you to carry out the task "en passant." And no teacher likes standing in for another teacher."

While additional effort because of poor work of others did not constitute a problem in the context of unreasonable tasks at school, *lack of planning and organization* and *heavy workload* were identified as problems, similar to situations in the study seminar (also see **Table 2**). *One* trainee for example described a situation where he had to stand in for a colleague on short notice because of lacking organization, "Last week I was told on Monday that I have to stand in the first two lessons on Tuesday." Finally, *arbitrary or not unique guidelines* were associated with unreasonable tasks at school as well ("There's an agreement that [these meetings] shouldn't be too long. I think no one cares about it."). As one trainee said, teachers were hold accountable in these situations: "It would have been the teacher's responsibility." or "The other teachers could also do that."

An interesting pattern appeared, shifting the focus on social aspects that are associated with illegitimacy. It is striking that social problems were almost never reported with reference to situations in the study seminar but were of great relevance at school (see **Table 2**). As some earlier descriptions of situations at school already suggest, illegitimate tasks at school were especially associated with *lacking social support from a supervisor* as became clear in descriptions such as, "I did not know the child at all, [...] no one informed me. In this moment I thought it would be great if the teacher was here." Moreover, illegitimacy in this context was often associated with lacking *information, communication,*

TABLE 2 | Characteristics of illegitimate tasks.

	Context study seminar		Context school		
	Unnecessary	Unreasonable	Unnecessary	Unreasonable	Example
Category	***N* (%)**	***N* (%)**	***N* (%)**	***N* (%)**	
M5:Task characteristics	**36 (24.2)**	**6 (4.0)**	**15 (10.2)**	**17 (11.4)**	
S5.1:unpopular				2 (1.3)	They tell you to carry out the task "en passant." And no teacher likes standing in for another teacher.
S5.2:senseless	13 (8.7)	2 (1.3)	7 (4.7)	1 (0.7)	And I didn't see how it made sense.
S5.3:not educational	4 (2.7)	1 (0.7)	1 (0.7)		You don't have the impression to learn anything valuable that helps you as teaching trainee.
S5.4:sub challenging, redundant	9 (6.0)		1 (0.7)		We all studied and learned these things at university.
S5.5:overextending	1 (0.7)		1 (0.7)	8 (5.4)	
S5.5a:quantitatively	1 (0.7)			2 (1.3)	In my opinion, a work load of 11 h was just too high for a trainee.
S5.5b:qualitatively			1 (0.7)	6 (4.0)	Any other teacher who knew the subject could have done a better job than me [...] having no clue what they are doing.
S5.6:not practically relevant	3 (2.0)	1 (0.7)	1 (0.7)		I am sure that in 80% of the cases I don't need these things.
S5.7:inefficient	6 (4.0)		4 (2.7)		We talked about the subject for more than 30 min [...]. It was dragged on too long.
S5.8:outside responsibility area		2 (1.3)		6 (4.0)	I absolutely don't see that as my job. She earns some big bucks (laughs) by sitting there and letting us work.
M6:Framework conditions	**13 (8.7)**	**7 (4.7)**	**6 (4.0)**	**5 (3.3)**	
S6.1:lack of planning and organization	2 (1.3)	1 (0.7)	3 (2.0)	2 (1.3)	I would have considered it more useful if that was done beforehand.
S6.2:additional effort through poor work of others	3 (2.0)	2 (1.3)			I think it's not enough to distribute topics [...]. I expect more from the instructor.
S6.3:guidelines	3 (2.0)	3 (2.0)	2 (1.3)	2 (1.3)	
S6.3a:lacking flexibility	2 (1.3)	1 (0.7)	2 (1.3)		We went to some kind of youth hostel and were required to sleep there. [...] That was strange for people who lived nearby, for example.
S6.3b:lacking uniformity, arbitrariness	1 (0.7)	2 (1.3)		2 (1.3)	There's an agreement that [these meetings] shouldn't be too long. I think no one cares about it.
S6.4:heavy workload	5 (3.4)	1 (0.7)	1 (0.7)	1 (0.7)	Parallel to all the other tasks such as lesson investigations, teaching, and so forth it is just a great deal of work.
M7:Social conditions	**2 (1.3)**		**6 (4.0)**	**19 (12.7)**	
S7.1:disrespectful treatment			2 (1.3)	4 (2.7)	
S7.1a:by supervisor			2 (1.3)	3 (2.0)	You are treated disrespectfully by some teachers because they think of you as the damn trainee and they put themselves above you.
S7.1b:by parents				1 (0.7)	You are in the role of being a trainee and being new [...]. And—in this case the parents—let you feel this.
S7.1c:by pupils					
S7.2:lacking social support from supervisor			1 (0.7)	6 (4.0)	I did not know the child at all, [...] no one informed me. In this moment I thought it would be great if the teacher was here.
S7.3:dependence on supervisor			2 (1.3)	3 (2.0)	Just because the school principal writes a report [...] which counts into the final grade.
S7.4:lacking information, communication and cooperation	2 (1.3)		1 (0.7)	6 (4.0)	If I had been informed about the problem earlier, it would have been easier to react in the situation.

(Continued)

TABLE 2 | Continued

	Context study seminar		Context school		
	Unnecessary	Unreasonable	Unnecessary	Unreasonable	Example
Category	***N* (%)**	***N* (%)**	***N* (%)**	***N* (%)**	
M8:Responsible person	**5 (3.4)**	**2 (1.3)**	**2 (1.4)**	**8 (5.4)**	
S8.1:teacher, principal, mentor			1 (0.7)	8 (5.4)	It would have been the teacher's responsibility.
S8.2:instructor/person in charge for the apprenticeship	5 (3.4)	2 (1.3)	1 (0.7)		The core instructor leaned back and watched.
Type of Task	**56 (37.6)**	**15 (10.1)**	**29 (19.5)**	**49 (32.8)**	
Context	**71 (47.7)**		**78 (52.3)**		
Total	**149 (100)**				

M, Main category; S, Sub category. N = 149 codings from 39 situations. (%): Frequency of coding in percentage (149 codings = 100%). For each situation a subcategory was only coded once.

and *cooperation*. Illustrating this, a trainee stated, "There was no chance or time to consult with the expert colleagues and the class teacher [...] to jointly think about the situation and come up with some useful measures," whereas another trainee similarly reported, "If I had been informed about the problem earlier, it would have been easier to react in the situation."

Moreover, *disrespectful treatment by a supervisor* or *by parents* was described. Teaching trainees reported situations "where you notice that the teachers think the younger ones should do that." Another statement by a trainee that described a situation at school was, "You are treated disrespectfully by some teachers because they think of you as the damn trainee and they put themselves above you." A description about an interaction with parents was: "You are in the role of being a trainee and being new [...]. And in this case the parents let you feel this." *Dependence on a supervisor* evolved as another category associated with illegitimacy at school and was characterized by statements such as, "Just because the school principal writes a report [...] which counts into the final grade."

Comparable to the study seminar, situations of illegitimacy were again associated with feelings of stress or a threat to the self by teaching trainees. For example, trainees reported to be "overwhelmed" or "stressed" by the task. One trainee also described a situation where she "felt like a fool" because a teacher persuaded her of standing in for him. Similarly, another trainee reported, "During the conversation [with a teacher and the parents of a student], I got the impression that I had to justify myself for talking to the student about his behavior [...]."

In situations where a classification into task type or context was not possible it was coded into the structuring dimension *other illegitimate task*. Results in this dimension are very similar to task and context specific results, and thus remain unattended here. An exception occurred in two situations at school where trainees described situations as illegitimate, and illegitimacy was associated with *disrespectful treatment by pupils*. One trainee was assigned the task to teach a class on how to handle a computer program and "got feedback from pupils that one should prepare better." Another trainee reported a situation at school: "I was trying to address their social behavior but they didn't accept what I said." Other than this, no major difference from context and task specific results occurred.

DISCUSSION

Interpretation of Results

The aim of the present study was to gain an understanding of how teaching trainees define their professional role. In relation to that, illegitimate tasks and typical task characteristics during the curriculum should be identified. Moreover, associated framework and social conditions and responsible persons ought to be revealed.

Our study results confirm existing research concerning teaching trainees' (professional) role. Teaching trainees in the present study had different conceptions about whether they adopt a role as a teacher or as a trainee, which highlights their intermediate and partly unclear role (e.g., Pithers and Soden, 1998; Elfering et al., 2007). Consistent with this, there were many tasks (central examinations, supervision, conferences, seminar lectures, substitution lessons, and school development and extra duties) that were reported as role confirming by some trainees but as extra role tasks by others. It is striking that illegitimacy was especially reported in the context of these tasks but not the reported "core tasks" (teaching, supporting, counseling and educating pupils and personal development). This also confirms existing research stating that illegitimacy mainly occurs within ancillary but not within core tasks (Semmer et al., 2015).

Focusing on characteristics of illegitimate tasks, several important new insights were gained. First, it is striking that there were major differences in the results depending on the situational context in which illegitimacy occurred. For example, while unnecessary tasks were the dominant problem in the study seminar because it was the seminar itself that was perceived as unnecessary (see **Table 1**), unreasonableness was more prevalent in the school context. Even more important however, it was the context that determined whether social conditions constituted a characteristic of illegitimacy but not the task or task type itself. More specifically, certain aspects could not be classified as unique characteristics for an unnecessary compared to an unreasonable

task. Rather, it depended on the context—school vs. study seminar—whether these aspects were of relevance. There is a visible tendency that social aspects are a more prevalent problem in association with unreasonable tasks. However, given the qualitative design of the study and the small number of codings, this result has to be interpreted with caution. Nevertheless, the present study clearly revealed that an analysis of illegitimate tasks should always include the situational context. Otherwise, important aspects remain undetected or are even misinterpreted. Despite this context specificity, the detailed analysis of social aspects associated with illegitimacy was an innovative feature of this study. It added to existing research on illegitimacy by providing concrete information regarding what illegitimacy really means, at least in the context of teaching trainees. As for social aspects, lack of social support by supervisors; disrespectful treatment by supervisors, parents, or pupils; lacking information or cooperation; and dependence on the supervisor are aspects that were associated with illegitimacy, and thus, potentially contribute to a stressful situation. Building on these results, emotional labor is an aspect that deserves further attention in future research. Teaching trainees in the present study reported disrespectful treatment by pupils and by supervisors—situations in which demands for emotional labor are increased: While on the one hand trainees' professional self is threatened, on the other hand showing positive emotions is part of their job. Research on teachers has shown that deep acting (being able to influence one's own emotions in an appropriate manner) is beneficial for health, whereas surface acting is associated with emotional exhaustion (Philipp and Schüpbach, 2010). While appreciating their work is the most important intervention, providing proper training in redefining their tasks might also help to reduce perceived illegitimacy by enabling trainees to engage in deep acting and thus reduce their experienced level of stress. So far, illegitimate tasks have been described as a two dimensional construct consisting of unnecessary and unreasonable tasks (e.g., Semmer et al., 2007). Consistent with these definitions, we found that unnecessary tasks can be distinguished from unreasonable tasks. While unnecessary tasks were related to inefficiencies, this was not the case for unreasonable tasks (see **Table 2**). In addition to previous findings, we found that unnecessary tasks were reported to be sub challenging or redundant while this did not occur at all for unreasonable tasks. The Bern Illegitimate Tasks Scale (Semmer et al., 2010), which is the typical instrument for measuring illegitimacy, already includes inefficiency but does not account for sub challenge, an aspect that deserves attention nevertheless. This is especially the case because sub challenge (or overextension as the opposite) were aspects by which unnecessary and unreasonable tasks could clearly be distinguished. As already stated, sub challenge was only found in association with unnecessary tasks. In addition, it is important to note that the opposite was found for unreasonable tasks. Specifically, qualitative overextension was something particularly characteristic for unreasonable tasks. Thus, it seems as if we detected another characteristic by which the two dimensions of illegitimate tasks are clearly separable—at least in teacher training—which also speaks on behalf of the two dimensionality of the construct. However, since we already stated the importance of the context other (quantitative) investigations are necessary to confirm this result.

Another interesting finding of the present study addresses framework conditions that are associated with illegitimate tasks. Reports by teaching trainees clearly revealed that guidelines framing a situation potentially contribute to the occurrence of illegitimacy. While no clear pattern was visible whether guidelines are too strict and inflexible or too loose and arbitrary, one conclusion can still be drawn: It is not only the task design itself or the social interaction that determines illegitimacy. Rather, one has to clearly investigate structures that promote or hinder the development of illegitimacy. Thus, by considering given structures scholars may shed light into why illegitimacy occurs in some contexts but not in others. In practical terms, one should be aware of the importance of structural guidelines and their consequences as a first step toward less illegitimacy.

While the definition of illegitimate tasks, the Bern Illegitimate Tasks Scale (Semmer et al., 2010) and some of our results suggest that unnecessary and unreasonable tasks are distinct constructs, we also found unexpected *similarities* between the two constructs. For example, while the definition and the Scale classify *unnecessary* tasks as avoidable by better planning or organization, we found this characteristic for both task types, unnecessary and unreasonable tasks. Hence, results of the present study raise the question whether this aspect embedded in the typical measurement of unnecessary tasks is able to distinguish between the dimensions in teacher training. Rather, reconsideration is recommended whether there are other task characteristics that would offer better separation of the dimensions. The same applies to additional effort that evolves due to mistakes or poor work of others. Following the Bern Illegitimate Tasks Scale, this is a specific feature of unnecessary tasks. However, this could not be confirmed in the present study. Instead, this aspect was something context but not task specific. In particular, poor work of others was described in the context of the study seminar (for unreasonable and unnecessary tasks) (see **Table 2**) but did not occur at school. Thus, again, our results suggest reconsideration whether the Bern Illegitimate Tasks Scale validly measures unnecessary tasks in the context of teacher training. In line with this, the dimension *other illegitimate task* evolved because the assignment to one category (unnecessary vs. unreasonable) was not always possible. This draws into question whether a separation is always useful (cf. Semmer et al., 2013).

In sum, the results of the present study partly suggest that illegitimate tasks are comprised of two dimensions, since we identified certain task characteristics that allowed a separation. Examples for those characteristics which separated the two task types in our study were being senseless or inefficient or being outside one's responsibility area. However, especially regarding the definition and measurement of *unnecessary tasks* there were aspects that could not serve as distinguishable characteristic for this dimension in the present study. Hence, reconsideration is recommended here. A first approach could be a detailed analysis of how far sub challenge vs. overextension are able to differentiate unnecessary from unreasonable tasks. Moreover, the situational context should be taken into account as clear

differences depending on the context evolved in the present study.

Strengths and Limitations

Eight out of 24 teaching trainees had to be excluded from the analysis because they pointed out that the concept of illegitimate tasks did not apply to them. While an exclusion rate of one third seems relatively high, it is otherwise alarming that two thirds of interviewed teaching trainees reported illegitimate tasks. We did not directly ask for links between illegitimate tasks and stress or threats to the self. Questions addressing these issues could have created a closer link to the theoretical framework underlying the study and is recommended for future investigations. Nevertheless, the fact that trainees reported feelings of stress and threats to the self although we did not directly address these elements of the SOS concept in our interview questions, can also be interpreted as an even stronger support for the supposed associations.

In the present study, a comparison of all 24 teaching trainees was not conducted. However, it would have been interesting to reveal individual or organizational aspects that led to the differences in perceived illegitimacy. Björk et al. (2013) already identified the organization as relevant for the experience of illegitimate tasks in a sample of managers. The same could apply to the teaching profession. It might depend on the school or study seminar whether illegitimacy occurs. More research is necessary here to identify specific organizational and individual factors. Moreover, future investigations should test how widespread illegitimate tasks really are among teaching trainees.

Two subcategories (*lack of appreciation by a supervisor* during unnecessary tasks at school and *dependence on supervisor* during unreasonable tasks at school) had lower interrater reliability values ($K = 0.48$) suggesting that these categories were less clear. Lower agreement here could be due to the fact that dependency and appreciation depict rather abstract constructs that would have needed further definition in order to gain unambiguous results. Although we followed inclusion recommendations by Wirtz and Caspar (2002), results relating to these categories have to be interpreted with caution. Illegitimate tasks comprise a complex construct and the perception of illegitimacy is strongly influenced by subjective evaluations. Therefore, an integration of different perspectives (e.g., full teachers, instructors, and pupils) would have been interesting to fully understand the development and preservation of illegitimate tasks in the teaching context. This remains open for future research. Moreover, this study exclusively focused on illegitimate tasks and the SOS concept. For future research, a stronger distinction from related concepts is needed. Especially interactional justice, which includes respectful interactions with authorities (Colquitt, 2001; Cropanzano et al., 2001), should be distinguished. Some studies controlled for organizational justice and found results that speak on behalf of illegitimate tasks as a distinct construct (e.g., Semmer et al., 2010, 2015). However, during interviews with teaching trainees a distinction was difficult at times. The group value model (Tyler, 1989) also contains need of belonging and appreciation in the work context as crucial factors that are relevant for a person's identity and positioning within a group. Similarly, social stressors focus on "social animosities, conflicts with co-workers and supervisors, unfair behavior, and a negative group climate" (Dormann and Zapf, 2002, p. 35) and likewise include self-threatening elements as causes for stress (Holz et al., 2004). Considering these models in the analysis to prove the additional value that illegitimate tasks and the SOS concept offer was not aim of the present study but should be considered in further examinations to underline the uniqueness and relevance of illegitimate tasks.

The application of illegitimate tasks to the teaching trainee curriculum yielded important new insights. Many teaching trainees had experienced such tasks and gave detailed descriptions about corresponding situations which show the concept's relevance. Two strengths of the present study are especially noteworthy: (1) Interviews and qualitative content analysis following Mayring (2015) offered strong methods that allowed an open and unbiased data collection and analysis of the teaching trainee context. It was possible to build on existing research while the identification of in-depth insights was facilitated. (2) The construct of illegitimate tasks is very specific, which makes it easy for people to talk about corresponding situations. To think of a previous unnecessary task is easier than to talk about a rather abstract construct like lacking appreciation. The approach facilitates the detection of an indirect form of lacking appreciation that otherwise would probably remain undetected.

The present study contributes to existing research by revealing typical tasks, characteristics, framework and social conditions, and responsible persons associated with illegitimate tasks during teacher training. Furthermore, teaching trainees' role definitions helped to put illegitimate tasks into context and also contributed to research on role identity development in this group. The present study also demonstrated that teaching trainees experience strain, considering statements such as: "There are a lot of situations where one just feels overloaded or overstrained. [...] It is alarming that many people have mental problems during this time or mental breakdowns close to an examination." Longitudinal designs are necessary to examine whether illegitimate tasks are causally responsible for such reactions. While some results of the present study specifically refer to the teaching trainee curriculum, others are more general and are likely to apply to other professions, offering new opportunities for the examination of illegitimate tasks as a general construct.

Practical Implications

Speaking in practical terms, awareness about ambiguity and tensions that teaching trainees experience during teacher training is a first important step toward less illegitimacy. Teachers, instructors, mentors, and trainees should talk about their roles and clarify reciprocal expectations they have. In doing so, exceeding trainees' responsibilities and under- or overestimation of their skills could be reduced. Moreover, instructors and teachers who assign tasks to teaching trainees should be made aware of the social message they convey. Lack of professional appreciation is not only expressed by disrespectful treatment. Rather, the task itself contains a message. This might be

counterintuitive for supervisors at first, since for them the delegated task is only one thing among many others. Therefore, it is all the more important to be sensitive to the opposite perspective; the person who receives the task. Nevertheless, creating awareness among trainees about what the teacher job and the curriculum include might as well be a step toward perceived legitimacy.

Regarding study seminars, the attendance of the seminar in general was perceived as especially illegitimate. A closer link to the school context might help here. Greater practical relevance in terms of a closer link to teaching and tailoring tasks to trainees' skills and experiences is necessary. The discussion of practical cases and worksheets and the planning of actual school lessons could be a way to reduce perceived illegitimacy. Moreover, inefficiencies should be avoided. A distancing from fixed structures and a loosening of guidelines might be useful. Instead, instructors and trainees could for example collectively decide on seminar contents and methods in order to get a better alignment with the needs and skills of a particular work group.

Increasing communication at school and providing more information as a signal of appreciation could result in significant improvement toward less illegitimacy at school. The establishment of standardized communication and information channels in terms of regular meetings to inform trainees about upcoming projects or classes could help to reduce perceived illegitimacy. Moreover, whenever an illegitimate task is not avoidable for some reason, appreciation could be expressed by at least explaining the situation.

Teaching trainees reported disrespectful treatment from pupils, parents, and supervisors. However, only supervisors were blamed for illegitimate tasks and more social support was only expected from them. They are the ones assigning tasks and are a major source of (direct and indirect) appreciation at work. Therefore, aside from improving task designs and framework conditions, supervisors are especially able to influence teaching trainees' perceptions of a situation in a positive manner. They are the people who should give social support to help trainees grow into their roles. Interventions in order to make supervisors aware of their role and the importance of appreciative task design, as well as interventions on how to give social support are promising approaches in the reduction of illegitimacy and are seen as important and necessary step toward an improvement of teaching trainees' health and well-being.

CONCLUSION

The present work analyzed illegitimate tasks as an important aspect of the broader SOS-concept (Semmer et al., 2007) in the context of the German teaching trainee curriculum. Leading questions addressed teaching trainees' role perception and their experience of illegitimate tasks during the curriculum. The reported frequency of these tasks showed their relevance and applicability in the teaching trainee curriculum. Moreover, tasks were often considered illegitimate when no agreement existed whether they are located within a trainee's professional role or not. While unnecessary tasks often occurred in the study seminar, unreasonable tasks and related social circumstances such as lacking social support, lacking communication and disrespectful treatment were mostly prevalent in the school context. Although not included in the interview questions, reports by trainees about feeling stressed were an alarming hint at the negative consequences illegitimate tasks can evoke. Therefore, we recommend further research on illegitimate tasks in the teaching context with a special focus on the influence of organizational and situational factors to get a more in-depth understanding of the effects these tasks have on trainees' health and well-being.

ETHICS STATEMENT

The study was performed in consensus with requirements, including participants' information about their rights and guarantee of anonymity. All subjects gave informed consent in accordance with the Declaration of Helsinki.

AUTHOR CONTRIBUTIONS

SF and MK designed the study. SF, KO, and MK structured the ideas and SF and HK did the analyses. All authors read and approved the final manuscript.

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Illegitimate Tasks as an Impediment to Job Satisfaction and Intrinsic Motivation: Moderated Mediation Effects of Gender and Effort-Reward Imbalance

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The current work examines a contemporary workplace stressor that has only recently been introduced into the literature: illegitimate tasks. Illegitimate tasks are work tasks that violate identity role norms about what can reasonably be expected from an employee in a given position. Although illegitimate tasks have been linked to employee well-being in past work, we know little about the potential explanatory mechanisms linking illegitimate tasks to work-relevant negative psychological states. Using a sample of 213 US-based employees of mixed occupations and a cross-sectional design, the present study examines job satisfaction and intrinsic motivation as outcomes of illegitimate tasks. Additionally, we examine perception of effort-reward imbalance (ERI) as a potential mediating mechanism through which illegitimate tasks relate to job satisfaction and intrinsic motivation, highlighting a possible pathway by which these relationships are functioning. Finally, we explore gender as a socially constructed variable that could contribute to variation in responses to illegitimate tasks and moderate the mediated link between illegitimate tasks and outcomes. Results indicated that illegitimate tasks were significantly related to job satisfaction and intrinsic motivation both directly and indirectly through perceptions of ERI in the predicted directions. Moreover, a moderated-mediation effect was found such that male workers reacted more than female workers to illegitimate tasks through the mechanism of perceived ERI.

Keywords: illegitimate tasks, well-being, effort-reward imbalance, gender differences, job satisfaction, intrinsic motivation

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INTRODUCTION

Employee work well-being continues to be central to organizational research and practice, given its importance to individual workers, as well as to organizational and societal-level functioning (Griffin and Clarke, 2011). Two prominent indicators of work well-being are job satisfaction and intrinsic work motivation (see Aamodt, 2016). In addition to being important work-relevant psychological states, both are established predictors of various important individual and organizational-level outcomes. Job satisfaction has been linked to job performance (Spector, 1997), burnout (Faragher et al., 2005), and retention (Tett and Meyer, 1993). Similarly, intrinsic

motivation has been positively linked to job performance (Ryan and Deci, 2000; Grant et al., 2007), as well as negatively related to turnover intentions (Richer et al., 2002), and burnout (Richer et al., 2002; Cerasoli et al., 2014). Given their importance to -and centrality within- work-related nomology, continued efforts are necessary to understand better how work conditions predict these outcomes. Furthermore, it is prudent to examine how occupational demands interact with prominent individual characteristics such as gender in predicting job satisfaction and intrinsic motivation because such characteristics tend to infiltrate the entire work experience (Lambert, 1991; Reed et al., 1994; Klassen and Chiu, 2010). The current work addresses both needs.

Stressful occupational demands have been repeatedly shown to undermine job satisfaction and intrinsic motivation (e.g., Spector, 1985, 1997; Rubino et al., 2009). The majority of existing research has focused on how high demand levels, as well as low levels of resources available to cope with demands, such as autonomy, decision making ability, and social support sources at work have produced decrements to these psychological states (e.g., Deci and Ryan, 1985; Dwyer and Ganster, 1991; Fila et al., 2014). However, given the changing nature of the workplace, it is imperative to examine contemporary understudied stressor demands that may have substantial explanatory power in the prediction of these outcomes *beyond* established forms of stress, in order to provide informed recommendations to leaders.

Illegitimate tasks (Semmer et al., 2005, 2007) represent one such contemporary work stressor that was recently introduced to the organizational psychology literature. Illegitimate tasks are assigned work demands that violate work role norms about what can reasonably be expected from an employee in a given position (Semmer et al., 2007), such as expecting a doctor to change a patient's bedpan, which would usually be the job of a junior nurse. Other examples include requiring a legal secretary to meet with a client to discuss matters that should involve an attorney or conforming to strict office rules that don't make any sense. Illegitimate tasks are not necessarily new to the workplace. However, the nature and structure of the evolving work environment, such as the US's transition to more service-oriented industries and increasing individual perceptions that organizational citizenship behaviors are obligatory (Haworth and Levy, 2001), are such that illegitimate tasks are becoming a bigger issue for employees. Combined with the recent conceptualization and operationalization of the construct in the organizational psychology literature, we argue these factors merit the consideration of illegitimate tasks as a contemporary stressor.

Importantly, illegitimate tasks have been found to be distinct from and account for strain *beyond* the predictive ability of other more established work demand stressors (Semmer et al., 2010, 2015). In comparison to role overload (Karasek, 1979), for example, illegitimate tasks are not necessarily hard to complete but they violate the worker's role identity based on the requirement to carry out demands that are out of context for the role, and the individual in question (Semmer et al., 2007, 2010). These tasks are also similar to, but conceptually distinct from, role conflict. Role conflict involves a conflict "between the focal person's internal standards or values and the defined role behavior..." (Rizzo et al., 1970, p. 155), whereas illegitimate tasks refer to conflict between a task's extrinsic qualities and one's role expectations (Semmer et al., 2015). Illegitimate tasks have also previously been demonstrated to be distinct from justice constructs (i.e., distributive, procedural, and interactional justice) in that illegitimate tasks focus on fairness perceptions of task assignments while justice theories refer to fairness perceptions regarding allotment of positions, resources, and reward (Semmer et al., 2010, 2015). Indeed, illegitimate tasks predict outcomes above and beyond justice constructs (Semmer et al., 2015).

Extant research on this egregious stressor has primarily focused on associations between illegitimate tasks and various forms of psychological strain, as well as counterproductive work behavior (e.g., Kottwitz et al., 2013; Eatough et al., 2015–2016; Semmer et al., 2015). However, little attention has been paid to how illegitimate tasks might affect *positive* work-relevant job states such as job satisfaction or work motivation; with the exception of Eatough et al. (2015–2016), and Stocker et al. (2010), whose findings suggest illegitimate tasks reduce job satisfaction. Furthermore, few studies have explored the mechanisms underlying basic illegitimate tasks-outcome associations and none have examined gender as a potential moderator, despite much research showing gender differences in the interpretation of workplace stressors and subsequent coping (Roxburgh, 1996; Quick et al., 1997; Niedhammer et al., 1998). As such, we address these deficiencies by making three unique contributions to current understanding of illegitimate tasks and their relationships with employee work well-being. First, grounding our study in "Stress-As-Offense-to-Self" (SOS) theory (Semmer et al., 2007) and Warr's (1990) model of well-being, we examine direct relationships between perceptions of task illegitimacy and both job satisfaction and intrinsic motivation, in order to establish illegitimate tasks as a negative correlate of these important markers of work well-being.

Second, we examine perceptions of effort-reward imbalance (ERI) as a possible mediator of these relationships. The ERI model (Siegrist, 1996) focuses on an individual's efforts to achieve balance in the workplace through comparison of inputs and outcomes with others (Siegrist, 1996). In the following sections, we postulate that employees assigned tasks perceived as illegitimate will experience decrements to job satisfaction and intrinsic motivation because they perceive that the effort they must expend to complete such tasks is – by nature of their illegitimacy –imbalanced with the reward they will receive for doing so. We cannot gain a complete understanding of the effects of illegitimate tasks without moving to models that suggest explanatory links. The present study will elucidate whether ERI is a possible mechanism that explains why these tasks may be detrimental to desirable employee states.

Third, we examine whether illegitimate tasks are differentially damaging to work well-being based on employee gender. Employee gender continues to be at the forefront of organizational literature (e.g., Heilman and Eagly, 2008; Barreto et al., 2009), and it is now widely accepted by researchers that males and females perceive stress, and cope with stressors differently (Roxburgh, 1996; Quick et al., 1997; Niedhammer et al., 1998). Yet, we presently lack an understanding of how gender might influence task illegitimacy perceptions and, in

turn, how these variables affect job satisfaction and intrinsic work motivation. Thus, we attempt to illuminate possible gender differences in illegitimate tasks perceptions, and explore how these perceptual differences relate to job satisfaction and intrinsic motivation in men versus women.

Taken together we aim to elucidate further how illegitimate tasks function in employees' minds in relation to their job satisfaction, and their intrinsic motivation at work. In the following sections we outline the concept of illegitimate tasks in more detail, as well as review the possible mediating role of perceived ERI, and moderating role of gender on relationships with these positive work-relevant psychological states.

Illegitimate Tasks

Illegitimate tasks can be conceptualized within the SOS framework (Semmer et al., 2007, 2015). SOS theory stems from the idea that individuals strive to maintain a positive self-view, which can be attained through personal self-esteem (i.e., positive self-evaluation; Epstein, 1998) or social esteem (i.e., positive evaluations by others; Leary and Baumeister, 2000). One factor that contributes to the development of one's self-view is an individual's work or professional role (Siegrist et al., 1986; Ashforth, 2001; Semmer et al., 2007). Work or professional roles become incorporated into an employee's identity by providing a sense of meaning and purpose (Thoits, 1991). These roles are defined by normative prescriptions regarding what can and cannot be expected from occupants of a given work or professional role (Ilgen and Hollenbeck, 1991). Moreover, these normative prescriptions are usually shaped by more collective norms at the occupational and/or organizational levels (Semmer et al., 2005, 2010). As such, tasks or assignments that defy these norms may be perceived as *illegitimate* (Semmer et al., 2007, 2010).

Tasks may be perceived as illegitimate to the extent that they are viewed to be unreasonable or unnecessary. *Unreasonable tasks* are those considered to outside the boundaries of one's occupational status, or one's range of occupational abilities, such as assigning tasks to junior employees that require a greater level of skill, experience, or expertise than they can reasonably be expected to possess; or assigning tasks to more senior employees that demean their capabilities. Concomitantly, *unnecessary tasks* are those that employees believe no-one should have to perform, such as being required to complete meaningless paperwork, or being held to policies which make no sense (Björk et al., 2013). Tasks can also be perceived as unnecessary due to organizational inefficiencies, such as being required to enter identical data on two incompatible information technology systems (Semmer et al., 2015). Illegitimate tasks threaten one's professional role identity by communicating disrespect, lack of appreciation, or negative evaluation by others (Semmer et al., 2007). Threats to professional role identity can threaten one's positive self-view and self-esteem, which is stressful (Stets, 2005). Thus, illegitimate tasks are considered "identity-relevant stressors" (Thoits, 1991).

Although the concept of illegitimate tasks is still relatively new to organizational literature, research to date suggests that task illegitimacy has a myriad of negative implications for employee work well-being. Illegitimate tasks have been shown to correlate positively with employee stress (Björk et al., 2013), resentment both directly and indirectly via lack of appreciation (Stocker et al., 2010), and burnout (Semmer et al., 2010); and negatively with satisfaction with work performance (Björk et al., 2013), mental health (Madsen et al., 2014), and self-esteem (Semmer et al., 2010).

With regard to more complex study designs, daily illegitimate tasks predicted poorer sleep quality in Swiss employees (Pereira et al., 2014) and daily fluctuations in state self-esteem (Eatough et al., 2015–2016). Further, in a US sample, Eatough et al. (2015–2016) demonstrated that daily fluctuations in illegitimate tasks predicted evening anger and job satisfaction, and depressive mood. Finally, Kottwitz et al. (2013) found longitudinal evidence that employees' who perceived illegitimate tasks and reported lower than average health had higher levels of cortisol, a biological indicator of stress. Illegitimate tasks also predicted irritability and resentment in Swiss employee's 2 months later (Semmer et al., 2010).

Warr's Model of Well-Being

Warr's (1990) model of well-being posits that affective work well-being can be conceptualized in terms of two independent dimensions: pleasure and arousal. *Pleasure* refers to the content of one's feelings and is represented by a horizontal dimension whereas *arousal* refers to the degree of activation one is experiencing and is represented by a vertical dimension (Warr, 1999). These dimensions are mapped onto a circumplex of affective well-being with three main axes that serve as markers of well-being (Warr, 1990). The first axis solely represents pleasure and is measured using only the horizontal pleased-displeased dimension. The second and third axes involve both pleasure and arousal and run diagonally through the four quadrants. The second axis ranges from anxiety to contentment, with anxiety characterized as high arousal and low pleasure and contentment characterized as low arousal but high pleasure (Warr, 1990, 1999). The third axis ranges from depression (marked by low pleasure and arousal) to enthusiasm (marked by high pleasure and arousal). Individuals' well-being is characterized based on their location on each axis (Warr, 1990, 1999).

Environmental factors, specifically job characteristics, are important predictors of employee work well-being, with various job aspects differentially predicting forms of well-being (Warr, 1990). As stated, illegitimate tasks have only been studied in relation to a limited set of aspects of well-being, with the majority of this work focusing on negative markers of well-being (e.g., resentment, anger, depression). Thus, the present study expands on existing work by examining two positively valenced markers of well-being (i.e., intrinsic motivation and job satisfaction), that are high and low arousal, respectively.

Illegitimate Tasks, Job satisfaction, and Intrinsic Motivation

The nature and characteristics of illegitimate tasks suggest they will play a role in predicting positive markers of work well-being such as job satisfaction and intrinsic motivation. Job satisfaction is defined as a positive and pleasurable state resulting from

an individual's job appraisal or job experience (Locke, 1976). Job satisfaction is a dominant subject in organizational research due to its importance for individual and organizational health and well-being, and continued functioning, which has been well established (for reviews, see: Petty et al., 1984; Iaffaldano and Muchinsky, 1985; Loher et al., 1985; Blegen, 1993; Brown and Peterson, 1993; Judge et al., 2002; Faragher et al., 2005; Zangaro and Soeken, 2007), making it by far the most examined construct in organizational literature (Spector, 1997).

The few studies that have empirically examined the illegitimate tasks-job satisfaction link have found illegitimate tasks to be negatively related to job satisfaction (Stocker et al., 2010; Eatough et al., 2015–2016). There are several theoretical reasons as to why illegitimate tasks may be tied to job satisfaction. First, SOS framework describes that assigning employees illegitimate tasks poses a threat to employee social and self-esteem, which results in psychological damage and is stressful. Relatedly, employee self-esteem may be threatened because employees may appraise being assigned illegitimate tasks as signifying failure to achieve their goal of succeeding in their job (Semmer et al., 2007). This stress derived from employees' inability to draw a positive sense of self from an important area of their identity will likely have negative implications for employee work well-being, for example, their job satisfaction (Semmer et al., 2007, 2010).

Second, job characteristics theory (Hackman and Oldham, 1975) states that task significance and task variety (i.e., the degree to which it is challenging) influence the meaningfulness of one's job. As illegitimate tasks are perceived as unreasonable or unnecessary, they detract from significant or challenging work and will therefore reduce the perceived meaningfulness of one's job. Reduced meaningfulness of one's job will in turn negatively affect job satisfaction (Hackman and Oldham, 1975).

Third, illegitimate tasks may be particularly important in forming effort-reward perceptions as well, as explained in detail below. As stated, illegitimate tasks fall outside of one's role expectations and may therefore offer little in regards to achieving one's goals or affirming one's work role identity (Semmer et al., 2007). Thus, individuals may perceive these tasks as creating a "reciprocity deficit" (van Vegchel et al., 2005) or imbalance by requiring effort but offering little reward.

Although the relationship between illegitimate tasks and intrinsic motivation has not yet been examined, theoretical evidence supports the negative relationship between illegitimate tasks and intrinsic motivation for several reasons. First, pride in professional roles assists us in maintaining a positive self-view (Stets, 2005). Social contexts that allow individuals to maintain positive self-views (Ryan and Deci, 2000) and that satisfy their need for competence facilitate the maintenance and enhancement of intrinsic motivation (Self-Determination Theory; Deci and Ryan, 1980, 1991). Examples of such supportive contextual events include getting positive feedback, desirable challenges, or intrinsically rewarding tasks (Richer et al., 2002), and not being subjected to negative evaluations (Ryan and Deci, 2000). Conversely, social contexts that thwart individuals' ability to maintain positive self-concepts and feel competent are associated with poorer intrinsic motivation (Ryan and Deci, 2000). Illegitimate tasks may constitute one such unsupportive contextual event because they convey disrespect and negative social evaluation to those assigned these tasks.

Second, job characteristics theory (Hackman and Oldham, 1975) posits that jobs that are meaningful are linked to higher intrinsic motivation. As illegitimate tasks are perceived as peripheral to one's job, may be discordant with one's job role, or may be seen as unnecessary, they are unlikely to be perceived as meaningful (Hackman and Oldham, 1975). Thus, jobs that are wrought with illegitimate tasks are expected to degrade intrinsic motivation of the role occupant.

Third, because illegitimate tasks are outside of the core elements of an employee's job, these tasks are not intrinsically rewarding (Semmer et al., 2007). Furthermore, as detailed below, these tasks may be perceived as unfair (Semmer et al., 2007) or as offering few reward for one's efforts because they convey lack of appreciation, social devaluation, and are not instrumental in achieving desirable goals (van Vegchel et al., 2005; Semmer et al., 2007).

Taken together, we expect that employees who experience high levels of illegitimate tasks may suffer threats to identity, a lack of meaningfulness in their jobs, or a sense of resource over expenditure, and are therefore expected to report lower intrinsic motivation.

Hypothesis 1: Perceptions of task illegitimacy will be negatively related to a) job satisfaction and b) intrinsic motivation.

Effort-Reward Imbalance

The ERI model states that work characterized by high efforts (i.e., job demands or obligations) and low reward (i.e., money, esteem, and job security/career opportunities) creates perceptions of imbalance that result in employee strain reactions and impaired well-being (Siegrist, 1996; Siegrist, 2002). Employee's assigned illegitimate tasks may perceive ERI because their efforts are not rewarded or these reward are insufficient. Indeed, Semmer et al. (2007) suggest that illegitimate tasks may be stressful because they provoke feelings of unfairness and resentment. Illegitimate tasks, by nature, may be perceived as offering little reward because they are not within-role performance duties for which the individual is getting paid, are often not intrinsically rewarding, and are not citizenship behaviors for which some relational value could be earned (Semmer et al., 2007). Consequently, illegitimate tasks are likely seen as poor opportunities, for which effort doesn't lead to gain. Thus, assignment of illegitimate tasks is expected to positively predict employee perceptions of ERI.

Hypothesis 2: Perceptions of task illegitimacy will be positively related to perceptions of ERI.

When employees expend effort and receive commensurate reward, it can signify to employees that they are successful and valued. However, a "reciprocity deficit" (van Vegchel et al., 2005) can signify devaluation, lack of respect and appreciation, unfairness, or negative evaluation (Semmer et al., 2007), which may threaten employees' social esteem (Semmer et al., 2007) and positive self-concept (Siegrist et al., 1986). This threat can cause "stress as disrespect" (SAD; Semmer et al., 2007, p. 46), which can

prompt strain reactions and negatively impact employee work well-being (Siegrist et al., 1986; Siegrist, 1996). For example, prior work has linked ERI perceptions to employee job dissatisfaction (de Jonge et al., 2000; van Vegchel et al., 2005).

Moreover, although there is a paucity of work examining the link between ERI and intrinsic motivation, a variety of motivation theories (e.g., equity theory, Adams, 1963; cognitive theory of emotion, Lazarus, 1991; expectancy theory of motivation and VIE theory, Vroom, 1964; Schönpflug and Batmann, 1989) purport that employees who perceive an imbalance between effort and reward will attempt to restore balance by either cognitively or behaviorally reducing their effort, or attempting to maximize their reward. Thus, employees may experience reduced intrinsic motivation regarding their work because (i) illegitimate tasks may not be tied to explicit reward within the job, and (ii) such tasks likely reduce the degree to which the work role fulfills esteem needs. Based on these theoretical and empirical arguments, we contend that because illegitimate tasks reduce or offer few reward, they will correlate with an increase in ERI perceptions, and in turn, predict reduced job satisfaction and intrinsic motivation.

Hypothesis 3: Perception of ERI will be negatively related to a) job satisfaction and b) intrinsic motivation.
Hypothesis 4: Perception of ERI will mediate the relationship between illegitimate tasks and a) job satisfaction and b) intrinsic motivation. Assignment of illegitimate tasks will be associated with higher ERI perceptions, which will be linked to decreased job satisfaction and intrinsic motivation.

Gender as a Moderator

Finally, this study explores the moderating role of gender. Historically, women have been disadvantaged in the workplace, in part because of assumptions, perceptions, and stereotypes about their characteristics and capabilities (e.g., Heilman, 2001; Eagly and Karau, 2002; Lyness and Heilman, 2006). Although the outlook for women has improved with changing roles for both men and women, gender stereotypes are still pervasive and gender disparity issues are still relevant in today's work environment. Gender role theory posits that the different social roles that men and women typically inhabit, and others' expectations for conformity to these roles results in behavioral differences between men and women (Eagly, 1987). Specifically, females are believed to be more *communal* (concerned with the welfare of others), nurturing, and giving whereas men are believed to be more *agentic* or assertive, ambitious, and dominant (Eagly, 1987; Eagly et al., 2000).

Based on gender role theory (Eagly, 1987), men and women may perceive and respond differently to being assigned illegitimate tasks, partly due to underlying assumptions about gender roles. Because gender role theory outlines that social role norms include women being communal, giving, and less dominant, women may be both expected to and accustomed to carrying out illegitimate tasks more than their male counterparts. If so, women are expected to feel less threatened by illegitimate tasks as the experience is more closely aligned with socialized norms. Indeed, research suggests there are more expectations for women to perform such extra-role work and women are more likely to be penalized in performance evaluations if they do not (Allen and Rush, 1998).

Conversely, men may be more reactive to illegitimate task assignments because being subjected to demands characterized by unfairness or disrespect would be inconsistent with the dominant male gender role. Thus, being assigned demoting or demeaning work is inconsistent with this norm. To clarify: regardless of the recipient's gender, illegitimate tasks are equally a violation of the recipient's *professional* role. Yet, for men, such tasks may *also* violate gender roles, making illegitimate tasks a more salient identity threat to men than to women. Given theoretical and empirical evidence suggesting men and women behave consistently with their respective gender roles (e.g., Zanna and Pack, 1975; Christensen and Rosenthal, 1982; Eagly, 1987), men are expected to be more reactive to illegitimate tasks than women due to compounding role-violations (both professional and gender) inherent in the experience, which in turn is expected to predict stronger direct associations with lower job satisfaction and intrinsic motivation.

Hypothesis 5a: Gender will moderate the direct relationship between illegitimate tasks and job satisfaction such that the link between illegitimate tasks and job satisfaction will be stronger for males than for females.
Hypothesis 5b: Gender will moderate the direct relationship between illegitimate tasks and intrinsic motivation such that the link between illegitimate tasks and intrinsic motivation will be stronger for males than for females.

We also expect that gender may moderate these relationships indirectly through ERI perceptions. Because women are expected to be more caring and giving, they may have lower expectations for reward for performing this type of behavior. Further, because men and women are socialized differently and women have historically been disadvantaged in the workplace, women may have lower expectations from their jobs in terms of effort-reward links than men and women's tolerance for undesirable task assignments may be higher (Lambert, 1991; Clark, 1997). Accordingly, Lambert (1991) found that women maintained higher levels of intrinsic motivation than men, despite reporting that their jobs were significantly less rewarding (i.e., lower in job autonomy, skill variety, and pay). Moreover, Clark (1997) found gender differences in job satisfaction ratings such that women were more satisfied than men, even after controlling for work values, personal characteristics (e.g., age, education) and job characteristics (e.g., pay, hours, occupation). A cross-national study by Kaiser (2007) suggests that this gender-job satisfaction paradox exists in multiple countries in which women face unequal or restricted labor market opportunities but does not exist in countries with modernized labor markets.

These findings support the notion that women have lower well-being expectations from work. Women may therefore be less reactive or threatened when faced with illegitimate tasks because they perceive less of an imbalance or perhaps even expect imbalance. Based on gender role theory and the empirical evidence outlined above, we predict a stronger positive link between illegitimate tasks and ERI for males than for females

because these tasks are inconsistent with the male gender role and socialized expectations.

H6a: Gender will moderate the indirect relationship between illegitimate tasks and job satisfaction via ERI, such that the indirect link will be stronger for males than for females.
H6b: Gender will moderate the indirect relationship between illegitimate tasks and intrinsic motivation via ERI, such that the indirect link will be stronger for males than for females.

MATERIALS AND METHODS

Design and Participants

Participants were 213 part-time and full-time employees in various predominantly junior-level positions, representing a 76% response rate. Advertisements for participants were placed on the regulated university research systems of three US higher education institutions and students who met criteria for the study expressed interest to the researchers. Participants ranged in age from 18 to 36 years, with a mean age of 20.9 years, and a standard deviation of 1.9 years. Forty-nine percent were women; 84.1% were Caucasian, 2.8% were African American, 9.3% were Asian, 1.9% were Hispanic or Latino, and the remaining 1.9% were of other ethnic groups (no participants were Native American). Participants averaged 18.6 hours of work per week, and had worked for their present organization for between 1 month and 12 years, with an average tenure of 1 year and 7 months. Participants provided consent prior to beginning the survey.

Procedure

Surveys were administered through (i) an anonymous online data collection server, or (ii) an anonymous paper and pencil survey, depending on system for data collected approved at the institution where the data were collected. All surveys were administered at a single time point. Participation was voluntary, and all participants were assured of both identity and response confidentiality as participants was anonymous within the dataset. Course credit was offered as compensation for participation. Institutional review board approval was obtained to complete this study.

Measures

Illegitimate Tasks

Illegitimate tasks were assessed using the eight-item Bern Illegitimate Task Scale (Semmer et al., 2015). Sample items included: "Do you have work tasks to take care of, which you believe should be done by someone else?" (unreasonable tasks), and "Do you have work tasks to take care of, which keep you wondering if they have to be done at all?" (unnecessary tasks). Participants rated each item on a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree). The reliability coefficient for the scores for this sample was 0.88.

Effort-Reward Imbalance Perceptions

van Yperen's (1996) six-item, 5-point scale was used to examine perceptions of ERI (1 = strongly disagree; 5 = strongly agree). A sample item is, "I invest more in my job than I receive in return," ($\alpha = 0.89$).

Intrinsic Motivation

Gagné et al.'s (2010) three-item 5-point Motivation at Work scale (MAWS) was used to assess intrinsic motivation (1 = strongly disagree; 5 = strongly agree). An example item includes, "I feel motivated because I enjoy this work very much," ($\alpha = 0.92$).

Job Satisfaction

To assess job satisfaction, Cammann et al. (1979, unpublished) three-item 5-point scale was used (1 = strongly disagree; 5 = strongly agree). A sample item is, "All in all, I am satisfied with my job," ($\alpha = 0.90$).

Demographics

Demographic information was collected from participants including age, gender, and ethnicity.

Data Analyses

Using SPSS 21 statistical software, Hypotheses 1–3 were tested with bivariate Pearson correlations. Hypotheses 4, 5, and 6 were tested using moderated mediation analyses. The SPSS PROCESS macro software by Hayes (2013) was used to conduct these analyses. Model 8 was used to test Hypotheses 4–6.

RESULTS

Main Effects

Bivariate correlations were used to test Hypotheses 1–3 and are reported in **Table 1**. Our results indicated that illegitimate tasks was significantly negatively related to job satisfaction ($r = -0.41$, $p < 0.01$) and intrinsic motivation ($r = -0.25$, $p < 0.01$), in support of hypotheses 1a and 1b. Illegitimate tasks was positively linked to ERI ($r = 0.52$, $p < 0.01$), in support of Hypothesis 2. Moreover, ERI perceptions were negatively related to both job satisfaction and intrinsic motivation ($r = -0.49$, $p < 0.01$, and $r = -0.28$, $p < 0.01$, respectively), thus supporting hypothesis 3a and 3b.

Moderated Mediation Analyses

Results of moderated mediation analyses for job satisfaction and intrinsic motivation are illustrated in **Tables 2** and **3**, respectively. Hypothesis 4 stated that ERI perceptions would mediate the relationship between illegitimate tasks and both job satisfaction and intrinsic motivation, respectively. Perceptions of ERI mediated the illegitimate tasks-job satisfaction link (0.12, 95% CI 0.02, 0.24) and the illegitimate tasks-intrinsic motivation link (0.07, 95% CI 0.01, 0.17), with the bootstrapped confidence intervals around both indirect effects not containing zero. Thus, support for hypotheses 4a and 4b was found.

The results of our conditional mediation analyses were mixed. First, hypotheses 5a and 6a proposed that gender would moderate the direct and indirect relationships between illegitimate tasks and job satisfaction, such that both the direct and indirect relationships would be stronger for males than for females.

TABLE 1 | Means, standard deviations, and correlations of study variables.

			Item						
Item	**Mean**	***SD***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
(1) Age (Years)	20.89	1.93	–						
(2) Tenure (Years)	1.62	1.73	0.34**	–					
(3) IT[a]	2.75	0.79	0.07	0.12	(0.88)				
(4) ERI[b]	2.63	0.88	0.12	0.15*	0.52**	(0.89)			
(5) Gender[c]	1.49	0.50	−0.23**	−0.09	0.00	−0.02	–		
(6) Job satisfaction	3.55	1.04	−0.01	−0.05	−0.41**	−0.49**	0.10	(0.90)	
(7) Intrinsic motivation	3.33	1.08	0.05	−0.03	−0.25**	−0.28**	0.06	0.71**	(0.92)

N = 208–214. [a]*IT, Illegitimate tasks.* [b]*ERI, effort-reward imbalance.* [c]*1 = Male, 2 = Female. Coefficient alphas are on the diagonals and correlations are below diagonals.* $^*p < 0.05$, $^{**}p < 0.01$.

TABLE 2 | Results of test of moderated mediation with job satisfaction as outcome.

	Job satisfaction				**ERI**			
Predictor	***B***	***SE***	**LLCI**	**ULCI**	***B***	***SE***	**LLCI**	**ULCI**
Illegitimate tasks	−0.31	0.25	−0.79	0.18	1.04***	0.21	0.64	1.45
Gender	0.17	0.40	−0.66	1.0	0.80*	0.37	0.07	1.53
ERI	−0.39***	0.08	−0.54	−0.24				
Illegitimate tasks × Gender	0.00	0.15	−0.29	0.30	−0.30*	0.13	−0.56	−0.05
R^2	0.10***							

	Indirect effects	
	B (SE)	**95% CI**
Illegitimate tasks	0.12 (0.05)	[0.02, 0.24]
Illegitimate tasks × Gender	0.12 (0.05)	[0.02, 0.24]

ERI, effort-reward imbalance. Bs represent unstandardized coefficients. SE, standard error. LLCI, lower level confidence interval. ULCI, upper level confidence interval. $^*p \leq 0.05$, $^{***}p \leq 0.001$.

TABLE 3 | Results of test of moderated mediation with intrinsic motivation as outcome.

	Intrinsic motivation				**ERI**			
Predictor	***B***	***SE***	**LLCI**	**ULCI**	***B***	***SE***	**LLCI**	**ULCI**
Illegitimate tasks	−0.14	0.30	−0.73	0.45	1.04***	0.21	0.64	1.45
Gender	0.27	0.51	−0.74	1.28	0.80*	0.37	0.07	1.53
ERI	−0.22*	0.09	−0.41	−0.03				
Illegitimate tasks × Gender	−0.06	0.18	−0.41	0.30	−0.30*	0.13	−0.56	−0.05
R^2	0.30***							

	Indirect effects	
	***B* (*SE*)**	**95% CI**
Illegitimate tasks	0.07 (0.04)	[0.01, 0.17]
Illegitimate tasks × Gender	0.07 (0.04)	[0.01, 0.17]

ERI, effort-reward imbalance. Bs represent unstandardized coefficients. SE, standard error. LLCI, lower level confidence interval. ULCI, upper level confidence interval. $^*p \leq 0.05$, $^{***}p \leq 0.001$.

Results indicated that gender did not moderate the direct path between illegitimate tasks and job satisfaction (0.00, *ns*), thus failing to support Hypothesis 5a. However, Hypothesis 6a was supported because illegitimate tasks predicted greater ERI perceptions (1.04, $p < 0.01$) and ERI perceptions, in turn predicted lower levels of job satisfaction (−0.39, $p < 0.001$). Additionally, gender moderated the mediated pathway (−0.31, $p < 0.05$), with the bootstrapped confidence interval around the

index of moderated mediation not including zero (0.11, 95% CI 0.02, −0.24), such that males were more reactive to illegitimate tasks (−0.29) than were females (−0.17). See **Figure 1**.

Second, hypotheses 5b and 6b stated that gender would moderate the direct (5b) and indirect relationship (6b) between illegitimate tasks and intrinsic motivation such that these links were stronger for males than for females. Gender did not moderate the direct path (0.06, *ns*), thus failing to support hypothesis 5b. However, support for hypothesis 6b was found because illegitimate tasks predicated greater ERI perceptions (1.04, $p < 0.05$), which in turn predicted lower intrinsic motivation (−0.22, $p < 0.05$). In addition, gender moderated the mediated pathway (−0.31, $p < 0.05$), with the bootstrapped confidence interval around the index of moderated mediation not including zero (0.06, 95% CI 0.01, −0.07) such that males demonstrated a stronger link between illegitimate tasks and intrinsic motivation via perceptions of ERI (−0.16) than females (−0.10). See **Figure 2**.

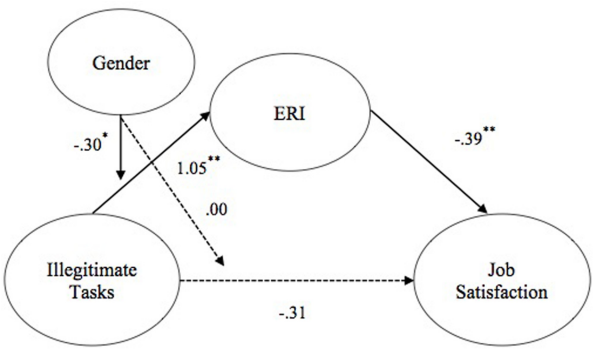

FIGURE 1 | Tested moderated mediation model for illegitimate tasks and job satisfaction. Solid paths represent significant links found. Dashed paths represent links that were hypothesized but non-significant. Parameters represent unstandardized beta coefficients, $^{*}p < 0.05$, $^{**}p < 0.01$.

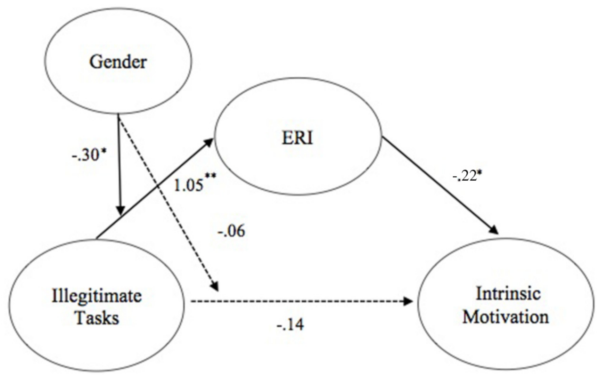

FIGURE 2 | Tested moderated mediation model for illegitimate tasks and intrinsic motivation. Solid paths represent significant links found. Dashed paths represent links that were hypothesized but non-significant. Parameters represent unstandardized beta coefficients, $^{*}p < 0.05$, $^{**}p < 0.01$.

DISCUSSION

The goal of this study was to broaden knowledge of how illegitimate tasks may negatively relate to job satisfaction and intrinsic motivation. Illegitimate tasks are thought to impact strain and well-being based on social threats to identity (Semmer et al., 2007, 2015). However, most research to date on illegitimate tasks has focused on psychological strain and negative behavioral outcomes (e.g., Semmer et al., 2010, 2015). Thus, in accordance with SOS theory and Warr's (1990) model of well-being, we aimed to show that perceptions of task illegitimacy may also diminish forms of work well-being – that is, job satisfaction and intrinsic motivation – that have been repeatedly shown to affect both personal and organizational-level functioning. Additionally, few studies have explored the mechanisms underlying basic illegitimate tasks-outcome associations. Thus, we also explored ERI as a possible mediator of these relationships, given clear theoretical links between perceived task illegitimacy and unfairness, and the likelihood of employees perceiving reciprocity deficits (van Vegchel et al., 2005) if tasks are perceived to be illegitimate. Finally, in accordance with gender role theory (Eagly, 1987), and extensive research on the role of gender in appraising, and coping with stress, as well as ongoing gender role norms in the workplace, we examined gender as a moderator of this mediated relationship.

Our results for hypothesis 1 suggest that illegitimate tasks are negatively related to job satisfaction and intrinsic motivation. This is consistent with SOS theory (Semmer et al., 2007), which suggests illegitimate tasks can create psychological damage; and with prior work demonstrating the importance of justice perceptions for employee motivation (Deci and Ryan, 2000; Colquitt et al., 2001; Zapata-Phelan et al., 2009). These results also expand our knowledge about the scope of illegitimate tasks, as they suggest that in addition to links with psychological strain and negative behavioral outcomes found in previous studies (e.g., Semmer et al., 2010, 2015), there are possible implications of perceived task illegitimacy for *positive* forms of work well-being, in accordance with Warr's (1990) model. If so, managers and job design consultants are advised to ensure that task assignments align with identity role norms about what can reasonably be expected from an employee in a given position (Semmer et al., 2007), or else employees may lose the meaningfulness of their job (Hackman and Oldham, 1975), fail to achieve their goals, or compromise their work role identity (Semmer et al., 2007).

Second, our results also support the plausibility that perceived ERI fully mediates the path between illegitimate tasks and both job satisfaction and intrinsic motivation. This finding is in line with past work that has suggested that inability to maintain a positive self-view or expending effort with little reward is problematic for well-being (Hackman and Oldham, 1975; Deci and Ryan, 2000). In addition, this finding supports the idea that employees may disengage from their role or lose drive to perform within professional roles if given tasks that undermine the appropriate role boundary. This may be damaging to organization when managers believe they have achieved an appropriate balance between effort demanded and reward afforded to employees and yet, if tasks are thought to be

illegitimate by employees, then they may perceive ERI, even if the overall workload appears to be commensurate with reward. Thus, our finding offers new context to previous knowledge of ERI, because it suggests that the *legitimacy* of tasks within the workload (e.g., the *effort*) must be considered in addition to the amount of work assigned. Otherwise, managers might erroneously presume that balance between effort and reward has been achieved, and may be unprepared for the consequences (e.g., Siegrist, 1996, 2002).

Finally, our findings illustrate that reactions to illegitimate tasks, while pervasive, may vary based on gender. Specifically, gender moderated the indirect relationship between illegitimate tasks and job satisfaction and intrinsic motivation through ERI such that males were, on average, more reactive to illegitimate tasks than females. These findings build upon previous research on gender differences in interpretation of stressors and coping with stressors (Day and Livingstone, 2003) as well as with the notions of gender role theory (Eagly, 1987) that socialized gender norms (e.g., females as more communal, and males as more agentic) are likely to influence these reactions.

Our findings regarding the role of gender in interpreting and dealing with illegitimate tasks raise several important points for consideration. For example, despite widespread movement toward gender equality at work, might the disadvantaged history of women and the continued existence of gender disparity issues promote a pressure that may be real -or perceived- for women to adhere to illegitimate tasks – more so than for men? If so, this may explain why women displayed weaker links between illegitimate tasks and outcomes. Perhaps they are expecting such treatment or are less threatened by such requests. Furthermore, to the extent that illegitimate tasks both directly, and indirectly through a mediating mechanism of ERI, negatively relate to job satisfaction and intrinsic motivation, the performance of women may suffer more greatly than men if they are more readily expected to (or prepared to) acquiesce to illegitimate tasks than their male counterparts. Clearly, more research is needed to understand better the effects of gender on the interpretation of, and adherence to illegitimate tasks. However, one possible implication is that critical progress toward gender equality at work might be being undermined by tolerance of this stressor. For example, if women's performance levels were to suffer more greatly, on average, than those of men, women's progress in organizational hierarchies are likely to be inhibited with perhaps lasting implications for their upward mobility. An even more ominous view is that this truncation of progress might not be viewed by an observer as gender-biased. In other words, this problem could be quite subtle and difficult for organizations to identify, especially because it is unlikely that objective performance measurements indicate willingness or readiness to absorb illegitimate tasks and how this may have cascading consequences for overall effectiveness.

It is also important to consider the negative implications of illegitimate tasks for male workers. That our findings show males to be more likely than females to react to illegitimate tasks has thus far been discussed as a negative for women. However, greater decrements to job satisfaction and intrinsic motivation are, on the basis of other established relationships in the literature, more likely to result in male workers' performance suffering than female workers. Consequently, males may be more likely to withdraw from their organization. An obvious concern with this possibility is that organizations may lose quality male employees who believe they are being asked to complete task assignment that they shouldn't be. However, in contrast to promoting greater levels of gender equality at work, this potential state of events may essentially lower the bar for women by reducing the satisfaction and intrinsic motivation of male workers such that performance may suffer and males may be more inclined to leave. Critically, this would give no credence to the ability of female employees to continue progressing in the manner they have been over recent decades. Clearly then, illegitimate tasks may have negative consequences for both genders, with harmful implications for not only the individuals themselves, but organizational- and societal-level functioning. We therefore invite and encourage future research on this subject, which may shed an entirely new light on respective gender roles in the workplace.

Limitations

We acknowledge several limitations of our study. First, the present study utilized a correlational research design, which constrains us from drawing conclusions about causality. Further, our analyses were cross-sectional, which limits inferences. Cross-sectional studies have been widely criticized in organizational literature for allowing reverse- or reciprocal-causation (e.g., Spector and Brannick, 1995; Spector, 2006). Moreover, cross-sectional design does not allow for the examination of whether repeated exposure to illegitimate tasks has an exacerbated or additive effect on ERI, job satisfaction, and intrinsic motivation. Replication of this study using a longitudinal or experimental design is necessary to clarify the directionality of these relationships, to fully support ERI as a mediator, and to explore the potential effect of time on these relationships. Third, the variables in this study were all assessed using self-report measurement, which raises the concern of whether common method bias could have impacted our results. According to Spector (2006), common method variance can be overstated, and study design should be based primarily on its purpose and the researcher's desired inference. However, future work may consider alternative sources for reports. For example, an experimental or quasi-experimental study of a sample of employees in a field with well-defined tasks could manipulate the legitimacy of assigned tasks. Similarly, balance between effort and reward could be manipulated (e.g., Siegrist et al., 2005).

Additionally, the present study examined a relatively limited set of outcomes. Future studies should expand on the present work by exploring additional outcomes outside of the realm of work well-being including behaviors, perceptions, and other attitudes. In particular, researchers should consider possible cross-domain effects if the stress resulting from illegitimate task assignments spills over into non-work domains. For example, Lyness and Erkovan (2016) recently addressed career constructs that have not always been well represented in the work-family literature. Examining the role of the role of illegitimate tasks across the work-family domain would be a timely next step in understanding this egregious stressor. Finally, while the

present study found support for gender as mediated moderator of the proposed relationships, it is possible that gender is merely a proxy for socially constructed differences in values, perceptions, personality characteristics, or behavioral tendencies. Future studies should examine specific attitudinal or behavioral characteristics, such as degree to which individuals display communal versus agentic self-view (e.g., Eagly et al., 2000), to determine whether such variables explain some or all of the variance accounted for by gender.

CONCLUSION

Consistent with SOS theory (Semmer et al., 2007), the current study suggests the assignment of illegitimate tasks may threaten one's job satisfaction and intrinsic motivation by creating the perception of an ERI. The present study also found that gender predicted the strength of the relationship between illegitimate tasks and outcomes such that men demonstrated stronger ties to negative outcomes than did women. As suggested by gender role theory (Eagly, 1987) and SOS theory (Semmer et al., 2007), illegitimate tasks should violate men's professional role and, additionally, may threaten their gender role as they signal lack of consideration, thought, and respect from others, which is inconsistent with an agentic self-view.

The present study contributes to the expanding literature on illegitimate tasks by adding to the construct's nomological network and exploring the processes by which illegitimate tasks may be negatively related to desirable employee attitudes and motivational states. This study found support for ERI as a mechanism that might explain this linkage. This work has also identified gender as a potentially important moderator of the relationships between illegitimate tasks and work-relevant outcomes: gender. This work was a first step into examining both why these tasks may relate to lower job satisfaction and intrinsic motivation and gender's role in the process.

AUTHOR CONTRIBUTIONS

RO: Co-wrote the manuscript draft and revised based on co-author comments. Put together materials for submission. EME: Generated initial idea, submitted IRB, collected and analyzed data, co-wrote manuscript. MJF: Generated initial idea, submitted IRB, collected and analyzed data, co-wrote manuscript.

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The Importance of Team Health Climate for Health-Related Outcomes of White-Collar Workers

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Occupational health researchers and practitioners have mainly focused on the individual and organizational levels, whereas the team level has been largely neglected. In this study, we define *team health climate* as employees' shared perceptions of the extent to which their team is concerned, cares, and communicates about health issues. Based on climate, signaling, and social exchange theories, we examined a multilevel model of team health climate and its relationships with five well-established health-related outcomes (i.e., subjective general health, psychosomatic complaints, mental health, work ability, and presenteeism). Results of multilevel analyses of data provided by 6,449 employees in 621 teams of a large organization showed that team health climate is positively related to subjective general health, mental health, and work ability, and negatively related to presenteeism, above and beyond the effects of team size, age, job tenure, job demands, job control, and employees' individual perceptions of health climate. Moreover, additional analyses showed that a positive team health climate buffered the negative relationship between employee age and work ability. Implications for future research on team health climate and suggestions for occupational health interventions in teams are discussed.

Keywords: organizational climate, health, presenteeism, teams, work ability

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INTRODUCTION

Based on theorizing on organizational climate (Schneider et al., 2013), signaling theory (Connelly et al., 2011), and social exchange theory (Blau, 1964), the goal of this study is to examine relationships between team health climate and important health-related outcomes of white-collar workers. While *psychological climate* is defined as employees' individual perceptions of their work environment (including policies, practices, and procedures), *team and organizational climates* refer to employees' shared perceptions of their work environment within these respective units (Schneider and Reichers, 1983; Glick, 1985). A large body of research has shown that specific psychological, team, and organizational climates are associated with relevant outcomes (James et al., 2008; Kuenzi and Schminke, 2009; Schneider et al., 2013). For instance, studies have demonstrated effects of team and organizational safety climates on safety knowledge, motivation, attitudes, and performance (Griffin and Neal, 2000; Zohar, 2000; Probst, 2004; Clarke, 2006; Dollard and Bakker, 2010).

Consistent with previous work on health climates in the occupational health psychology literature (Ribisl and Reischl, 1993; Basen-Engquist et al., 1998; Sonnentag and Pundt, 2013, 2016; Zweber et al., 2016), we define *team health climate* as employees' shared perceptions of the extent to which their team is concerned, cares, and communicates about health issues. In line with Morgeson and Hofmann (1999), we assume that team health climate emerges through a bottom-up process during which employee interactions form a collective construct at the team level that, in turn, impacts on health-related outcomes. We argue that team health climate is positively related to favorable health-related outcomes because employees are motivated to behave consistent with expectations and common practices in their teams (i.e., team climate; Ehrhart and Naumann, 2004; Schneider et al., 2013). Moreover, signaling theory (Ostroff and Bowen, 2000; Connelly et al., 2011) suggests that a positive team health climate signals to employees that their health is valued. Social exchange theory (Blau, 1964; Tetrick and Peiró, 2016) proposes that employees are more committed to maintaining and improving their health when they perceive that their health is valued by others.

Despite an increased interest among researchers and practitioners in understanding how psychosocial work characteristics impact on health-related outcomes (Sparks et al., 2001; Parker, 2014), so far very little empirical research on relationships between team health climate and relevant outcomes exists. This is surprising, given that organizational psychologists have early emphasized the potential importance of teams and health climate for employee health (Ilgen, 1990; Stokols, 1992; Sonnentag et al., 1994). The World Health Organization (1948) defines health as "a state of complete physical, mental, and social well-being and not merely the absence of disease and infirmity" (note that well-being is a general term that can refer to various positive conditions of individuals and groups).

It is important to study health-related outcomes and their predictors in the work context because health is an essential prerequisite for labor force participation and employee contributions in the workplace; poor health is associated with lower quality of life, lower productivity, and absenteeism at the individual level and immense costs due to productivity losses and health care expenditures at the organizational and societal levels (Danna and Griffin, 1999; Cartwright and Cooper, 2013). In the year 2014, on average, a white-collar worker in Germany was 12 days on sick leave, and there were 122 instances of sickness absence per 100 white-collar workers who are members of public health insurances – these statistics are very similar to the averages across different occupations (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, 2016). The most common reasons for sickness absences were musculoskeletal and mental health problems. The total costs of the inability to work due to sickness in Germany are estimated at 57 billion Euro based on average worker salary, and at 90 billion Euro based on lost productivity (i.e., workers' inability to create value through their work when they are on sick leave; Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, 2016).

As health-related outcomes, we investigate employees' general subjective health, psychosomatic complaints, mental health, work ability, and presenteeism in this study. These frequently investigated constructs broadly represent the domains of physical health (i.e., general subjective health and psychosomatic complaints; individuals typically think of their physical health when asked about their general health; Ware et al., 1996), mental health, and behavioral indicators of health (work ability and presenteeism; Ng and Feldman, 2013). Our research is important for individual employees, organizations, and society as a whole, as improving the health climate in teams might benefit employee health and, in turn, improve productivity and reduce absenteeism and health care costs.

Previous Research on Team Health Climate

A number of previous studies examined relationships between health climate perceptions and outcomes at the individual employee level. Using a sample of 203 employees from seven companies, an early study by Ribisl and Reischl (1993) found that health climate perceptions were negatively related to self-reported symptoms of physical ill-health (e.g., headache, poor appetite, dizziness), and positively related to a range of beneficial self-reported health behaviors (i.e., exercise, nutrition, and reduced smoking) and job attitudes (i.e., job satisfaction and low strain). A study by Basen-Engquist et al. (1998) investigated health climate perceptions of 6,867 employees from 40 worksites. In contrast to the study by Ribisl and Reischl (1993), these researchers reported that health climate perceptions aggregated to the worksite level did not significantly correlate with employee health behaviors such as healthy eating and smoking.

Furthermore, results by Ernsting et al. (2013) showed that health climate at baseline positively predicted affective commitment at follow-up: those who perceived a positive health climate showed higher levels of affective commitment 5 months later. Sonnentag and Pundt (2016) defined organizational health behavior climate as "employee perceptions of organizational efforts to promote health behavior" (p. 260). In three studies, these authors developed and validated scales to assess two dimensions of organizational health behavior climate (i.e., healthy eating, physical exercise). They showed that organizational health behavior climate was positively associated with healthy eating, exercise identity, and negatively associated with body mass index. Finally, Zweber et al. (2016) developed a three-dimensional scale (with foci on workgroup, supervisor, and organization) to assess workplace health climate from the perspective of employees. Using individual-level data, they found that the measure was positively related to employee health, and negatively related to job stress and fatigue.

Overall, previous research showed that perceptions of health climate are associated with health-related outcomes at the individual level. However, these findings are not conclusive regarding outcomes of health climate conceptualized at higher levels, because studies either did not assess health-related outcomes, or because the number of units at the team or organizational level – if examined at all – was rather small,

agreement among employees in health climate perceptions was not reported, or data were not analyzed using multilevel methods that simultaneously account for within- and between-unit variance in employees' health climate perceptions. Thus, it remains unknown whether a positive and shared team health climate is associated with more favorable health-related outcomes among employees.

Health-Related Outcomes

Before developing our hypotheses, in this section we define and explain the five health-related outcomes that we examined in relation to team health climate in the current study. We chose these health-related outcomes because (a) they have important implications for individuals, organizations, and society, (b) they are frequently investigated in the occupational health psychology literature, and (c) because they represent three important health domains, that is, physical health (i.e., general subjective health and psychosomatic complaint), mental health, and behavioral indicators of health (work ability and presenteeism; Ng and Feldman, 2013).

Subjective general health is an overall assessment of one's current health status (Kristensen et al., 2005). Research has shown that subjective general health is positively correlated with indicators of objective physical health, particularly symptom checklists and results of medical examinations based on strict protocols (Pinquart, 2001). Moreover, subjective general health has been found to negatively predict mortality; individuals with greater subjective general health tend to live longer (DeSalvo et al., 2006a).

Psychosomatic complaints involve employee perceptions of physical symptoms that may also have a psychological cause, such as headaches, back, neck, and shoulder pain, and concentration difficulties (Frese, 1985). Research has shown that psychosomatic complaints lead to increased absenteeism from work (De Boer et al., 2002).

Mental health is defined as a psychological syndrome composed of positive feelings and positive functioning in different life domains (Keyes, 2002). Employee mental health has been shown to be positively related to subjective and objective measures of job performance (Wright et al., 1993; Bond and Bunce, 2003; Zacher et al., 2012) and company productivity (Goetzel et al., 2004).

Work ability refers to employees' assessment of the extent to which they possess the physical and mental capabilities to meet their work demands (Ilmarinen et al., 1997; McGonagle et al., 2015). Research has demonstrated that work ability is positively associated with employees' retirement age (Sell, 2009), quality of life before and after retirement (Ilmarinen, 2009), and disability status (Alavinia et al., 2009).

Finally, *presenteeism* means that employees go to work despite feeling they should have taken sick leave due to their perceived health status (Aronsson et al., 2000). Presenteeism is associated with negative individual, organizational, and societal outcomes, such as deteriorating employee health over time and productivity losses (Johns, 2010), as well as high health care and insurance costs for employers (Goetzel et al., 2004).

Hypothesis Development

The organizational and team climate literature shows that specific workplace climates (e.g., safety climate) are most strongly related to relevant and specific employee outcomes (e.g., safety performance; Patterson et al., 2005; González-Romá et al., 2009; Schneider et al., 2013). In other words, predictive validity of climate measures is highest when the focus of the climate construct matches with the nature of the outcomes. Based on climate theory (Schneider et al., 2013), we therefore expect that team *health* climate is associated with five *health*-related outcomes. Specifically, we expect that team health climate is positively related to employees' subjective general health, mental health, and work ability, and negatively related to psychosomatic complaints and presenteeism, above and beyond employees' idiosyncratic perceptions of team health climate (i.e., psychological team health climate).

Climate involves "the shared perception of the way things are around here" (Reichers and Schneider, 1990, p. 22). Climate theory suggests that, due to social norms and expectations, employees are motivated to behave consistent with common practices in their team (Ehrhart and Naumann, 2004). Moreover, a positive team health climate indicates that knowledge, skills, and support for maintaining health and healthy behaviors exist in the team which, in turn, should enhance health communication and outcomes among team members (Sonnentag and Pundt, 2016).

Relationships between team health climate and health-related outcomes can be further explained by signaling theory (Ostroff and Bowen, 2000; Connelly et al., 2011) and social exchange theory (Blau, 1964; Tetrick and Peiró, 2016). According to signaling theory, a positive team health climate signals to employees that the topic of health is valued in their team and, accordingly, that employees are expected to take care of their own health and support others in this regard as well (Connelly et al., 2011). These expectations are likely to motivate employees to maintain and improve their health. Social exchange theory further suggests that employees who perceive that their health is valued by the team become more committed to their team and its goals and, therefore, invest increased effort to maintain and improve their health (Blau, 1964).

Overall, if a team is very concerned, cares, and communicates about health issues, and team members are expected to take care of their own health and support others in maintaining and improving their health, this should result in favorable health-related outcomes among employees (i.e., increased subjective general health, mental health, and work ability, and reduced psychosomatic complaints and presenteeism). Contrarily, if health is not a priority in the team and members are not expected by others in the team to take care of their own health and support others in this regard, this should result in less favorable health-related outcomes. Thus, based on climate theory (Schneider et al., 2013), signaling theory (Connelly et al., 2011), and social exchange theory (Blau, 1964), we propose that team health climate is a work-related resource (Hobfoll, 2011) that resides at the team level and benefits employees' health-related outcomes.

Accordingly, we examine a multilevel model of team health climate and its relationships with five well-established health-related outcomes (i.e., subjective general health, psychosomatic complaints, mental health, work ability, and presenteeism) and test the following hypotheses:

Hypothesis 1: Team health climate is positively related to subjective general health.
Hypothesis 2: Team health climate is positively related to mental health.
Hypothesis 3: Team health climate is positively related to and work ability.
Hypothesis 4: Team health climate is negatively related to psychosomatic complaints.
Hypothesis 5: Team health climate is negatively related to presenteeism.

MATERIALS AND METHODS

Participants and Procedure

Data for this study came from 6,449 white-collar workers working in 621 teams of a large statutory health insurance organization in Germany. Each participant could be unequivocally linked to one work team because each individualized online survey link was connected to a specific team code. All procedures performed in this study were in accordance with the ethical standards of the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Because this study was carried out in an occupational setting and approval was given by the work council (which, in the business context, is comparable to a university ethical committee) including a confidentially note, no university ethical approval was required.

Of the employees, 1.9% were under 20 years old, 24% were between 21 and 30 years, 21.3% were between 31 and 40 years, 34.4% were between 41 and 50 years, 17.4% were between 51 and 60 years, and 1% was older than 60 years. In terms of job tenure, 24.8% had worked for less than 5 years in the organization, 28.5% between 6 and 15 years, and 46.7 more than 15 years. The teams were distributed across the country and are responsible for tasks such as arrangements of ambulatory and hospital care, membership administration, marketing and sales, and customer relationships.

Employees' voluntary participation in an online questionnaire during work hours was encouraged by the organization's management via a letter in the intranet and by a note from the human resource department included with the pay slips. The questionnaire and scales were kept relatively short to reduce participant attrition and time investment. Based on requests of the organization's management, staff council, and department of data protection, gender of employees was not measured in the questionnaire.

At the time of the study, approximately 11,000 individuals worked for the organization and 8,070 of them completed at least one item in the online questionnaire (73%). We excluded responses from team leaders ($n = 680$), participants who could not be allocated to a specific team ($n = 470$), participants with missing data in the study variables ($n = 458$), and participants from teams with less than two members ($n = 13$). We excluded team leaders because they are not only part of the team they are leading, but also part of a leadership team at a higher organizational level, which could have resulted in biased responses to the team health climate items. The number of participants per team (i.e., team size) ranged from two to 31 employees ($M = 10.38$, $SD = 5.10$) and the average response rate at the team level was 72.44% (range from 40.54 to 100%).

Measures

Team Health Climate

We assessed team health climate with three items adapted from a short, reliable, and well-validated general organizational health climate scale developed by Sonnentag and Pundt (2013). We used the procedure outlined by Brislin (1970) to translate the items from English into German. Consistent with our definition of team health climate, the items reflect whether members of a team are concerned, care, and communicate about health: "The topic of health is present in our team meetings and other team events," "In our team, it is expected that one takes care of his/her health," and "In our team we exchange ideas about healthy living" (the original items by Sonnentag and Pundt, 2013, were "Here, one's attention is drawn to health issues during presentations and other events," "Here, most people expect that one takes care of one's health," and "Here one exchanges ideas about how to live healthy").

The items used a referent-shift approach in that the employees rated their team and not their own attitudes (Chan, 1998). Employees responded using a 4-point scale ranging from 1 (*disagree*) to 4 (*agree*). To compute psychological team health climate at the individual level (i.e., individuals' perceptions of the health climate in their team), we averaged scores across items for each employee. Cronbach's alpha for this scale was 0.71 in the current study. For our measure of team health climate at the team level, we aggregated employee responses to the team level. This was justified by a significant intraclass correlation coefficient (ICC[1]) of 0.20 ($p < 0.001$), indicating that 20% of the total variance resided at the between-group level, as well as an ICC(2) of 0.73, indicating satisfactory reliability of the team means (Bliese, 2000).

At the time this study was conducted, recently published short scales to measure team health climate were not yet available (Sonnentag and Pundt, 2016; Zweber et al., 2016), and existing scales did not explicitly focus on teams (e.g., they also include questions about supervisors; Basen-Engquist et al., 1998). Therefore, we conducted a pilot study using Amazon's Mechanical Turk platform to gather validity evidence for our team health climate scale. We asked 150 workers to respond to our three items as well as five items developed by Basen-Engquist et al. (1998) to measure health climate (i.e., "At my workplace, sometimes we talk with each other about improving our health and preventing disease," "Most employees here are very health conscious," "Around here they look at how well you take care of your health when they consider you for

promotion," "My supervisor encourages me to make changes to improve my health," and "Supervisors always enforce health-related rules (smoking policies, requirements about medical examinations, etc.)." The correlation was positive and strong, $r = 0.78$ ($p < 0.001$), providing evidence for the convergent validity of our three-item team health climate measure.

Subjective General Health

We measured subjective general health with a single item ("How would you describe your current health?") adapted from Kristensen et al. (2005). Employees provided their answer on a 5-point scale ranging from 1 (*poor*) to 5 (*very good*). The original item is "Would you say your health is excellent, very good, fair, or poor?" We translated and back-translated the item from English into German to ensure similarity with the original wording (Brislin, 1970). Research has demonstrated good reliability and validity of single-item subjective general health measures (Lundberg and Manderbacka, 1996); for instance, the item has been found to negatively predict mortality (DeSalvo et al., 2006a,b).

Psychosomatic Complaints

We measured psychosomatic complaints with a German short version of the complaint list developed by Fahrenberg (1975), which is a frequently used scale in German-speaking countries (e.g., Frese, 1999; Zacher and Schulz, 2015). It is similar to a well-established English-language scale of psychosomatic complaints (Caplan et al., 1975). The six items describe relevant symptoms for a sample of white-collar workers ("How often do you experience the following strains during or immediately after work?"): headaches, backaches, tiredness, neck pain, shoulder pain, and difficulties concentrating. The items were answered on a 5-point scale ranging from 1 (*never*) to 5 (*almost daily*). In the current study, Cronbach's alpha for the scale was 0.81.

Mental Health

We assessed mental health with two screening items in German language that are frequently used in clinical assessments and that have been well-validated in previous research (Kroenke et al., 2003; DGPPN et al., 2009). The items are "In the past 4 weeks, did you often feel down, depressed or hopeless?" and "In the past 4 week, did you have little interest or pleasure in doing things that you usually like to do?" Employees responded with either *no* (1) or *yes* (2). Due to the ordinal nature of both items, we computed the Spearman rank-order correlation coefficient ($r_s = 0.67$) as an estimate of reliability. As this estimate was based on two items only, we deemed the coefficient to indicate acceptable reliability.

Work Ability

We assessed employees' perceptions of their work ability with two items from the German version of the work ability index (Tuomi et al., 1997; WAI-Netzwerk, 2015): "How do you rate your current work ability with respect to the physical demands of your work?" and "How do you rate your current work ability with respect to the mental demands of your work?" Previous research has demonstrated good reliability and convergent validity of this two-item measure (Ahlstrom et al., 2010). The response format was a 5-point scale ranging from 1 (*very poor*) to 5 (*very good*). We averaged the items to form a single work ability score (note that additional analyses for each item yielded very similar results to the ones reported in the "Results" section). In the current study, Cronbach's alpha was 0.71, which is satisfactory for a two-item measure.

Presenteeism

We measured presenteeism with a single item adapted from Aronsson et al. (2000) and Demerouti et al. (2009): "Did you go to work in the past 12 months, even though you were sick or felt sick?" Employees responded on a 4-point scale ranging from 1 (*no, never*) to 4 (*yes, more than five times*). The original item by Aronsson et al. (2000) is "Has it happened over the previous 12 months that you have gone to work despite feeling that you really should have taken sick leave due to your state of health?" We used the procedure outlined by Brislin (1970) to translate the item from English into German. Previous research has successfully utilized this single-item measure, showing for instance that job demands predicted presenteeism ratings (Demerouti et al., 2009).

Demographic and control variables

Based on requests of the organization's management, staff council, and department of data protection, gender of employees was not measured in the questionnaire, and age and job tenure were assessed using several bands. Specifically, age was coded 1 = *20 years or younger*, 2 = *21–30 years*, 3 = *31–40 years*, 4 = *41–50 years*, 5 = *51–60 years*, and 6 = *older than 60 years*, and job tenure was coded 1 = *5 years or less*, 2 = *6–15 years*, and 3 = *16 years or more*. We controlled for age and job tenure, because research suggests that these time-related constructs are associated with health-related outcomes (Maertens et al., 2012; Stephan et al., 2012; Ng and Feldman, 2013). We controlled for number of participants from each team as a proxy for team size, because some research suggests that team size is negatively related to positive team climate due to lower average individual participation in larger teams (Colquitt et al., 2002).

Moreover, we measured and controlled for job demands (i.e., perceived stressors in the work environment) and job control (i.e., the perceived amount of autonomy and decision latitude an employee has with regard to work responsibilities). The job demands-control model (Karasek, 1979) and empirical research on this model suggest that these job characteristics are related to health-related outcomes (van der Doef and Maes, 1999; de Lange et al., 2003). Specifically, job demands should relate negatively to favorable health-related outcomes, whereas job control should relate positively to favorable health-related outcomes.

Job demands were measured with a reliable and well-validated German version of the five-item effort scale from the effort-reward imbalance questionnaire (Pfaff et al., 2004; Siegrist et al., 2004). The effort scale is a suitable indicator of job demands, as noted by Siegrist et al. (2004): "Effort is measured by five or six items that refer to demanding aspects of the work environment (three items measuring quantitative load, one item measuring qualitative load, one item measuring increase in total load over time)" (p. 1486). An example item is "I have constant time pressure due to a heavy work load." We did not include the

sixth item measuring physical load because Siegrist et al. (2004) suggested that ". . .the five-item version excluding physical load has been found to be psychometrically appropriate in samples characterized predominantly by white-collar jobs" (pp. 1486–1487). The 5-point response scale ranged from 1 (*no – does not apply*) to 5 (*yes – does apply and I feel very distressed about this*). In the current study, Cronbach's alpha for the scale was 0.77.

Job control was measured with four items from a reliable and well-validated German-language job control scale that was developed to test Karasek's (1979) job demands-control model (Richter et al., 2000). Two example items are "I can independently plan and schedule my work tasks" and "I can participate in decisions of my supervisor." The 5-point response scale ranged from 1 (*disagree*) to 5 (*strongly agree*). In the current study, Cronbach's alpha for the scale was 0.60, which is somewhat lower than established cut-off values (0.70) and reliability estimates reported in previous validation studies (e.g., 0.73–0.75; Pfaff et al., 2004). However, we deemed a reliability estimate of 0.60 acceptable for a control variable (i.e., not focal construct) with only four relatively heterogeneous items (cf. Gosling et al., 2003).

Finally, we note that the pattern of results was very similar when age, job demands, and job control were not included as control variables in the analyses.

Statistical Analyses

As our data had a nested structure (i.e., individual employee reports nested within teams), we conducted multilevel modeling with the hierarchical linear modeling (HLM) software to analyze the data (Raudenbush and Bryk, 2002). The employee-level predictors (i.e., age, job tenure, job demands, job control, psychological team health climate) were centered at the group (or team) mean, and the team-level predictors (i.e., team health climate, team size) were centered at the grand (or sample) mean. These centering procedures allowed for unconflated multilevel modeling, which involves controlling for the within-team effects of the aggregated between-team construct (Preacher et al., 2011; Spell et al., 2014). A series of null models (i.e., models without predictors at the employee and team levels) in HLM showed that between 6 and 11% of the variance in our health-related outcomes resided at the team level (**Table 1**). These percentages represent the maximum share of the variance in outcomes that could potentially be explained by employees' shared perceptions of team health climate.

To evaluate the factor structure of our multi-item measures (i.e., psychological team health climate, psychosomatic complaints, mental health, work ability, job demands, and job control) and to examine the possibility of common method variance, we conducted confirmatory factor analyses using MPlus version 7 (Muthén and Muthén, 2012). For the two measures with only two items each (i.e., mental health and work ability), factor loadings were constrained to be equal for the purpose of allow model identification. Results showed that a model with six factors fitted the data adequately ($\chi^2 = 7115.340$, $df = 194$, $p < 0.001$; RMSEA = 0.074; CFI = 0.853; TLI = 0.826; SRMR = 0.078). In contrast, a model with a single factor fitted the data significantly worse ($\chi^2 = 23818.867$, $df = 209$, $p < 0.001$; RMSEA = 0.132; CFI = 0.500; TLI = 0.448; SRMR = 0.105; $\Delta\chi^2 = 16703.527$, $df = 15$, $p < 0.001$). These findings suggest that our multi-item measures are distinct and that it is unlikely that common method bias had an influence on our findings.

RESULTS

Table 1 shows the descriptive statistics and employee-level correlations of the study variables (due to the large sample size, the vast majority of correlations are significant at $p < 0.001$). According to Cohen (1988), a correlation coefficient of 0.10 is small, a coefficient of 0.30 is moderate, and a coefficient of 0.50 is large. Accordingly, psychological team health climate was very weakly associated with psychosomatic complaints ($r = -0.09$) and presenteeism ($r = -0.08$), and weakly associated with subjective general health ($r = 0.11$), mental health ($r = 0.11$), work ability ($r = 0.15$), job demands ($r = -0.17$), and job control ($r = 0.18$). Age was very weakly associated with psychological team health climate ($r = -0.05$), mental health ($r = -0.08$), and presenteeism ($r = 0.05$), weakly associated with psychosomatic complaints ($r = 0.10$), subjective general health ($r = -0.24$), and job demands ($r = 0.24$), moderately associated with work ability ($r = -0.30$), and strongly associated with job tenure ($r = 0.67$). The correlations of job tenure with the other study variables were similar. The health-related outcomes were moderately to strongly intercorrelated (see **Table 1**).

Table 2 shows the results of the multilevel analyses. In terms of effect size, Cohen (1988) suggested that traditional R^2 values of 0.02, 0.13, and 0.26 can be considered small, medium, and large, respectively. In multilevel analyses, only pseudo R^2 values can be computed, which involve the reduction in within- and between-person level variance components (LaHuis et al., 2014). The pseudo R^2 values in **Table 2** indicate that the within- and between-team predictor variables explained 7% of the variance in both mental health and presenteeism, as well as 10% in both subjective general health and psychosomatic complaints. These pseudo R^2 values correspond to small effects sizes. Predictors further explained 23% of the variance in work ability, which indicates a relatively large effect size.

At the employee level, psychological team health climate significantly predicted all five health-related outcomes in the expected direction, after controlling for age, job tenure, as well as job demands and job control. Specifically, psychological team health climate positively predicted subjective general health ($\gamma = 0.07$, $p = 0.001$), mental health ($\gamma = 0.02$, $p = 0.014$), and work ability ($\gamma = 0.06$, $p < 0.001$), and negatively predicted psychosomatic complaints ($\gamma = -0.05$, $p = 0.003$) and presenteeism ($\gamma = -0.04$, $p = 0.033$).

Table 2 further shows that, at the individual level, age negatively predicted subjective general health ($\gamma = -0.13$, $p < 0.001$) and work ability ($\gamma = -0.13$, $p < 0.001$), and positively predicted psychosomatic complaints ($\gamma = 0.03$, $p = 0.030$). In contrast, age did not significantly predict mental health ($\gamma = -0.01$, $p = 0.297$) and presenteeism ($\gamma = -0.02$, $p = 0.092$). Job tenure negatively predicted subjective general health ($\gamma = -0.07$, $p < 0.001$) and work ability ($\gamma = -0.05$, $p < 0.001$). Job tenure did not significantly predict psychosomatic

TABLE 1 | Descriptive statistics and correlations of variables.

Variable	*M*	*SD*	ICC[e]	1	2	3	4	5	6	7	8	9	10	11
1. (Psychological) Team health climate[a]	2.30	0.68	0.20	(0.71)	0.09*									
2. Team size[b]	10.38	5.10	–	–	–									
3. Subjective general health	3.33	0.94	0.07	0.11***	–	–								
4. Psychosomatic complaints	2.94	0.89	0.08	−0.09***	–	−0.53***	(0.81)							
5. Mental health	1.63	0.44	0.07	0.11***	–	0.47***	−0.40***	(0.67)						
6. Work ability	3.78	0.78	0.11	0.15***	–	0.64***	−0.56***	0.53***	(0.71)					
7. Presenteeism	2.83	0.87	0.06	−0.08***	–	−0.42***	0.44***	−0.33***	−0.41***	–				
8. Age[c]	3.44	1.12	–	−0.05***	–	−0.24***	0.10***	−0.08***	−0.30***	0.05***	–			
9. Job tenure[d]	2.22	0.82	–	−0.06***	–	−0.24***	0.13***	−0.09***	−0.29***	0.09***	0.67***	–		
10. Job demands	2.37	0.81	–	−0.17***	–	−0.30***	0.34***	−0.31***	−0.47***	0.28***	0.24***	0.30***	(0.77)	
11. Job control	3.02	0.53	–	0.18***	–	0.18***	−0.18***	0.17***	0.24***	−0.12***	0.01	0.01	0.03*	(0.60)

N = 6,449 workers nested in 621 teams. The correlations below the diagonal represent relationships at the individual level (N = 6,449 workers); the correlation above the diagonal represents a relationship at the team level (N = 621 teams). [a]*Psychological team health climate refers to individual employees' perceptions of the health climate in their teams (we aggregated psychological team health climate to create our measure of team health climate at the team level, see also* ***Table 2****).* [b]*As team size is a team-level variable, only the correlation with team health climate is reported (above the diagonal).* [c]*Age was coded 1 = 20 years or younger, 2 = 21–30 years, 3 = 31–40 years, 4 = 41–50 years, 5 = 51–60 years, and 6 = older than 60 years.* [d]*Job tenure was coded 1 = 5 years or less, 2 = 6–15 years, and 3 = 16 years or more.* [e]*The intraclass correlation coefficient (ICC) is calculated by dividing the between-team variance component (τ_{00}) by the sum of τ_{00} and the within-team variance component (σ^2), and indicates the percentage of between-team variance observed for the variable. Reliability estimates (Cronbach's α, except for the reliability estimate for mental health, which is a Spearman's rank-order correlation coefficient), where available, are shown in parentheses on the diagonal. ***p < 0.001; *p < 0.05.*

complaints ($\gamma = -0.01$, $p = 0.488$), mental health ($\gamma = 0.01$, $p = 0.501$), and presenteeism ($\gamma = 0.01$, $p = 0.453$). Job demands negatively predicted subjective general health ($\gamma = -0.31$, $p < 0.001$), mental health ($\gamma = -0.17$, $p < 0.001$), and work ability ($\gamma = -0.40$, $p < 0.001$), and positively predicted psychosomatic complaints ($\gamma = 0.40$, $p < 0.001$) and presenteeism ($\gamma = 0.33$, $p < 0.001$). In contrast, job control positively predicted subjective general health ($\gamma = 0.24$, $p < 0.001$), mental health ($\gamma = 0.13$, $p < 0.001$), and work ability ($\gamma = 0.31$, $p < 0.001$), and negatively predicted psychosomatic complaints ($\gamma = -0.21$, $p < 0.001$) and presenteeism ($\gamma = -0.11$, $p < 0.001$). As a cross-level predictor, team size was significantly associated with psychosomatic complaints ($\gamma = 0.01$, $p < 0.001$) and presenteeism ($\gamma = 0.01$, $p < 0.001$), but not significantly associated with subjective general health ($\gamma = -0.00$, $p = 0.111$), mental health ($\gamma = -0.00$, $p = 0.952$), and work ability ($\gamma = -0.00$, $p = 0.134$).

According to our hypotheses, team health climate positively predicts subjective general health (Hypothesis 1), mental health (Hypothesis 2), and work ability (Hypothesis 3), and negatively predicts psychosomatic complaints (Hypothesis 4) and presenteeism (Hypothesis 5), above and beyond the effects of team size, team members' idiosyncratic perceptions of health climate, and the other individual-level control variables. The results in **Table 2** show that Hypotheses 1, 2, 3, and 5 were supported, whereas Hypothesis 4 was not supported. Specifically, team health climate positively predicted subjective general health ($\gamma = 0.12$, $p = 0.006$), mental health ($\gamma = 0.07$, $p = 0.001$), and work ability ($\gamma = 0.16$, $p < 0.001$), and negatively predicted presenteeism ($\gamma = -0.10$, $p = 0.007$). In contrast, team health climate did not significantly predict psychosomatic complaints above and beyond the control variables ($\gamma = -0.04$, $p = 0.300$).

Additional Analyses

We conducted a series of additional analyses in which not only the main effects of team health climate, but also the cross-level moderating effects of team health climate on the relationships between employee age- and health-related outcomes were tested. Results showed that only the employee-level relationship between age and work ability was moderated by team health climate (interaction effect: $\gamma = 0.07$, $SE = 0.02$, $t = 3.01$, $p = 0.003$). Simple slope analyses showed that the relationship was stronger negative for employees in teams with a less positive team health climate (-1 *SD*: $\gamma = -0.16$, $SE = 0.01$, $t = -11.01$, $p < 0.001$) compared to employees in teams with a more positive team health climate ($+1$ *SD*; $\gamma = -0.10$, $SE = 0.01$, $t = -7.61$, $p < 0.001$). This cross-level interaction effect is shown in **Figure 1**. The finding suggests that a positive team health climate buffers the negative relationship between employee age and work ability, but it does not seem to impact on the relationships between age and the other health-related outcomes.

DISCUSSION

Maintaining and improving individual employee health is not only important with regard to employees' quality of life, but also

TABLE 2 | Results of hierarchical linear modeling analyses predicting health-related outcomes.

	Subjective general health				Psychosomatic complaints				Mental health				Work ability				Presenteeism			
Effect	*γ*	***SE***	***t***	***p***	*γ*	***SE***	***t***	***p***	*γ*	***SE***	***t***	***p***	*γ*	***SE***	***t***	***p***	*γ*	***SE***	***t***	***p***
Intercept	3.34	0.02	206.77	< 0.001	2.91	0.02	186.48	< 0.001	1.63	0.01	219.08	< 0.001	3.79	0.01	264.15	< 0.001	2.81	0.01	198.09	< 0.001
Employee-level predictors																				
Age	−0.13	0.01	−8.86	< 0.001	0.03	0.01	2.17	0.030	−0.01	0.01	−1.04	0.297	−0.13	0.01	−12.08	< 0.001	−0.02	0.01	−1.68	0.092
Job tenure	−0.07	0.02	−3.62	< 0.001	−0.01	0.02	−0.69	0.488	0.01	0.01	0.67	0.501	−0.05	0.01	−3.27	0.001	0.01	0.02	0.75	0.453
Job demands	−0.31	0.02	−18.14	< 0.001	0.40	0.02	24.88	< 0.001	−0.17	0.01	21.05	< 0.001	−0.40	0.01	−32.02	< 0.001	0.33	0.02	20.48	< 0.001
Job control	0.24	0.02	9.94	< 0.001	−0.21	0.02	−9.42	< 0.001	0.13	0.01	11.16	< 0.001	0.31	0.02	17.61	< 0.001	−0.11	0.02	−5.01	< 0.001
Psychological team health climate[a]	0.07	0.02	3.45	0.001	−0.05	0.02	−2.93	0.003	0.02	0.01	2.45	0.014	0.06	0.01	4.14	< 0.001	−0.04	0.02	−2.13	0.033
Team-level predictors																				
Team size	−0.00	0.00	−1.59	0.111	0.01	0.00	3.89	< 0.001	−0.00	0.00	−0.06	0.952	−0.00	0.00	−1.50	0.134	0.01	0.00	3.42	0.001
Team health climate	0.12	0.04	2.76	0.006	−0.04	0.04	−1.04	0.300	0.07	0.02	3.43	0.001	0.16	0.04	4.32	< 0.001	−0.10	0.04	−2.73	0.007
Null model τ_{00}		0.06				0.06				0.01				0.07				0.04		
Null model σ^2		0.82				0.73				0.18				0.54				0.71		
Predictor model τ_{00}		0.07				0.07				0.01				0.08				0.04		
Predictor model σ^2		0.72				0.64				0.16				0.39				0.65		
Model Pseudo R^2		0.10				0.10				0.07				0.23				0.07		

N = 6,449 employees nested in 621 teams. [a]*Psychological team health climate refers to individual employees' perceptions of the health climate in their teams (we aggregated psychological team health climate to create our measure of team health climate at the team level). Age, job tenure, and psychological team health climate were group mean centered, and team health climate was grand mean centered. Unstandardized coefficients (γ) with standard errors (SE) are shown.* τ_{00} *= between-person variance;* σ^2 *= within-person variance. Model Pseudo* R^2 *= ([null model* τ_{00} *+ null model* σ^2*] - [predictor model* τ_{00} *+ predictor model* σ^2*])/(null model* τ_{00} *+ null model* σ^2*).*

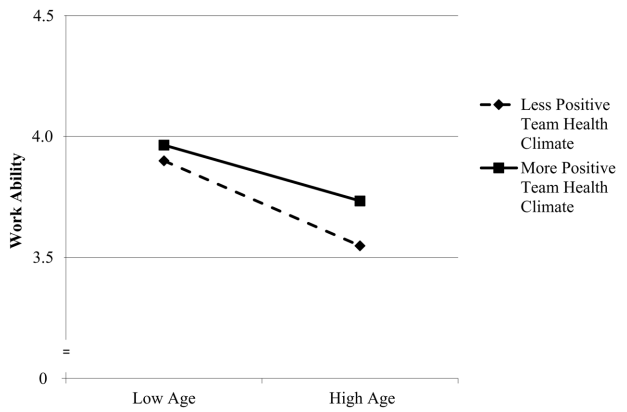

FIGURE 1 | Relationship between age and work ability moderated by team health climate.

with regard to increased productivity and reduced costs at the organizational and societal levels (Danna and Griffin, 1999). On average, a German white-collar worker was 12 days on sickness leave in the year 2014, which corresponds to costs of Euro 1,519 per worker per year estimated based on average worker salary (2% of Germany's gross domestic product) and of Euro 2,378 per worker per year estimated based on lost productivity (3.1% of gross domestic product; Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, 2016). Even though organizational psychologists suggested already more than two decades ago that workplace climate predicts health-related outcomes (Ilgen, 1990; Stokols, 1992), very little empirical research has so far been conducted to demonstrate this link. The few studies on health climate that exist are limited due to a small number of higher level units (i.e., teams, worksites, or organizations), lack of evidence for within-unit agreement of employees in their health climate perceptions, the absence of multilevel analyses of hierarchically structured data, or the non-assessment of relevant health-related outcomes (Ribisl and Reischl, 1993; Basen-Engquist et al., 1998; Ernsting et al., 2013; Sonnentag and Pundt, 2013, 2016; Zweber et al., 2016).

The goal of this study, therefore, was to contribute to this research domain by examining the relationships between team health climate and health-related outcomes using a large sample of 6,449 employees in 621 teams. We hypothesized and found that team health climate as a collective team property was positively related to employees' subjective general health, mental health, and work ability, and negatively related to presenteeism, above and beyond the effects of team size, age, tenure, job demands, job control, and individual employees' individual perceptions of team health climate. Thus, our findings are consistent with assumptions based on climate theory (Schneider et al., 2013), signaling theory (Connelly et al., 2011), and social exchange theory (Blau, 1964), as well as previous studies suggest that health climate is a contextual resource that facilitates health-related outcomes among employees.

Contrary to our expectation, we did not find a significant relationship between team health climate and psychosomatic complaints in this study. A possible explanation for this finding may be that the causes that lead to the development of rather objective (and possibly more strongly genetically determined) physical symptoms such as headaches, backaches, neck and shoulder pain, and tiredness are less likely to be influenced by environmental factors such as team health climate, and more likely to be influenced by idiosyncratic medical conditions (Watson and Pennebaker, 1991). In contrast, more subjective and behavioral outcomes such as subjective general health, mental health, work ability, and presenteeism may be more susceptible to the influence of the team environment and team health climate in particular.

Interestingly, psychological team health climate was significantly associated with all five health-related outcomes. Due to the cross-sectional design of our study, it remains unclear, however, whether individual employees' perceptions of their team health climate influence outcomes or, alternatively, whether employees attribute their health-related outcomes, at least in part, to their team environment. In a similar vein, it may be possible that the health-related outcomes of employees within a team influenced team health climate in a bottom-up manner, and not vice versa, as we assumed, in a top-down manner.

Employee age and job tenure were negatively associated with subjective general health and work ability, and age was positively associated with psychosomatic complaints. These findings contradict results of a recent meta-analysis on age and health by Ng and Feldman (2013). These authors found that age was unrelated to subjective general health and psychosomatic complaints; work ability was not included in the meta-analysis but longitudinal research has shown that work ability declines with age (Ilmarinen et al., 1997). It is important to point out here that there were only few older employees represented in Ng and Feldman's (2013) meta-analysis, with the oldest employees being 58 years old, and thus range restriction may have attenuated the relationships between age and health outcomes. In support of this assumption, and consistent with our current findings, Stephan et al. (2012) showed that age was negatively related to subjective general health when older adults are included in the sample.

Finally, additional analyses showed that a positive team health climate weakened the negative relationship between age and work ability, whereas team health climate did not impact on the other relationships between age- and health-related outcomes. Thus, older employees appear to benefit more from a positive team health climate than younger employees in terms of work ability. Interestingly, of all outcomes in this study, work ability had the strongest negative relationship with employee age, and also the strongest relationship with team health climate. It may be possible that team health climate is particularly important for older employees' work ability because the team context may offer opportunities for the use of compensation strategies (e.g., asking others for help) when employees' capabilities do not mesh well with their physical and mental job demands (Weigl et al., 2013). More broadly, the interactive effect of age and team health climate on work ability suggests that team health climate may be a contextual resource for successful aging in the work context (Zacher, 2015).

Strengths, Limitations, and Future Research

This study has several strengths and limitations. The large sample and multilevel design constitute clear strengths, as does the assessment of a range of health-related outcomes that fall within the broad domains of physical and mental health as well as behavioral indicators of health. However, the study is also limited in that the cross-sectional, correlational design does not allow inferences about causality. Future research should therefore examine the effects of team health climate on changes in health-related outcomes over several months or years, or conduct quasi-experimental intervention studies or randomized control trials in which team health climate is manipulated (cf. Basen-Engquist et al., 1998). Also, the data we collected for this study did not allow us to differentiate different work areas and to compare them, which might be worthwhile to do in future research.

Second, all data collected in this study was self-reported by employees using an online questionnaire. Thus, it may be possible that our findings were biased by common method variance and socially desirable responding. By conducting confirmatory factor analyses and by aggregating individual employees' ratings of health climate to the team level and by using multilevel analyses to regress individual employee outcomes on team health climate while controlling for psychological team health climate, we were able to partially address concerns about common method bias. However, future studies should attempt to collect health-related outcomes from multiple sources, including supervisors and peers, and by obtaining objective employee outcomes such as sickness absences or medical diagnoses. We attempted to reduce socially desirable responding by ensuring complete anonymity and confidentiality to participants. Inspection of the scale means and standard deviations suggested that ratings were not attenuated or inflated; however, we cannot complete rule out the possibility that participants' responses were somehow biased.

A third potential limitation concerns the length of the measures used in this study. Due to time constraints, we had to use short and rather global measures. We used a three-item measure of general team health climate that was adapted from previous research (Basen-Engquist et al., 1998; Sonnentag and Pundt, 2013) and had acceptable reliability and aggregation statistics in this study. Moreover, we provided evidence for the convergent validity of our measure by showing a strong positive relationship with a previously used general health climate scale (Basen-Engquist et al., 1998). However, future research could assess additional, more specific dimensions of team health climate, for instance, supervisor and coworker support for employee health (Ribisl and Reischl, 1993; Zweber et al., 2016), smoking norms (Basen-Engquist et al., 1998), and eating and exercise climates (Sonnentag and Pundt, 2016). While we expected that general team health climate would predict relatively broad health-related outcomes, it may be that these more specific health climate dimensions better predict specific employee health behaviors and outcomes.

Fourth, the use of single-item measures of subjective general health and presenteeism in the current study may be criticized, as such measures do not allow estimating internal consistency reliability. However, subjective general health and presenteeism were moderately correlated with the other health-related outcomes in the present study, and previous research has demonstrated their reliability and validity (Lundberg and Manderbacka, 1996; Aronsson et al., 2000; Pinquart, 2001; DeSalvo et al., 2006b; Demerouti et al., 2009). Moreover, researchers have suggested that relatively narrow and unambiguous constructs such as general health, presenteeism, and mental health can be assessed with a single item (Wanous et al., 1997; Fisher et al., 2016). Nevertheless, future studies in which employees have more time available to complete surveys should use longer scales which allow estimating internal consistency reliability and which may represent multiple dimensions of a construct. Similarly, the reliability estimate for the job control scale used in this study was somewhat below the conventional cut-off of 0.70. We recommend that researchers use more homogeneous short scales to measure job control (e.g., Morgeson and Humphrey, 2006).

Finally, participants in this study came from a single organization in the health insurance industry. It may be argued that health is a priority for all teams in a health insurance company. However, health-related topics are not necessarily part of meeting discussions in this company. Instead, team members discuss backlogs, service levels, and efficiency issues (similar to a call center). Moreover, our findings suggested that teams within the organization differed significantly in their team health climate, despite a shared organizational level human resource management (indeed, it constitutes a strength of this study that these background variables were held constant). Nevertheless, we acknowledge that it may not be possible to readily generalize the findings of our study with white-collar workers to blue-collar workers in industries such as construction and manufacturing. Future research should therefore collect data on team health climate from more diverse occupational samples to support the external validity of the results.

Theoretical and Practical Implications

Our findings have a number of implications for future theory development and occupational health management practice. Researchers could develop a conceptual framework, based on the broader organizational climate literature (Schneider et al., 2013), that outlines the company-, team-, and employee-level antecedents and consequences of team health climate. For instance, a positive team health climate may be easier to establish in certain industries (e.g., health care, food) than in others (e.g., construction, entertainment). Moreover, employee attitudes and behaviors may be more difficult to change through organizational interventions in certain industries, thus more individual-based interventions may be needed (e.g., Ernsting et al., 2013; Lippke et al., 2015). The framework should also distinguish between more immediate consequences (or mediators of the effects) of team health climate (e.g., behavior and acute health-related outcomes such as irritation) and more distal outcomes (e.g., chronic health outcomes such as burnout). This conceptual framework could also integrate ideas from the literature on personal and contextual resources (Hobfoll, 2001), job demands and resources (Demerouti et al., 2001), dynamic person-team fit

(Zacher et al., 2014), as well as goal selection, optimization, and compensation mechanisms that enhance favorable health-related outcomes (Müller et al., 2013; Weigl et al., 2013).

The pseudo R^2s obtained in this study suggested that psychological and shared team health climates, together with the control variables, explained only between 7 and 23% of the total variance in the health-related outcomes. An explanation for these results is that team health climate constitutes a rather distal predictor and only one of many factors that may impact on health-related outcomes. For instance, individual-level factors such as genetics and personality dispositions, as well as more proximal situational factors such as leadership behavior also influence health-related outcomes (Watson and Pennebaker, 1991; Montano et al., 2016). Nevertheless, it is possible that team health climate has stronger effects on some teams and among certain groups of employees than others. Thus, future theorizing should also consider potential team- and employee-level moderators of the effects of team health climate. In this study, we found that team health climate had particularly positive effects on older employees' work ability. While this finding is consistent with conservation of resources theory applied to age-related resource losses (Hobfoll and Wells, 1998), it remains a question for future research why team health climate did not moderate the relationships between employee age and the other health-related outcomes in this study (many of which were also related to age).

In terms of practical implications, team health climate needs to be taken into account in health interventions because our results suggest that employees' shared perceptions of the extent to which their team is concerned, cares, and communicates about health issues are positively related to subjective general health, mental health, and work ability, and negatively related to presenteeism. These employee outcomes have been shown to be associated with significant long-term consequences such as individuals' quality of life, mortality, onset of retirement, absenteeism, and company productivity and costs (De Boer et al., 2002; Goetzel et al., 2004; DeSalvo et al., 2006a; Sell, 2009). As absenteeism, productivity loss, and increased health care and insurance costs due to ill-health are very costly for organizations and society (Danna and Griffin, 1999), improving team health climate is an important endeavor.

Human resource managers and supervisor could encourage team members to discuss health issues and provide teams with health-related information and practical support (e.g., physical and mental health workshops, employee assistance programs). Moreover, managers and supervisors can gain a more differentiated picture of employee perceptions of how the team supports positive health outcomes and identify areas where improvements are needed. Recent research suggests that supervisors and team leaders may be important role models in terms of health-related outcomes (Koch and Binnewies, 2015). The finding of a moderating effect of team health climate on the negative relationship between age and work ability has implication for managing the aging workforce. Practitioners interested in maintaining older employees' work ability, as well as subsequent outcomes such as quality of life and delayed retirement onset, should ensure that older employees have access to health-related information and discussions within the team.

CONCLUSION

In summary, this study contributes to the occupational health psychology literature by extending research on the topic of health climate, and by showing that general team health climate was related to several important health-related outcomes, above and beyond individual employees' idiosyncratic perceptions of team health climate, in a large sample of white-collar workers. However, some aspects could not be analyzed with the current data; for instance, it was not possible to differentiate different work areas and compare them, which might be worthwhile to do in future research. Moreover, future research is now needed that examines multiple dimensions and additional outcomes of team health climate, health climate at the organizational level, the mediating mechanisms and boundary conditions of relationships between health climate and employee health-related outcomes, and the effects of health climate in different groups of employees and in different types of occupations. This line of research on health climate has the potential to contribute importantly to the improvement and maintenance of employee health and thus individuals' quality of life, as well as to increased productivity and reduced health care and insurance costs for organizations and society as a whole.

AUTHOR CONTRIBUTIONS

HS conducted the study, HS drafted the first version of the manuscript, HZ and SL provided feedback, and all authors edited and revised the manuscript.

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Professionalism and Occupational Well-Being: Similarities and Differences Among Latin American Health Professionals

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Context: Empathy, teamwork, and lifelong learning are described as key elements of professionalism. The first recipients of their benefits are professionals themselves. Paradoxically, scarce studies have reported association between professionalism and occupational well-being. The main purpose of this study was to characterize the influence that empathy, teamwork, and lifelong learning, play in the occupational well-being of physicians and nurses working in Latin American healthcare institutions.

Materials and Methods: The Jefferson Scale of Empathy, the Jefferson Scale of Attitudes toward Physician-Nurse Collaboration, the Jefferson Scale of Physicians Lifelong Learning, and the Scale of Collateral Effects (somatization, exhaustion, and work alienation), were administered to 522 physicians and nurses working in institutions of Mexico, Colombia, Ecuador, and Argentina. Internal reliability was calculated. Gender and discipline were used as explanatory variables in comparison analysis. Two-way analysis of variance was performed to examine differences due to the main effects of the gender, and discipline, and to determine possible combined effects. Correlation analysis was performed to measure associations between collateral effects and age, and between collateral effects and professionalism.

Results: A total of 353 (68%) surveys were returned fully completed. Adequate reliability was confirmed in all instruments. No differences were found among countries for collateral effects. Correlation analysis confirmed in physicians an inverse association between empathy and collateral effects ($P = –0.16$; $p < 0.05$), and between collateral effects and lifelong learning ($P = –0.18$; $p < 0.01$). In nurses, this association was confirmed only for empathy ($P = –0.19$; $p < 0.05$). Important differences in the development of professionalism and in its effects on occupational well-being appeared associated to inter-professional collaboration and work roles. An inverse correlation between age and collateral effects was confirmed in physicians ($P = –0.22$; $p < 0.001$) and in nurses ($P = –28$; $p < 0.001$). Comparison by gender confirmed higher somatization in women physicians and nurses than in men groups ($p < 0.001$). On the other hand, comparison by discipline confirmed higher exhaustion and alienation in physicians than in nurses ($p < 0.01$).

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Conclusion: The findings support the importance that empathy, teamwork, and lifelong learning have in practitioners' health and welfare, and the role that cultural behaviors, associated to work professional models and social stereotypes, play in the interaction between professionalism and occupational well-being.

Keywords: empathy, collaboration, lifelong learning, somatization, exhaustion, alienation, healthcare professionals, Latin America

INTRODUCTION

According to the Medical Professionalism Project (2002), an international consortium created by three leading medical organizations: the American Board of Internal Medicine (ABIM), the American College of Physicians and American Society of Internal Medicine (ACP-ASIM), and the European Federation of Internal Medicine, professionalism refers to the set of skills, values, and behaviors that characterize the essence of humanism in professional work. In physicians and nurses, this professionalism arises as an articulated body made up of professional traits and skills that constitute their professional work, regardless of the geographical, social, or cultural settings where it is carried out (Vivanco and Delgado-Bolton, 2015). The Royal College of Physicians (2005), remarks that recipients of the benefits of this professionalism are not only patients, but also healthcare professionals and, ultimately, the society as a whole. Efforts to foster professionalism in healthcare settings emphasize the qualities and attainments of physicians and nurses, beyond their required medical knowledge and clinical skills. Some educational organizations, as the Accreditation Council on Graduate Medical Education (ACGME), the Liaison Committee on Medical Education (LCME), or the Association of American Medical Colleges (AAMC), call attention to this critical educational objective (Cohen, 2006). Unfortunately, professionalism remains among the most difficult domains of doctor competence to assess (Veloski and Hojat, 2006). Although many promising approaches are under evaluation, no single measure or set of measurements has yet proven sufficiently reliable and valid to meet demanding psychometric criteria. In this scenario, Veloski and Hojat (2006) suggested to create a multi-score profile based on recognized elements of professionalism that can be measured. A multi-score measure, according to those authors, has two important advantages in comparison to a global measure: it can provide more complete information from characterized and independent domains, and it can identify specific elements that may need attention for medical educators and health managers. In the challenging work to define which elements of professionalism are capable to be psychometrically measured, Veloski and Hojat proposed three elements that are recognized components of professionalism: empathy, teamwork, and lifelong learning.

Empathy is described as a central attribute of the *humanistic* healthcare professionals (Arnold, 2002) that is also embedded in the three fundamental principles of professionalism described in the "Physicians' charter" (2002): primacy of patient welfare, patient autonomy, and social justice. In healthcare settings, empathy is defined as a "predominantly *cognitive* (rather than an affective or emotional) attribute that involves an *understanding* (rather than feeling) of experiences, concerns and perspectives of the patient, combined with a capacity to *communicate* this understanding, and an *intention to help*" (Hojat, 2016, p. 74). In clinical encounters, empathy – as it was remarked at the beginning of this definition – also prevents to the negative effects caused by an intensive emotional involvement (Hojat, 2016). A large volume of literature supports the important role that empathy plays in patients' adherence to treatment regimens, in their satisfaction with the healthcare provider and the healthcare system, and how this ability helps with coping with the disease (Hojat et al., 2015a). But not only patients, also healthcare professionals may perceive the benefits of being empathetic. According to Hojat (2016), physicians often perceive empathic relations with patients as meaningful interpersonal connections, and these relationships can serve as a buffer against dissatisfaction with the healthcare system and professional burnout. It has been demonstrated in physicians that empathic relationships with their patients provide an intrinsically joyful reward that serves as a remedy for the stress associated to their profession (Zuger, 2004). Empathy has been also identified as a protective factor against the stress experienced by clinicians (Shamasundar, 1999), as a potential factor for their well being (Hyyppä et al., 1991), and a protective factor against burnout in physicians (Thirioux et al., 2016), in physicians-in-training (Park et al., 2016), in nurses (Yu et al., 2016), and in medical students (Hojat et al., 2015b).

Teamwork and inter-professional collaboration work between physicians and nurses are behavioral examples of *respect* and *accountability* to others on the healthcare team. These two characteristics of teamwork are directly related with other two professional commitments of professionalism described in "Physicians' charter": the commitment to improving quality of care, and the commitment to professional responsibilities (Medical Professionalism Project, 2002). In clinical settings, this teamwork refers to a set of abilities that nurses and physicians have when they are able to work together cooperatively, sharing responsibilities for solving problems and making decisions to formulate and carry out plans centered on patients' care (Hojat et al., 1999). In this frame, teamwork can be described as a "complementary" work model where the emphasis is stressed on interdisciplinary education, communication skills, shared autonomy, and mutual authority (Vivanco and Delgado-Bolton, 2015). This model of inter-professional relationship is not a recent phenomenon and has been the subject of several World Health Organization reports (Hammick et al., 2007; Thistlethwaite, 2012). By definition, this model is opposite to

a "hierarchical" one where medicine is placed above nursing in patient-care responsibilities while nurses are viewed as "handmaidens" of physicians (Tang et al., 2013). In societies where a "hierarchical" model is dominant, nurses have little autonomy while most of patient-care decisions are carried out by physicians. In consequence, the risk of teamwork and communication failures increases. Empirical research has shown that those failures are the leading causes of worldwide patient safety incidents in health care institutions (Abdi et al., 2015; Hailu et al., 2016). Furthermore, working in hierarchical work environments also increases the risk of burnout in nurses (Hakanen et al., 2014). On the other hand, it has been demonstrated that the benefits that inter-professional collaborative work has in improving moral distress of caregivers and the quality of patients' care (Piers et al., 2014; Lancaster et al., 2015).

Finally, lifelong learning is described as a third key element of professionalism. According to Veloski and Hojat (2006), lifelong learning is a component of both *excellence* and *self-regulatory and accountable* behavior to ensure quality of care. The "Physicians' charter" explicitly put lifelong learning as a central component of the commitment of professional competence, and as a necessarily requirement to uphold scientific standards, to promote research, to create new knowledge and to ensure its appropriate use in patients care (Medical Professionalism Project, 2002). This attribute involves an asset of self-initiated activities (behavioral aspect) and information-seeking skills (capabilities) that are activated in individuals with a sustained motivation (predisposition) to learn and the ability to recognize their own learning needs (Hojat et al., 2009). There is a demonstrated association between lifelong learning and some indicators of occupational well being such as motivation, professional accomplishments, career satisfaction, and professional commitment (Hojat et al., 2009). This association is also in accordance with the Job Demand-Control model (JDC model) on learning and work characteristics (Karasek, 1979). According to the JDC model, having abilities to control work activities (skill discretion and decision authority) reduces workers' stress but increases their attitudes toward learning. In a recent study, differences reported on lifelong learning in Ugandan nurses bring new elements for a better understanding of the complex interaction that takes place between this element and job demands, job control, and social support (Muliira et al., 2012). Social support is defined as the overall level of helpful social interactions available in the job from coworkers and supervisors that make workers feel valued and enmeshed in a network of communication and mutual obligation (Johnson and Hall, 1988; Karasek and Theorell, 1990). Social support plays an essential role in work-health interaction and learning's improvement. For example, it is demonstrated that nurses' attitudes toward lifelong learning are enhanced in workplaces with high job control and high supervision support (Doorn et al., 2016). In contrast, work overload and poor or null supervision act as barriers to foster lifelong learning (Muliira et al., 2012).

From a cross-cultural approach, differences between Anglo-Saxon America and Latin or Hispanic America have been pointed out by sociologists and economists (Belaunde, 1923; Saltalamacchia, 2014). Despite important social, political, and economical differences among Latin American countries, there still persists an idea of a common cultural identity. In fact, there are no big differences among Latin American countries in terms of medical and nursing educational curricula (Andrade, 1978) and in public health policies (Atun et al., 2015). This is reflected in findings reported in Latin American physicians in relation to medical empathy (Alcorta-Garza et al., 2016), or attitudes toward inter-professional collaboration and lifelong learning (San Martín et al., 2016). In relation to professional roles and inter-professional relationships, two studies reported a "hierarchical" model as dominant in Mexican institutions (Hojat et al., 2001, 2003). Despite this unique evidence reported is only from Mexican institutions, it is reasonable that a similar tendency may appear in institutions from other Latin American countries since medical education systems and social stereotypes associated to medicine and nursing are similar. In fact, findings reported in two recent studies on well being and work distress in Latin American institutions may offer new evidence in support of a common cultural perception of the physicians' professional role (Grau et al., 2009; Ochoa and Blanch, 2016). In the first study (Grau et al., 2009), with Latin American healthcare professionals from Argentina, Uruguay, Mexico, Ecuador, Peru, Colombia, Guatemala, and El Salvador, differences in global perception of burnout were reported when the Argentinean group was compared to the other Latin American countries, but also when physicians were compared to the other healthcare professionals. In the second study (Ochoa and Blanch, 2016), performed only with physicians from Colombia, Brazil, Chile, and Venezuela, no differences were reported by country neither for somatization, exhaustion, or work alienation. Based on these findings, it is possible that not only differences in working conditions among countries, but also the dominance of a "hierarchical" model associated to the discipline may influence the presence of differences of workload among healthcare professionals of Latin America.

Despite the scarce number of studies exploring the relation among cultural and social factors, occupational well-being, and professionalism in Latin American institutions, the above mentioned findings offer an important preliminary support. Taking this into consideration, this study was designed with the main purpose of determining the type of influence that some elements of professionalism (empathy, teamwork, and lifelong learning) play in the occupational health and well-being of physicians and nurses who are working in healthcare institutions of four Latin American countries. With this purpose, and based on previous reports on other locations mentioned above, three research hypotheses were tested: (i) Occupational health, measured by three indicators (somatization, exhaustion, and alienation), is not different when groups by country are compared; (ii) Professionalism's measures (empathy, teamwork, and lifelong learning) vary according to discipline; and (iii) Despite these differences, professionalism plays a protective role against work distress for Latin American healthcare professionals.

MATERIALS AND METHODS

Participants

The study was based on a sample of healthcare professionals (physicians and nurses) involved in direct patient care and who were working in four public healthcare institutions (general hospitals) with similar characteristics located in the provinces of Yucatán (Mexico), Bogota (Colombia), Santa Elena (Ecuador), and Río Negro (Argentina). Inclusion criteria were: healthcare professionals (physicians and nurses) who had completed their professional training and, at the time of the study, had a work contract directly with the referred institution. Exclusion criteria were: medical students and students of nursing, physicians-in-training, nursing assistants, or being healthcare professionals without a direct work contract with the institutions (working for tertiary parties). Healthcare professionals who complied with the inclusion criteria were invited to participate voluntarily and anonymously.

Principal Measures

The participants completed the Scale of Collateral Effects (SCE) of the Questionnaire of General Labor Well-being. The SCE is a psychometrically sound instrument composed by the sub-scale of somatization, the sub-scale of exhaustion, and the sub-scale of alienation, that measures somatization, exhaustion, and work alienation, respectively (Blanch et al., 2010). The sub-scale of somatization includes 5 items, the sub-scale of exhaustion includes 4 items, and the sub-scale of alienation includes four items. All items are answered on a 7-point Likert-type scale (1 = never, 7 = always). Possible scores of the SCE range from 13 to 91 and the higher the score, the greater the side-effects self-perception.

To measure empathy the healthcare professional version of the Jefferson Scale of Empathy (JSE) was used. The JSE includes 20 items that measure empathetic behavior of physicians and health professionals in the context of patients' care (Hojat et al., 2002; Alcorta-Garza et al., 2016). The JSE is answered in a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). A higher score in this scale is associated with a more empathetic behavior in the context of patients' care.

To measure teamwork the Jefferson Scale of Attitudes toward Physician-Nurse Collaboration (JSAPNC) was used. The JSAPNC is a 15-item scale that measures attitudes toward physician-nurse collaborative relationships (Hojat et al., 1999). The JSAPNC is answered in a 4-point Likert scale (1 = strongly disagree, 4 = strongly agree). A higher score on this scale is associated with a more positive attitude toward physician-nurse collaborative relationships.

To measure lifelong learning the Jefferson Scale of Physicians Lifelong Learning (JeffSPLL), and its variant for other health professionals different than medicine was used. The JeffSPLL includes 14 items that measure the orientation toward lifelong learning of physicians (Hojat et al., 2009) and other health practitioners (Muliira et al., 2012). The JeffSPLL is answered in a 4-point Likert scale (1 = strongly disagree, 4 = strongly agree).

Complementary Information

Information about age, gender, and discipline, was collected through a complementary survey.

Procedures

Between 2014 and 2015, questionnaires including the instruments and the complementary surveys were administered to physicians and nurses of the participant institutions. The questionnaires consisted of paper forms provided together with an information letter in enclosed envelopes that were returned to the local researchers following a general protocol previously approved by an independent ethics committee (Ref. CEICLAR PI 199). All participant institutions provided administrative support to the process of distribution and collection of the questionnaires. The work was carried out in accordance with the Ethical principles for medical research involving human subjects of the Declaration of Helsinki, adopted by the 18th World Medical Association (WMA) and amended by the 64th WMA General Assembly in 2013. There was no potential risk for participants, and anonymity was guaranteed throughout the process.

Statistical Assessment

Internal consistency reliability was calculated using Cronbach's alpha coefficient. Following the guidelines suggested by the American Educational Research Association, values higher than 0.7 were considered satisfactory.

An analysis of variance was performed to determine differences in the punctuations of the SCE and its three sub-scales among the groups from Mexico, Colombia, Ecuador, and Argentina.

The scores of the SCE and its three sub-scales were considered as dependent variables, gender (men and women), and discipline (physicians and nurses) were used as explanatory variables. A two-way analysis of variance (2 × 2 design) was performed to examine the group differences due to the main effects of the gender (men versus women), and discipline (physicians versus nurses). A two-way interaction effects were analyzed to determine if there were differences on scores in subgroups defined by a combination of "gender by discipline". For comparisons among all punctuations, global scores were transformed into a common adjusted score from 0 to 100.

Age, empathy, and attitudes toward inter-professional collaboration and lifelong learning were analyzed using a correlation analysis. In order to determine the most suitable correlation coefficient, normality was previously analyzed in each case.

All analyses were performed using R statistical software, version 3.1.1 for Windows. The statistical analyses of the data also included multilevel (Bliese, 2013), and nortest (Gross, 2012) packages.

RESULTS

Of the 522 healthcare professionals who received the questionnaires, 374 returned their surveys. From them, 353

were fully completed, giving an overall effective response rate of 68%. With regard to representativeness, this response rate was considerably higher than the typical response rate of 61% reported for mailed surveys to practitioners (Cummings et al., 2001), and similar than the mean rate of 68% reported in previous studies using mailed surveys to American practitioners (Cull et al., 2005). However, a response rate of at least 75% should be achieved to ensure representativeness of the sample for mailed surveys to professionals (Gough and Hall, 1977). Following a methodology proposed by other authors with a similar situation (Hojat et al., 2002), a comparison between the respondents and non-respondents on their disciplines (the only variable available for non-respondents) was performed to ensure that the respondents were representative in that regard. No significant differences in disciplines were observed between the respondents and the non-respondents.

The mean age was 38 years old with a 23 to 66 year-old age range (SD = 9.51). Sixty nine (18%) of the surveys returned were from Mexico; 85 (23%) from Colombia; 70 (19%) from Argentina; and 150 (40%) from Ecuador. The entire sample was composed by 225 (64%) physicians (107 men and 118 women physicians), and 128 (36%) nurses (36 men and 92 women nurses). The score distribution, descriptive statistics, and reliability for the four instruments used in this study are described in **Table 1**.

With regard to the first research hypothesis related to work health and country of residence, no differences were found among countries when the global score of the SCE was compared [$F_{(1,351)} = 0.04$; $p = 0.85$]. Similar situation was observed in scores of the sub-scales of somatization [$F_{(1,351)} = 2.26$; $p = 0.13$], exhaustion [$F_{(1,351)} = 0.2$; $p = 0.65$], and alienation [$F_{(1,351)} = 0.98$; $p = 0.32$]. Based on these preliminary findings, the entire sample was treated as a unique group in subsequent analyses for the three collateral effects assessed.

Regarding the second research hypothesis related to professionalism and discipline, a t-test was performed to compare the punctuations for the three elements measured of professionalism. Comparison analysis showed that physicians' group expressed higher empathetic orientation than nurses' group ($t = 2.61$, $p = 0.009$). Physicians also showed higher abilities toward lifelong learning than nurses ($t = 3.92$, $p < 0.001$). On the other hand, nurses showed more positive attitudes toward physician-nurse collaboration than physicians ($t = -6.68$, $p < 0.001$). Those differences are shown in **Figure 1**.

Concerning the third research hypothesis related to professionalism as a protective factor against work distress in healthcare professionals, findings of the three collateral effects measured are summarized as follows:

Somatization

Regardless the discipline (physician, nurse), results of the analysis of variance confirmed a significant main effect of gender (men, women) for this element [$F_{(1,349)} = 12.67$; $p < 0.001$], as is shown in **Figure 2**. No main effects were found when a two-way interaction of gender with discipline was performed. The summary of these results is reported in **Table 2**.

On the other hand, correlation analysis confirmed the existence of an inverse association between somatization and age in the entire sample ($P = -0.26$; $p < 0.001$). Correlation analysis by groups of discipline (**Table 3**), show that in the group of physicians there are inverse associations between somatization and empathy ($P = -0.17$, $p = 0.01$), and between somatization and lifelong learning ($P = -0.14$; $p = 0.04$), but not between somatization and teamwork ($P = -0.07$; $p = 0.32$). This association was not evident in nurses neither between somatization and empathy ($P = -0.14$; $p = 0.11$), nor between teamwork and somatization ($P = -0.05$; $p = 0.60$).

Exhaustion

Results of the variance analysis (**Table 2**), regardless of gender (men, women), showed significant main effects of the discipline (physician, nurse) for exhaustion [$F_{(1,349)} = 9.26$; $p = 0.003$]. Physicians reported higher exhaustion than nurses (**Figure 2**). No main effects were found with gender. No main effects for this element appeared when a two-way interaction was performed.

TABLE 1 | Descriptive statistics and psychometric reliability of scales of collateral effects, empathy, teamwork, and lifelong learning in 353 Latin American physicians and nurses.

Statistics	SCE				JSE-HP	JSAPNC	JeffSPLL
	Global	SS1	SS2	SS3			
Possible range	13–91	5–35	4–28	4–28	20–140	15–60	14–56
Actual range	13–91	5–35	4–28	4–28	60–140	18–60	18–56
Mean	41	17	15	9	110	50	48
Standard deviation	18	8	7	6	15	7	6
Percentile							
25th	25	10	8	4	98	46	45
50th (Median)	41	16	15	8	111	51	49
75th	54	23	21	13	121	55	52
Reliability	0.92	0.85	0.91	0.83	0.79	0.81	0.83

SCE, Scale of Collateral Effects; SS1, Sub-scale of somatization; SS2, Sub-scale of exhaustion; SS3, Sub-scale of alienation; JSE-HP, Jefferson Scale of Empathy HP-Version; JSAPNC, Jefferson Scale of attitudes toward physician-nurse collaboration; JeffSPLL, Jefferson Scale of physician lifelong learning.

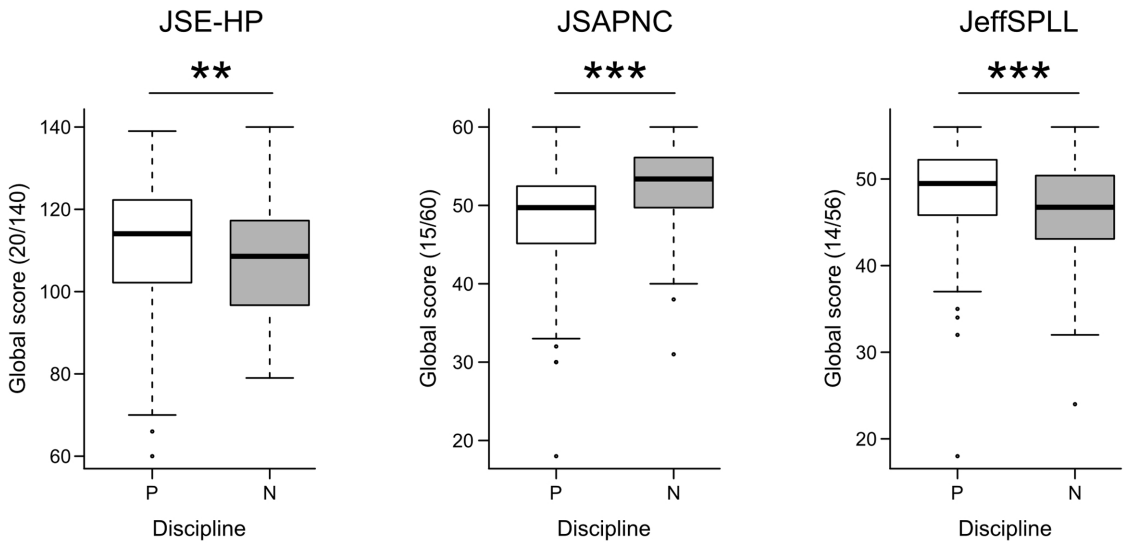

FIGURE 1 | Comparisons by discipline, physicians (P) and nurses (N), in global scores of Jefferson Scale of Empathy (JSE-HP), Jefferson Scale of attitudes toward physician-nurse collaboration (JSAPNC), and Jefferson Scale of physicians' lifelong learning (JeffSPLL); **$p < 0.01$; ***$p < 0.001$.

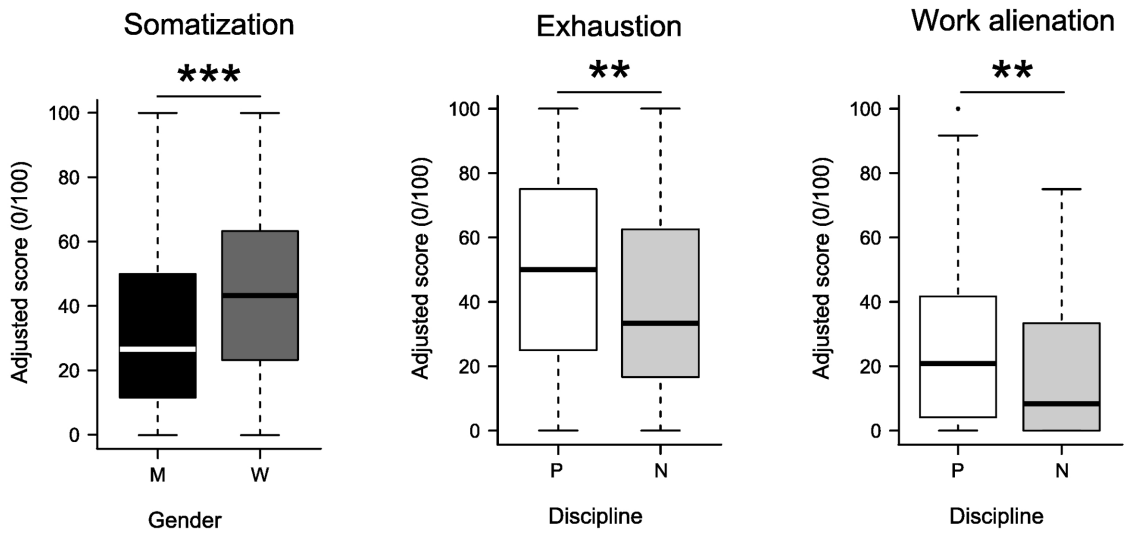

FIGURE 2 | Differences confirmed from comparative analysis by gender, men (M) and women (W), and by discipline, physicians (P) and nurses (N), of the sub-scales of somatization, exhaustion, and work alienation; **$p < 0.01$; ***$p < 0.001$.

Correlation analysis confirmed an inverse association between exhaustion and age in the entire sample ($P = -0.15$; $p = 0.006$). This association appears in both groups of discipline separately (physicians and nurses), as is shown in **Table 3**. However, no association to exhaustion was confirmed in either group (physicians and nurses) when empathy, teamwork, or lifelong learning punctuations were assessed.

Alienation

Regardless of the gender (men, women), results of the variance analysis showed significant main effects for the discipline [$F_{(1,349)} = 8.72$, $p = 0.003$]. No main effects were found with gender. No main effects were either found when a two-way interaction of gender by discipline was assessed (**Table 2**). Differences in punctuation between physicians and nurses are shown in **Figure 2**.

Age in physicians and nurses ($P = -0.14$, $p = 0.01$) was associated with less alienation. Empathy in physicians ($P = -0.14$, $p = 0.04$) and in nurses ($P = -0.23$; $p = 0.009$) was also associated with less alienation (**Table 3**). With regard to lifelong learning, it was associated to less alienation in physicians ($P = -0.26$; $p < 0.001$), but not in nurses ($P = +0.02$; $p = 0.81$). No association appeared from the correlation analysis between alienation and teamwork.

TABLE 2 | Summary results of a Two-Way analysis of variance in a sample of 353 Latin American physicians and nurses.

Source of variation	$F_{(1.349)}$			
	SCE	Somatization	Exhaustion	Work alienation
Main effects				
Gender (men vs. women)	2.42	12.67***	0.22	0.41
Discipline (physician vs. nurse)	5.54*	0.38	9.26**	8.72**
Two-way interaction				
Gender – Discipline	0.16	0.13	0.31	0.01

*SCE, Scale of Collateral Effects; *p < 0.05; **p < 0.01; ***p < 0.001.*

DISCUSSION

All instruments showed an adequate psychometric reliability with Cronbach's alpha coefficients higher than 0.70. Those coefficients were slightly inferior to the originals for empathy (Hojat et al., 2002), lifelong learning (Hojat et al., 2009), and somatization (Blanch et al., 2010), but slightly superior to the originals for teamwork (Hojat et al., 2003), exhaustion (Blanch et al., 2010), work alienation (Blanch et al., 2010), and global perception of collateral effects (Blanch et al., 2010). Looking at **Table 1**, a potential ceiling effect was observed since the maximum possible punctuations of empathy, teamwork, and lifelong learning scales were reached by some respondents. Although those instruments have shown robust psychometric properties that have been demonstrated in different professional and cultural contexts, future studies can be performed to revised possible improvements in this direction.

No statistical differences were found for the scores of global perception of collateral effects, somatization, exhaustion, and alienation when they were compared by country. These findings confirm a similar perception of the three collateral effects measured in healthcare professionals from institutions of four different Latin American territories. These findings are also in consonance with those reported in a recent study with physicians from Colombia, Brazil, Chile, and Venezuela (Ochoa and Blanch, 2016), but not with those preliminary reported with healthcare professionals from Argentina and other Latin American countries (Grau et al., 2009), where Argentineans showed a higher perception of burnout. According to those authors (Grau et al., 2009), differences observed between Argentinean and other Latin American healthcare professionals may be associated to differences in socio-economical conditions in those countries, but also can be the consequence of a methodological limitation: an unbalanced geographical distribution of the study sample (65% of the entire sample was composed by the Argentinean group, while the other 35% included data collected in ten Latin American countries). In this sense, findings of this study offers updated and new evidence in support of a similar perception of occupational work in Latin American healthcare professionals despite potential socio-economical differences by territory.

TABLE 3 | Spearman's correlation analysis among collateral effects, empathy, teamwork, lifelong learning, and age in 353 physicians and nurses from four Latin American countries.

Variables	SCE	Somatization	Exhaustion	Work alienation
Professionalism				
Empathy				
Physicians	–0.16*	–0.17*	–0.12	–0.14*
Nurses	–0.19*	–0.14	–0.15	–0.23**
Teamwork				
Physicians	–0.09	–0.07	–0.11	–0.02
Nurses	–0.07	–0.05	–0.03	–0.09
Lifelong learning				
Physicians	–0.18**	–0.14*	–0.13	–0.26***
Nurses	+0.11	+0.16	+0.10	+0.02
Age				
Physicians	–0.22***	–0.27***	–0.16*	–0.13*
Nurses	–0.28**	–0.28***	–0.20*	–0.23**

*SCE, Scale of Collateral Effects; *p < 0.05; **p < 0.01; ***p < 0.001.*

A recently published review by Zacher and Schmitt (2016) remarks the positive role that age plays in occupational well-being. According to them, the lack of studies on work characteristics (i.e., social support or time pressure) as mediators of age-occupational well-being relationship is surprising. Our study provides evidence of a positive association between age and occupational well-being even when work characteristics are different, as it possibly occurs when physicians' and nurses' work characteristics are compared. Our findings are also in accordance with two models: "successful aging" and "role theory". According to the "successful aging" model, successful aging at work involves a process during which workers maintain or improve favorable work outcomes, such as motivation, performance, and well-being with increasing age (Kooij et al., 2008; Zacher, 2015). On the other hand, the "role theory" model states that workers occupy multiple roles within and outside the work context, and that perception and perceived importance of these roles, and more specific tasks, expectations, and available resources within those roles, change over time and with age (Ashforth, 2001).

In physicians, punctuations observed for empathy and teamwork were slightly inferior than reported in previous studies with Latin American physicians-in-training (Delgado-Bolton et al., 2015; San Martín et al., 2016), but superior to those reported for lifelong learning (San Martín et al., 2016). Based on those differences, findings of this study are consistent

with those reported in a previous cross-cultural study where the same specific elements of medical professionalism were compared between Spanish and Latin American physicians-in-training (San Martín et al., 2016). On the other hand, differences observed between physicians' and nurses' attitudes toward inter-professional collaboration in this study are consistent with those reported in previous studies with physicians and nurses from Mexican institutions (Hojat et al., 2001, 2003). Indeed, this study provides evidence of the prevalence of a "hierarchical" model in physician-nurse relationships not only in Mexican, as was first reported years ago (Hojat et al., 2001), but also in other Latin American institutions.

With regard to the role of the influence that the "hierarchical" work model plays in the relationship between occupational well-being and professionalism, the findings of this study confirm that not only nurses (Hakanen et al., 2014) but also physicians suffer higher risk of work distress when inter-professional relationships are hierarchical instead of complementary. Furthermore, important differences in the perception of exhaustion and work alienation between physicians and nurses in Latin American institutions reveal that physicians have a higher risk of suffering work distress than nurses. These findings, in consonance with those reported in a previous study on medical burnout in Latin American healthcare professionals (Grau et al., 2009), might be consequence of the bigger responsibilities and decisions that practitioners have to take in comparison with nurses. On the other hand, nurses under hierarchical working contexts are restricted to caring. In consequence, other abilities (especially those related to inter-professional collaboration and lifelong learning) could be often undervalued by their supervisors (Ogilvie et al., 2007) or by other nurses (Rooddehghan et al., 2015). This is also in accordance with what the JDC and JDCS models state about job demands, job control, and social support interactions, especially when they are coming from coworkers and supervisors (Karasek, 1979; Johnson and Hall, 1988; Karasek and Theorell, 1990; Pisanti et al., 2016).

In physicians, the more managerial and the greater the responsibility of their professional role may drive them to a greater development of abilities in research and information analysis, which they can apply to improve the diagnosis and treatment of their patients. It can explain their higher scores in lifelong learning in comparison with nurses. On the contrary, with the nurses' collaborative role being limited to patient care, it may drive them to lose their motivation for developing learning abilities. In accordance with other authors (Tang et al., 2013), the findings of this study bring new evidence in support of how different roles and autonomy attached with these stereotypical ideals have made not only collaboration, but also learning, a stifling experience for many nurses. Under those circumstances, nurses who have strong commitments with the improvement of their professional competencies toward lifelong learning are the most vulnerable.

In nursing, as a healthcare profession that is oriented to the patients' care, empathy has a central role (Mortier et al., 2016). Therefore, empathy is expected to be a characteristic found in all nurses, independently of their specific role (Hojat, 2016). This would explain why nurses had lesser distractions than the physicians concerning empathy, and why this ability is protective in prevention of work distress. A higher distraction concerning empathy in physicians may be caused by the nature of their clinical and medical roles and the professional duties associated to them.

However, regarding the differences in empathy scores between physicians and nurses, it is necessary to understand two important issues: the double nature of empathy and the healthcare contexts in Latin America. Empathy in the context of healthcare is defined as a cognitive (as opposed to emotional/affective) attribute that involves understanding the experiences and perspective of the patient, combined with the ability to communicate this understanding to the patients (Hojat and Gonnella, 2016). This distinction is very important since it has demonstrated that emotional empathy in nurses is positively correlated with emotional exhaustion (Williams, 1989), and with burnout (Vévodová et al., 2016). On the contrary, empathy as a cognitive attribute of caregivers has a positive role on prevention of burnout and work distress (Hojat, 2016). On the other hand, many Latin American public health institutions, healthcare professionals have to address daily social needs with scarce resources (Almeida, 2002; Cotlear et al., 2015). Under those circumstances, nurses are more exposed than physicians to patients' daily concerns, complains, and frustrations (Grau et al., 2009). Under those circumstances, it is expected that nurses whom are emotionally intense with their patients build psychological barriers against any empathetic concern as the coping strategy (Hojat, 2016). Additionally, nurses, limited to patient care, may be less motivated to develop learning abilities that could help them in the improvement of their empathetic abilities with the patients. Both issues, one related to the working environment and the other to the coping strategy, can explain why in this study the entire group of nurses reported lower empathetic punctuations than physicians. Unfortunately, this coping strategy is counterproductive to nurses since findings of this study demonstrate that empathy plays a positive role in occupational well-being.

Finally, gender comparisons yield differences for somatization but not for exhaustion or work alienation. These findings are consistent with those of previous studies where somatization was compared between men and women in developing countries (Wool and Barsky, 1994; Piccinelli and Simon, 1997). Another study reported that the risk of somatization is slightly higher for women in comparison to men but it rapidly escalates when it is combined with low social class and high emotional distress (Ladwig et al., 2001). The findings of this study are in agreement with those previous observations, and underline important differences due to gender that are still prevalent in societies where hierarchical role models are dominant.

All these findings stress the importance that empathy, abilities toward inter-professional collaboration, and lifelong learning have in practitioners' health and welfare, and the role that cultural behaviors play in the interaction between professionalism and occupational well-being.

ETHICS STATEMENT

This study was carried out in accordance with the recommendations of tico de Investigacin Clinica de La Rioja with written informed consent from all subjects. All subjects gave written informed consent. The work was carried out in accordance with the Ethical principles for medical research involving human subjects of the Declaration of Helsinki, adopted by the World Medical Association. The protocol was approved by the tico de Investigacin Clinica de La Rioja (Ref. CEICLAR PI 199).

AUTHOR CONTRIBUTIONS

LV was in charge of the study's overall design, coordination with the participating institutions, and drafting of the manuscript. MS-B and LV performed the statistical processing of data. All authors contributed to the presented work, participated during the interpretation process of the results, and approved the final manuscript.

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Subjective Psychological Well-Being in Families with Blind Children: How Can We Improve It?

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The aim of this work was to examine family well-being in a sample of Spanish families with blind children. Sixty-one participants reported their perceived economic status, the level of job satisfaction, and state-anxiety symptoms. The participants of our study scored higher on state-anxiety and lower on material well-being than the normative sample, although these differences did not reach statistical significance. They also scored higher on job satisfaction and family satisfaction than the general population. A negative correlation was found between state-anxiety and material well-being ($r = -0.62$, $p = 0.001$) and between state-anxiety and family satisfaction ($r = -0.57$, $p = 0.001$). A positive correlation was found between material well-being and job satisfaction ($r = 0.40$, $p = 0.001$), and between material well-being and family satisfaction ($r = 0.41$, $p = 0.001$). Higher levels of material well-being, job satisfaction, and family satisfaction were associated with lower levels of anxiety in these families. However, no statistically significant correlation was found between family satisfaction and job satisfaction. Our results suggest that the family experience of having a disabled child is evolving, and this implies achieving greater job and family satisfaction than the normative samples, although anxiety scores continue to be higher and material well-being scores remain lower. On the whole, our results confirm that it is necessary to provide these families with more economic resources, which would have a positive impact on their subjective psychological well-being, decreasing their state-anxiety, and increasing their satisfaction with life.

Keywords: blind children, anxiety, well-being, job satisfaction, family satisfaction

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INTRODUCTION

The repercussions of a disability on children and their parents are currently the subject of social and scientific interest. Some previous studies describing how the birth of a disabled child affects family coexistence have found negative consequences as a result of paying too much attention to the child, for example, the high social and emotional cost, which can turn into a powerful source of anxiety and which has an impact on subjective well-being (Diener and Lucas, 2000; Eisenhower et al., 2009; Hatton et al., 2010; Martorell et al., 2011).

According to the tridimensional model of Diener and Lucas (2000), subjective psychological well-being is made up of positive affect (a subjective component of emotions like joy, pleasure, and

euphoria), negative affect (fear, stress, and sadness), and satisfaction with life, understood as the subjective appraisal of well-being at work, in the family, and with regard to economic income and leisure.

Other authors, like Emerson et al. (2010), have defended that, if the fact that these families are more exposed to socioeconomic disadvantages is not taken into account, the relation between the disabled child and the parents' lack of subjective well-being may be overestimated (Emerson and Hatton, 2008). Thus, for example, according to Leyser and Heinze (2001), long-distance trips to provide special services are one of the main priorities of parents with visually impaired children. This prevents the children from taking part in other activities of their community, reducing their integration. At the same time, it implies a great overload in terms of economy and dedication, affecting families' work, leisure time, and social relations. In a study conducted in Spain, Calvo and González (2004) observed that having a child with a visual impairment requires the mobilization of resources to cover the child's needs. This implies an increase of expenses and/or a relevant decrease of family income. These circumstances worsen when these families already have a low socioeconomic level. Thus, it has been observed that the mother frequently quits her job, reduces her workday schedule, or else the family is forced to hire support personnel so that the visually impaired child will receive specialized educational or therapeutic services, which are usually offered by the public administration, organizations for disabled people, or private groups (Calvo and González, 2004; Montes and Halterman, 2008).

This situation may also produce exhaustion and tension in the couple relation due to arguments and less consensus or mutual understanding among family members when making decisions. Changes in the family dynamics have also been reported, as the members may feel unsure and doubtful about their capacity to care for the child with disabilities (Berg et al., 2007). All of this causes symptoms of depression and anxiety and poor quality of life (Brehaut et al., 2009; Hutchinson et al., 2009; Kuhlthau et al., 2010). It would therefore be interesting to have deeper knowledge of the relation between the key factors that contribute to the subjective well-being of blind children's parents. In others words, would be interesting to examine the relationships between the three components of the subjective psychological well-being model (Diener and Lucas, 2000) in the parents of blind children. As stated by other authors, the parents of children with some type of disability act as mediators between their children and society (Ojeda and Mateos, 2006). They are the ones who can best determine their children's needs and well-being (Dempsey and Keen, 2008) and, ultimately, the ones who can promote their development (Calvo and González, 2004). However, there are few studies on the subjective psychological well-being of parents with disabled children, and particularly in the case of visual impairment (Leyser and Heinze, 2001; Dunst and Dempsey, 2007; Dempsey and Keen, 2008; Dempsey et al., 2009; Feniger-Schaal and Oppenheim, 2013; **?**; Holbrook, 2015).

Accordingly, our first goal consisted of measuring the three components of subjective psychological well-being in a Spanish sample of parents of blind children, and determining possible significant differences compared with the scores of the normal population. Specifically, to address the component of positive affect, we used a measure of family satisfaction (Barraca Mairal and Yarto-López Elizalde, 2003); for negative affect, we used a measure of state-anxiety (Spielberger et al., 1983; Spielberger, 1988; Spielberger and Sydeman, 1994); and for the component of satisfaction with life, a measure of material well-being (Sánchez-Cánovas, 2007), and one of job satisfaction (Sánchez-Cánovas, 2007). The second goal consisted of studying the relation between these components in the parents of blind children.

Previous studies of families with visually impaired children led us to hypothesize that the level of state-anxiety in blind children's parents would be higher than that of the general population. In contrast, material well-being, job satisfaction, and family satisfaction would be lower in families with blind children.

MATERIALS AND METHODS

Participants

The total population of this investigation comprised 95 parents from the province of Almería (southern Spain), whose children fulfilled the ophthalmic requirements for affiliation in the National Organization of Spanish Blind (ONCE).

Parents who took part in this study were chosen according to the following selection criteria: perfect knowledge of Spanish language, efficient reading comprehension, having children affiliated with the ONCE and who were also assisted by the specialized orientation staff for blind and visually disabled people of this province (which has a total population of about 700.000 inhabitants).

The exclusion criteria were: parents who refused to give their consent to participate and parents whose children did not receive assistance directly from the specialized orientation team for blind people in Almería.

The initially selected sample consisted of 81 fathers or mothers (not couples; they all belonged to different families), of whom 61 completed the questionnaires. In total, 34 participants were excluded (20 participants refused to take part in the study and 14 were parents of children who were not attended to by the orientation team).

The final sample comprised 28 fathers (45.90%) and 33 mothers (54.10%), aged between 25 and 58 years old (mean age 41.52 $\pm$ 5.90 years) of 61blind children. Of these parents, 82% were married in first nuptials, and 30% had one child (the one with the visual disability). Only 39.30% had a higher educational degree, and 60.70% were working, that is, receiving work wages.

Concerning the children of these families, 13.10% were totally blind, 34.40% were visually impaired, and 52.50% were visually impaired and also had other physical disabilities as well as intellectual disability. Their mean age was 9.16 $\pm$ 4.90 years, and 62.30% were male.

Procedure

This is a descriptive, cross-sectional study in which data were collected through questionnaires. First, the institutional review board at the Psychology Department in the University of Almería reviewed this project and granted permission to implement it.

Members of the orientation staff of the ONCE contacted the selected families personally and the parents received a study description with a consent form to participate in this study. After explaining the aims of the investigation to the parents, 81 questionnaires with instructions on how to complete them were sent by postal mail to those who consented to participate in the study. The parents of the contacted families filled in the questionnaires independently, and 61 questionnaires were returned to the researchers by postal mail.

Instruments

To select the instruments for data collection, we drew on the model of subjective psychological well-being proposed by Diener and Lucas (2000), and on previous studies like that of Barraca Mairal and Yarto-López Elizalde (2003), which indicated important factors related to the construct of subjective psychological well-being, such as state-anxiety, economic well-being (both material and job satisfaction), and family satisfaction (understood as the cognitive and affective appraisal of verbal and physical interactions with the family members).

(1) The State-Anxiety Subscale of the Spanish version of the State-Trait Anxiety Inventory-STAI (Spielberger et al., 1983; Spielberger, 1988; Spielberger and Sydeman, 1994). This provides a measure of state-anxiety, defined as a transitory condition or emotional state, characterized by subjective feelings of tension and apprehension as well as hyperactivity of the autonomic nervous system, which may change over time and fluctuate intensively. The subscale has 20 items, with a minimum score of 0 and a maximum score of 60, with higher scores indicating more anxiety. Items are rated from 0 to 3 points depending on the degree of anxiety experienced. Ten items are scored positively, and ten are inversely scored. In the Spanish standardized version of the scale, Cronbach's alpha reliability ranged between 0.90 and 0.93. Using the split-half method, reliability was 0.94. In our study, Cronbach's alpha was 0.93. These data are similar to the original studies of this test (Spielberger and Sydeman, 1994). In the present study, the data from our sample were compared with those obtained with the same scale in the normative sample of adolescents and normal adults, aged between 16 and 62 years old (45% male and 55% female). Concerning gender, the standardization sample included 295 males with a mean State-anxiety score of 20.54 ($SD = 10.56$) and 365 females, with a mean State-anxiety score of 23.30 ($SD = 11.93$).

(2) Material Well-Being Subscale of the Spanish "Escala de Bienestar Psicológico" (EBP; in English, the Psychological Well-Being Scale; Sánchez-Cánovas, 2007), which measures the subjective perception of the respondent's economic situation (income and quantifiable material possessions). It has 10 items on which the frequency or degree of agreement with the statement is rated on Likert-type scales ranging from 1 to 5, with higher scores indicating higher subjective perception of material well-being (maximum score is 50). Cronbach's alpha reliability was 0.91. The concurrent validity of this subscale with the Oxford Happiness Questionnaire was 0.53 (Argyle et al., 1989; Hills and Argyle, 2002). In our study, Cronbach's alpha was 0.88. The standardization of this test was conducted in a sample made up of 1885 people from the general population. The mean score of the sample of the test was 33.48 ($SD = 8.90$).

(3) Job Satisfaction Subscale of the Spanish "Escala de Bienestar Psicológico" (EBP; in English, the Psychological Well-Being Scale; Sánchez-Cánovas, 2007). This scale provides a measure of the level of job satisfaction (positive emotional response to work). It has 10 items that are rated on Likert-type scales ranging from 1 to 5, with higher scores indicating a greater job satisfaction. The concurrent validity of this subscale with the Oxford Happiness Questionnaire was 0.30 (Argyle et al., 1989). Cronbach's alpha reliability was 0.87. In our study, Cronbach's alpha was 0.89. The test was standardized with a sample of 1317 people, with a mean score of 32.76 ($SD = 9.25$).

(4) "Escala de Satisfacción Familiar por Adjetivos" (ESFA; in English, the Family Satisfaction by Adjectives Scale; Barraca Mairal and Yarto-López Elizalde, 2003). This instrument provides information about people's cognitive and affective appraisal of the verbal and physical interactions with their family members. It attempts to evoke affective responses to the stem statement "When I am at home with my family, I feel rather . . ." People choose from 27 pairs of antonym adjectives (i.e., happy/unhappy, criticized/supported, etc.) the adjective (i.e., happy or unhappy) and score, ranging from 1 (*A little*) to 6 (*Completely*), that best describe their feelings. Scores range from a minimum of 27 to a maximum of 162, with higher scores indicating higher levels of family satisfaction. In general, scores above the mean indicate family satisfaction (scores exceeding percentile 70 are considered high, and scores below percentile 30 are considered low). Cronbach's alpha internal consistency was 0.97, and reliability was 0.96. Its criterion validity with the Family Satisfaction Scale (Olson and Wilson, 1982) was 0.65, and with the Family Satisfaction Scale (Carver and Jones, 1992), it was 0.78. It has been adapted in other Spanish-speaking countries, like Peru, where it obtained Cronbach alpha reliabilities of 0.97 (Altamirano, 2008) and 0.95 (Chapi Mori, 2012). In our study, Cronbach's alpha internal consistency was 0.93. The standardization of this test was conducted with 274 subjects from the general population. The mean score of the normative sample was 123.05 ($SD = 24.59$).

Statistical Analysis

Through Student's *t*-test, the mean scores of our sample on state-anxiety, material well-being, job satisfaction, and family satisfaction were compared with the mean scores of the normative samples of the above-mentioned standardized instruments. This analysis was complemented with the effect size using Cohen's *d* to avoid a Type II error (failing to detect actual differences because of the differences in the sample size). Subsequently, the relation between these variables was analyzed with Pearson correlation coefficients. Lastly, we carried out a generalized linear model using univariate factorial analysis of variance, concurrently relating each measure of the dimensions of subjective psychological well-being to the sociodemographic

variables of the sample. This analysis was complemented by the effect size using η^2. Analyses were performed with the statistical program SPSS version 21.0.

RESULTS

The participants of our study scored higher on anxiety and lower on material well-being than the normative sample (see **Table 1**). However, these differences did not reach statistical significance, suggesting that the levels of anxiety and material well-being experienced by families with blind children are not very different from those of the general population. We note that the effect size of material well-being was high ($d = 0.72$), which could indicate that this lack of significance is due to sample size. However, the mean scores on job satisfaction and family satisfaction of parents with blind children were higher than the mean scores of the general population. Although these differences were not statistically significant, the effect size was moderate in both analyses ($d = 0.39$, and $d = 0.42$, respectively, for job and family satisfaction). In addition, as can be observed in **Table 1**, there were no statistically significant differences as a function of gender in material well-being, job satisfaction, state-anxiety, or family satisfaction ($p > 0.050$).

Correlational analysis revealed negative correlations between anxiety and material well-being ($r = -0.62$, $p < 0.001$), between anxiety and family satisfaction ($r = -0.57$, $p < 0.001$), and between anxiety and job satisfaction ($r = -0.43$, $p = 0.008$). That is, higher levels of material well-being, job satisfaction, and family satisfaction correlated with lower levels of anxiety in the parents of blind children.

We also observed a statistically significant positive correlation between job satisfaction and material well-being ($r = 0.40$, $p = 0.004$) and between material well-being and family satisfaction ($r = 0.41$, $p = 0.001$). This indicates that higher levels of material well-being are associated with higher levels of job satisfaction and family satisfaction. Or, contrariwise, a low level of material well-being indicates lower levels of job satisfaction and family satisfaction. No statistically significant correlation was found between family satisfaction and job satisfaction ($r = 0.21$, $p = 0.204$).

Lastly, **Table 2** shows the results of the univariate factorial analysis relating each dimension of subjective psychological well-being to the sociodemographic variables of the sample (parents' sex, parents' age, type of marriage, parents' technical qualification, work wages, child's visual level). As can be observed, only the variables "type of marriage" and "work wages" had an effect on the component of material well-being in these parents of visually impaired children. In contrast, no effects were found for the rest of sociodemographic variables or for their interaction.

DISCUSSION

As expected, when comparing the scores on state-anxiety of parents of blind children with those of the general population, we found higher anxiety scores in our sample. These differences were not statistically significant, but the effect size was moderate, similar to the data found by Femenías and Sánchez (2003) in an investigation of parents of disabled children. Authors like Dykens (2005) and Sola-Carmona et al. (2013) have reported that these families do not present generalized anxiety, and that the anxious response to having a disabled child is not homogeneous, suggesting that this variability is similar to that of the general population.

However, as predicted in the hypothesis, these families' material well-being is lower than that of the general population, although the differences are non-significant (with a moderate effect size). In previous scientific publications, there was no clear evidence of how the socioeconomic status of families with disabled children may affect the parents' anxiety. Authors like Friedrich and Friedrich (1981) and Dunst et al. (1986) and concluded that the two variables are related, but Byrne and

TABLE 1 | Descriptive statistics and comparison of the variables material well-being, job satisfaction, and family satisfaction with normative samples.

Variable	Parents of blind children		Normatie samples		Student *t*-test	*gl*	*p*	*d* (effect size)
	M	*SD*	*M*	SD				
Material well-being	27.21	9.85	33.48	8.90	–0.63	60	0.530	–0.70
Male	27.50	10.28	33.11	8.72	–0.53	27	0.596	–0.58
Female	26.96	9.63	33.72	9.01	–0.69	32	0.495	–0.72
Job satisfaction	35.55	6.81	32.76	9.25	0.40	48	0.687	0.39
Male	36.82	5.15	34.46	8.76	0.44	22	0.658	0.32
Female	34.42	7.93	31.65	9.47	0.34	25	0.734	0.31
State-anxiety	24.96	11.71	21.92	11.23	0.36	60	0.717	0.26
Male	23.21	11.91	20.54	10.56	0.22	27	0.827	0.23
Female	26.50	11.50	23.30	11.93	0.51	31	0.614	0.27
Family satisfaction	132.23	18.18	123.50	24.59	0.47	60	0.636	0.42
Male	134.50	17.11	123.97	22.48	0.60	27	0.551	0.52
Female	130.30	19.09	122.26	26.30	0.41	32	0.681	0.34

State-anxiety was measured with the State subscale of the State-Trait Anxiety Inventory (Spielberger and Sydeman, 1994). Material and Job Satisfaction were subscales of the Scale of Psychological Well-Being Scale (Sánchez-Cánovas, 2007) and family satisfaction was measured with the Family Satisfaction by Adjectives Scale (Barraca Mairal and Yarto-López Elizalde, 2003).

TABLE 2 | General linear unifactorial model to assess the effect of the sociodemographic variables on material well-being, job satisfaction, state-anxiety, and family satisfaction.

Variable	Material well-being				Job satisfaction				State-anxiety				Family satisfaction			
	F	*df*	*p*	η^2	*F*	*df*	*P*	η^2	*F*	*df*	*p*	η^2	*F*	*df*	*p*	η^2
Parents' sex	0.13	1	0.719	0.00	0.01	1	0.920	0.00	0.08	1	0.774	0.00	0.08	1	0.773	0.00
Parents' age	0.84	1	0.369	0.03	0.39	1	0.536	0.02	0.02	1	0.874	0.00	3.82	1	0.062	0.13
Type of marriage	6.73	1	0.016	0.21	0.08	1	0.775	0.00	0.61	1	0.441	0.02	3.00	1	0.096	0.11
Parents' technical qualification	0.83	1	0.371	0.03	0.20	1	0.659	0.01	0.49	1	0.490	0.02	2.06	1	0.164	0.07
Work wages	4.09	1	0.050	0.14	3.12	1	0.094	0.14	0.09	1	0.767	0.00	0.41	1	0.524	0.01
Child's visual level	0.46	2	0.631	0.03	1.38	2	0.276	0.13	1.15	2	0.333	0.09	0.16	2	0.846	0.01
Interactions	No significant interaction $p < 0.050$				No significant interaction $p < 0.050$				No significant interaction $p < 0.050$				No significant interaction $p < 0.050$			

Cunningham (1985) stated that there was no relation. Mayo Pals (2011), in a study with blind children's families, defended that families with a higher socioeconomic status present lower rates of illness and mortality. In contemporary society, the salary earned and the material goods one possesses are very important, as noted by Garaigordobil et al. (2009), who reported the influence of material well-being on Spanish families' subjective well-being. Other authors also confirmed that, besides the psychological impact of a child's disability on the parents (increasing their levels of stress, anxiety, and depression), these families also suffer financial losses (Lukemeyer et al., 2000; Park et al., 2002; Bumbalo et al., 2005; Emerson et al., 2006; Msall et al., 2007; Bourke-Taylor et al., 2011).

In Spain, interventions are being implemented to favor of the collective of people with disabilities through actions like the Act of Social Integration of Disabled People (Law 13/1982, 1982) and the Act of Promotion of Personal Autonomy and Care of Dependent People (Law 39/2006, 2006), developing school integration and services for treatment/rehabilitation. This has led to a greater level of dignity and quality of life for this collective. In the specific case of blind people, the ONCE has formed a series of specialized services favoring their full integration. But despite all this, families with visually impaired children perceive that their economic income is lower and that they have fewer possessions than the normative sample. They think that they do not have enough resources to meet their children's needs, as they must sometimes seek supplementary private resources. Authors like Badia Corbella (2002) have defended that counseling and economic aid for families with a disabled child are the most important factors to reduce family anxiety.

Although there were no statistically significant differences in the sample of parents with visually impaired children, it was found that job satisfaction was higher than in the standardized population (with a large effect size). This result is congruent with previous studies that have observed that the father's work-focused role is beneficial for his contact with his blind child (Calvo and González, 2004; Durán Estrada, 2011). Coinciding with the generalization of women's integration in the workforce, other authors have also observed that paid work can be considered a gratifying protective factor that may improve the well-being of mothers of disabled children (Einam and Cuskelly, 2002; Eisenhower and Blacher, 2006; Olsson and Hwang, 2006; Bourke-Taylor et al., 2010). Although in our work, we found no statistically significant differences between men and women with regard to job satisfaction, other authors like Chapi Mori (2012) found higher job satisfaction in women than in men, and attributed it to personal achievement, recognition of their work, their contribution to society, greater social participation, and a feeling of independence. In general, our results suggest that holding a job in these families with blind children allow them to recharge their energy and refresh their emotional relations when caring for a loved one like a child. We can observe a dichotomy: on the one hand, their child, who is the most important person in the world for them but, on the other hand, temporal distancing is also positively valued. Therefore, it would be appropriate for the authorities to facilitate access to or permanence in a job by

increasing schedule flexibility, so that both parents can reconcile the care of their blind child and their work activity.

Our results also show that family satisfaction in parents of visually impaired children is higher than in the normative population, although there were no statistically significant differences (with a moderate effect size). This result was unexpected, taking into account previous studies in which it has been suggested that the birth or the diagnosis of a child with a disability necessarily implies family reorganization (Badia Corbella, 2002; Femenías and Sánchez, 2003). In a study with five disabled children's families, Femenías and Sánchez (2003) obtained a lower score on family satisfaction than the control group formed by parents who did not have disabled children. Nevertheless our results suggest that this situation is currently changing and that these families display greater satisfaction, and the relations among their members are more positive. This may be due to the fact that having a blind child frequently causes the family to focus on the child, as if he or she granted a new meaning to life, in spite of the exhaustion involved in the child's care (Sola-Carmona et al., 2013).

Finally, regarding our second objective, our results have revealed that the four scores (family satisfaction, state-anxiety, material well-being, and job satisfaction) used to measure the three components of subjective psychological well-being in our sample of parents of blind children correlated with each other, and the correlations were statistically significant (except for the relation between job satisfaction and family satisfaction). It is important to note that the correlations between state-anxiety and the remaining variables were negative, indicating that higher levels of material well-being, job satisfaction, and family satisfaction are associated with lower levels of anxiety. In previous studies with another type of population (Chapi Mori, 2012), it was also observed that higher levels of anxiety correlated with lower family satisfaction. On the whole, these results confirm one of the demands frequently made by families with blind children. They also reveal that providing these families with more economic resources would have a positive impact on their subjective psychological well-being, decreasing their state-anxiety and increasing their life satisfaction.

In addition, Sánchez-Cánovas (2007) described a moderate relation between material well-being and job satisfaction. However, our findings differ from the results of Sánchez López and Quiroga Estévez (1995), who had observed a positive and significant relation between job satisfaction and family satisfaction, and those of Femenías and Sánchez (2003), who found no correlation between situational anxiety and family satisfaction.

Among the limitations of this investigation, we note the reduced sample size, as not all the parents contacted consented to participate in the study. With regard to the selected sample, not all the blind children had the same degree of disability, and the comparison with the control group was done using the same group as the population chosen to validate the questionnaires employed. Moreover, despite the anonymity of the questionnaires, social desirability may have distorted some answers.

In spite of these limitations, the results of this study are very relevant to further our knowledge of the variables that can help to improve the psychological well-being of the parents of blind children.

A blind child's parents are essential agents for his/her good development. Nowadays, the experiences of parents in this situation are changing. The parents express discomfort but they also acknowledge what raising an impaired child means for them. Therefore, this research was designed using many daily life aspects, such as family relations, work, and the economy of families with blind children.

Although these families feel comfortable, they also have a shortage of financial resources resulting from the expense incurred by treatments, trips, medication, and support personnel, as well as the uncertainty about the possible lifelong needs of the impaired child. The government should become more involved because, in spite of the update of Acts in favor of disabilities and the escalation of public services, it does not seem that enough is being done. This aspect requires further study so that this collective does not lose its quality of life and, ultimately, become marginalized. Such a situation would clash with the values of social integration and inclusion encouraged in our society, and which may be truncated.

AUTHOR CONTRIBUTIONS

JS-C: contribution to the conception and design of the work; the acquisition and interpretation of data for the work, revising it critically for important intellectual content and final approval of the version to be published. RL-L, MD, and DP-G: contribution to the conception and design of the work; the interpretation of data for the work, revising it critically for important intellectual content, and final approval of the version to be published. JA-P: contribution to the design of the work; the analysis of data for the work, revising it critically for important intellectual content and final approval of the version to be published. All authors are accepting and agreeing that the work is original; any methods and data presented are described accurately and honestly; any relevant interests have been disclosed.

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Revisiting the Link between Job Satisfaction and Life Satisfaction: The Role of Basic Psychological Needs

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The link between job satisfaction and life satisfaction has been extensively explored in the relevant literature. However, the great majority of past research has been carried out using cross-sectional analyses, and almost exclusively in the Western world. Moreover, the underlying psychological mechanisms explaining the link are not yet completely understood. Thus, we report the first research to date which uses both cross-sectional and longitudinal data among workers in Chile—a fast-developing Latin American economy—and which aims to tackle previous limitations. Three studies consistently support a positive link between the constructs. Study 1 ($N = 636$) found that higher job satisfaction predicted higher life satisfaction both contemporaneously and longitudinally, and vice versa, above and beyond several key control variables. Study 2 ($N = 725$) and Study 3 ($N = 703$) replicated Study 1 results, but tested for the first time the role of satisfaction of basic psychological needs (as stated by self-determination theory) in the job–life satisfaction link. This is the most novel contribution of our paper. Key implications not only for individual quality of life, but also for companies' human resource practices emerge from our findings.

Keywords: job satisfaction, life satisfaction, need satisfaction, self-determination theory, longitudinal analyses, Chile

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INTRODUCTION

How related are job satisfaction and life satisfaction? This question has been extensively explored in the literature (Heller et al., 2002). The spillover hypothesis (Bowling et al., 2010) is the most supported hypothesis to date. It argues that "job experiences spill over onto other spheres of life, and vice versa, suggesting that a positive relationship exists between the two variables" (Heller et al., 2002, p. 816). However, there are still three important research gaps in this area. First, previous research has reported results mainly from the Western world (Rain et al., 1991; Heller et al., 2002; Diener and Tay, 2012). Second, most research in the subject is correlational, which does not allow for the inferring of causality (Bowling et al., 2010). Third, and finally, the lack of research aiming to give a solid theoretical explanation for the results is surprising (Rain et al., 1991; Judge and Watanabe, 1993; Rode, 2004). In fact, the underlying psychological mechanisms explaining the hypothesis are still not completely understood.

Further, aiming to tackle previous limitations, we explored three large samples of workers in Chile (a fast-developing Latin American economy) using both cross-sectional and longitudinal data, which is very rarely done in this field (Rode, 2004). In addition, because recent research has argued that the link between job satisfaction and life satisfaction might be spurious, and that a third variable could be involved (Judge and Watanabe, 1993; Rode, 2004), we tested for the first time the mediational role of basic need satisfaction (Deci and Ryan, 2000) in the job-life satisfaction link.

Job Satisfaction and Life Satisfaction

Happiness has been conceptualized from the hedonic and eudaimonic approaches (Delle Fave et al., 2011). The hedonic approach defines happiness in relation to the attainment of pleasure and the avoidance of pain (Ryan and Deci, 2001). From this point of view, happiness is often called subjective well-being (Diener, 1984), which consists of cognitive (life satisfaction) and emotional (positive and negative emotions) experiences. Life satisfaction represents the judgment that a person makes about his/her life in several domains (Diener, 1984; Diener and Tay, 2012), and it is the most extended construct for assessing subjective well-being (Helliwell et al., 2013). A growing body of research has shown that higher life satisfaction is associated with several desirable companies' results, such as higher career satisfaction, organizational commitment, and especially, job satisfaction (Diener and Tay, 2012).

Job satisfaction is a key construct in industrial and organizational psychology, and has been associated with multiple desirable outcomes such as job performance, organizational citizenship behavior, absenteeism, and life satisfaction (Heller et al., 2002; Erdogan et al., 2012). Most definitions of job satisfaction tend to focus on how employees feel and think about their work (Locke, 1969; Smith et al., 1969; Weiss, 2002; Drafke, 2009). These definitions, in a very similar way to those of life satisfaction, involve emotional states, feelings, affective responses, and cognitive evaluations of work (Alonso, 2006).

Three hypotheses have been argued to explain the link between job satisfaction and life satisfaction: the segmentation, compensation, and spillover hypotheses (Rain et al., 1991; Heller et al., 2002; Bowling et al., 2010).

The Segmentation Hypothesis

The segmentation hypothesis suggests that there is no relationship between job satisfaction and life satisfaction. Theoretical positions such as *partial inclusion* have been proposed to explain the link between both concepts from this perspective (for a review see Rain et al., 1991). However, only one study supported this hypothesis in the meta-analysis by Rain et al. (1991). Indeed, Gupta and Beehr (1981) found more support for the segmentation hypothesis than for the compensation and spillover ones, among 651 employees of five Midwestern organizations. According to the authors, these findings show that work (e.g., job satisfaction) and non-work aspects (e.g., life satisfaction) load on separate factors.

The Compensation Hypothesis

The compensation hypothesis states that people compensate for their job dissatisfaction by finding more satisfaction in other areas of their life, and vice versa (Iris and Barrett, 1972). Thus, a negative relationship is postulated. Theoretical positions such as the *principle of substitution* and *catharsis theory* have been proposed to explain this hypothesis (Rain et al., 1991). Very few studies, however, have supported it (e.g., Champoux, 1980; Chacko, 1983; Schlenker and Gutek, 1987; for a review see Rain et al., 1991). For example, Schlenker and Gutek (1987) studied 132 government-employed social workers. Half of them were reassigned to non-professional jobs, and this allowed understanding the impact of their dissatisfaction with the new job on their life satisfaction. The authors found that their discontent because of their work role-loss focused on their new jobs instead of on their satisfaction with life, thus supporting the compensation hypothesis. Chacko (1983) studied a US national probability sample, which was representative of the American labor force. The authors found that satisfaction with working conditions was a negative source of life satisfaction, thus also supporting the compensation hypothesis.

The Spillover Hypothesis

The spillover hypothesis argues that there is a positive relationship between job satisfaction and life satisfaction. Theoretical explanations such as *generalization* of belief and attitudes, *conditioning*, and *cognitive dissonance* have been given to explain it (Tait et al., 1989; Rain et al., 1991). To date, the spillover hypothesis is by far the most supported one in the literature. Meta-analytic techniques and literature reviews confirm these findings (Rice et al., 1980; Tait et al., 1989; Rain et al., 1991; Bowling et al., 2010). For example, a meta-analysis by Rice et al. (1980) explored 350 associations between job satisfaction and overall life satisfaction reported in 23 studies. More than 90% of the 350 statistical relationships supported a positive correlation. However, the reported zero-order correlations were mostly small (mid −0.30 for males and mid –0.20 for females), and none of the negative correlations they found was statistically significant.

The Tait et al. (1989) meta-analysis also confirmed that the spillover hypothesis is the most evidence-backed one. They explored 34 studies assessing the link between job and life satisfaction, but the authors found larger correlations than Rice et al. (1980). The corrected correlation (for both sampling error and measurement error) was 0.44. Importantly, whereas the corrected correlation was greater for men ($r = 0.40$) than for women ($r = 0.20$) in studies prior to 1974, the difference between men ($r = 0.37$) and women ($r = 0.39$) disappeared in studies after that year. Demographic changes among women, and the role of work in their lives, may explain these findings.

The Causal Direction of the Link Between Job Satisfaction and Life Satisfaction

Despite the strong empirical support for the spillover hypothesis, most research to date is correlational in nature, which does not allow for the inferring of causality. Does life satisfaction predict

job satisfaction or vice-versa? Would a bi-directional link be possible? Unfortunately, only a few studies to date have explored cause–effect patterns, and even these have mostly done so under the assumption that either job satisfaction or life satisfaction are dependent variables. For example, whereas Schmitt and Mellon (1980) showed that only life satisfaction predicts job satisfaction, Orpen (1978) and Chacko (1983) showed that only job satisfaction causes life satisfaction (Judge and Watanabe, 1993). Thus, there are hardly any studies that explore and show a reciprocal link (Rain et al., 1991; Judge and Watanabe, 1993). Nonetheless, a bi-directional link may be expected, thus making previous results inconsistent with the theory.

The Causal Influence of Life Satisfaction in Job Satisfaction: The Top-Down Model

The link between job satisfaction and life satisfaction can be interpreted in two ways: top-down vs. bottom-up models. The top-down model offers a dispositional explanation, claiming that "basic differences in personality and affectivity predispose people to be differentially satisfied with various aspects of their lives, including their jobs" (Heller et al., 2002, p. 816). Thus, affective states spillover into people's evaluations of their jobs (Judge and Watanabe, 1993, p. 939). In fact, a substantial body of research has shown that higher life satisfaction is associated with several desirable results for companies, such as higher career satisfaction, organizational commitment, and—of interest here—job satisfaction (Diener and Tay, 2012).

The Causal Influence of Job Satisfaction on Life Satisfaction: The Bottom-Up Model

Job satisfaction is a key indicator of workers' well-being (Diener and Tay, 2012), and therefore can also influence life satisfaction (Judge et al., 2001). Thus, the bottom-up model suggests a situational explanation. That is, "because the job is an important part of adult daily life, people who enjoy their jobs will report greater overall satisfaction with their lives" (Heller et al., 2002, p. 816). Indeed, research has consistently found that higher job satisfaction is associated with higher life satisfaction (Rice et al., 1980; Rain et al., 1991). This causal influence of job satisfaction on life satisfaction reflects the importance of work in people's lives, and is the most hypothesized direction of the link (Judge and Watanabe, 1993).

The Bi-Directional Link between Job Satisfaction and Life Satisfaction

The relationship between job and life satisfaction is likely not only to be a one-way direction, but also reciprocal. Thus, a bi-directional link may be expected (Heller et al., 2002). However, only a few exceptions have explored and found reverse causality (Keon and McDonald, 1982; Judge and Watanabe, 1993). For example, Keon and McDonald (1982) found that job satisfaction and life satisfaction were jointly determined among employees of an auto parts manufacturer in the US. Judge and Watanabe (1993) tested a causal model exploring bi-directional associations between job and life satisfaction, over a 5-year period, and controlling for several exogenous influences on life satisfaction (such as age, gender, education, wage rate, and marital status). Based on a national probability sample of US workers, they found that job and life satisfaction were significantly and reciprocally related both cross-sectionally and longitudinally. However, due to the small amount of research on this, and various limitations in the previous studies, scholars have advocated for more longitudinal research in the field exploring causality and the bi-directional link (Judge and Watanabe, 1993; Rode, 2004). Finally, the meta-analysis by Bowling et al. (2010) explored longitudinally the association between job satisfaction and subjective well-being. Despite the authors having found a reciprocal causal link between the constructs, the subjective well-being measure did not assess life satisfaction independently. The composite subjective well-being measure included not only life satisfaction, but also positive affect, happiness, and negative affect.

Individual Differences in the Link between Job Satisfaction and Life Satisfaction: Moderators and Mediators

To date, the great majority of previous research has supported the spillover hypothesis. However, what are the underlying psychological processes behind the link between job satisfaction and life satisfaction? Unfortunately, most studies have not advocated a theoretical proposition (Kabanoff, 1980; Rain et al., 1991), and the three hypotheses approach seems too simplistic (Rain et al., 1991). Indeed, researchers have suggested that more than one relationship between job satisfaction and life satisfaction may operate at any given time point, and that the three hypotheses "may exist for different individuals" (Heller et al., 2002, p. 816). Thus, more studies exploring different mediators and moderators are needed (Rice et al., 1980; Tait et al., 1989; Rain et al., 1991). Initially, the focus was on the moderator role of gender (Tait et al., 1989; Rain et al., 1991). However, other potential moderators (such as age, self-employment, locus of control, importance of work, need for achievement) have been suggested later on, but either they are not all consistent or they have not been tested yet (for a review see Rain et al., 1991).

Nobel research has proposed another look at the job–life satisfaction link. For example, it has been suggested that "much of the relationship between job satisfaction and life satisfaction is spurious, resulting from common influences" (Rode, 2004, p. 1206). Therefore, a third or confounding or mediator variable could be involved (Heller et al., 2002). Following this theorization, Heller et al. (2002) explored the role of personality (Big Five, positive/negative affectivity, and core self-evaluations) in the link between job satisfaction and life satisfaction. Using a longitudinal design among US employees, and multisource data, the authors found support for the confounding role of personality, especially core self-evaluations (neuroticism, locus of control, self-esteem, and generalized self-efficacy). After controlling for personality, the magnitude of the association between job and life satisfaction decreased significantly, suggesting the presence of a third variable involved.

However, despite the importance and novelty of these results, they need to be treated with caution, due to some limitations. First, despite the fact that Heller et al. (2002) argued that their design was longitudinal, it is correlational in nature.

A suitable longitudinal model needs to include all relevant T1 and T2 variables in the same model and modeling the stability paths, which in their study was not the case. Second, the authors did not test reciprocal causality: in their first two models, they assumed that job satisfaction precedes life satisfaction, while in the latter two models they took the opposite approach, meaning that life satisfaction precedes job satisfaction.

In another study, Rode (2004) replicated the findings of Heller et al. (2002). Using a nationally representative US sample, the author tested a comprehensive model examining the relationship between job satisfaction, life satisfaction and core self-evaluations and found a positive relationship between job satisfaction and life satisfaction over time. Interestingly, the link became non-significant after controlling for the effects of core self-evaluations. Similarly to Heller et al. (2002), Rode's (2004) findings present some limitations. First, the author only measured life satisfaction at time 1 (T1) and core self-evaluations at time 2 (T2). Therefore, although he argued the model is a longitudinal cross-lagged one, it is only cross-sectional in nature. A suitable cross-lagged model needs to include lagged paths from each relevant measure (e.g., life satisfaction, job satisfaction) at T1 to all relevant measures at T2, controlling for stability effects (i.e., all constructs need to be represented as potential antecedents and as potential consequences of all other constructs).

Previous results have given initial empirical support to the idea that the link between job satisfaction and life satisfaction may be spurious, and that a third variable could be involved. However, those studies only focused on personality and affectivity variables, without exploring other constructs. We hypothesize that the satisfaction of basic psychological needs as proposed by self-determination theory (Deci and Ryan, 2000) may also play a key role in the job–life satisfaction link. Initial evidence may be found in Hombrados-Mendieta and Cosano-Rivas (2013) and Di Fabio and Kenny (2016a). Hombrados-Mendieta and Cosano-Rivas (2013) found that workplace support (a proxy of the need for relatedness) protects job satisfaction and life satisfaction against the negative effects of burnout. Di Fabio and Kenny (2016a) stated that the need for relationship and the need for self-determination (a proxy of the need for autonomy) are crucial for workers' well-being. These preliminary results allow us to hypothesize that need satisfaction may mediate the relationship between job satisfaction and life satisfaction.

The Role of Basic Psychological Needs in the Job–Life Satisfaction Link

Self-determination theory (Deci and Ryan, 2000) is a "macro theory of human motivation, emotion and personality" (Vansteenkiste et al., 2010, p. 105). It states that human beings have three psychological needs—autonomy, competence, and relatedness—which are essential for psychological well-being and integration. Just as plants need essential nutrients, such as water and minerals, so people have essential needs too (Reis et al., 2000).

The need for *autonomy* (DeCharms, 1968) refers to the perception that our behavior is volitional and meaningful; the need for *competence* (White, 1959) refers to feeling effective and efficient in our behavior, as well as being able to successfully manage difficult challenges and meet performance standards; the need for *relatedness* (Baumeister and Leary, 1995) refers to feeling connected, appreciated and understood by others who are important (Vansteenkiste et al., 2010; Unanue et al., 2014). Therefore, feeling able to decide what to do and that these actions are valuable and enjoyable (*autonomy*); feeling good at daily activities (*competence*); and having meaningful and deep relationships with people who is important to us (*relatedness*) are the key nutrients for people flourishing (Deci and Ryan, 2000).

A substantial amount of research has supported the self-determination theory claims, showing that satisfaction of psychological needs is significantly associated with higher well-being both in general life and at work. For example, in everyday life settings, Unanue et al. (2014) showed that higher need satisfaction *in life settings* is associated with higher well-being (e.g., life satisfaction, vitality and positive affect) and lower ill-being (physical symptoms, negative affect and depressive symptoms). These findings have been replicated across the lifespan, as well as cross-culturally (Chen et al., 2014). In job settings, a recent meta-analysis (Van den Broeck et al., 2016), reviewing 99 studies with 119 distinct samples, found that the satisfaction of basic psychological needs *at work* is significantly associated not only with higher well-being (e.g., life satisfaction) but also with several desirable organizational outcomes (e.g., job satisfaction).

Previous findings allow us to hypothesize that the link between job satisfaction and life satisfaction may be spurious, and instead is rooted in basic needs satisfaction. This is because both job satisfaction and life satisfaction seem to be dispositionally based, and the same characteristics that predict one construct (job satisfaction) also predict the other (life satisfaction) (Heller et al., 2002). The role of psychological needs was suggested more than 30 years ago (Champoux, 1981; Rain et al., 1991). However, it has not been tested until now.

Therefore, in our research, we explore the confounding influence of basic need satisfaction (Deci and Ryan, 2000) on the link between job and life satisfaction. Because need satisfaction in life settings as well as at work predict well-being, our research will test both kinds of need satisfaction in the mentioned link.

Research Gaps: Justification for the Present Research

As mentioned before, meta-analytic techniques and literature reviews confirm that the spillover hypothesis is the most supported explanation for the link between job and life satisfaction. However, several methodological and theoretical research gaps have emerged in the field (Tait et al., 1989; Rain et al., 1991; Heller et al., 2002).

In methodological terms, there are two aspects that need to be improved: samples and design (Rain et al., 1991). First, most

research so far has focused on samples from the Western world[1]. Therefore, culture has not been taken into account. Nonetheless, cross-cultural research has shown that cultural aspects might influence several links (Thomas and Au, 2002; Thomas and Pekerti, 2003). Moreover, recent research has shown that the effects of happiness (such as life satisfaction) may be specific to some individualistic cultures (Ford et al., 2015). Such findings raise the question of whether the associations between job and life satisfaction found in the Western world are also held in different populations with different demographic characteristics, like Chile (Heller et al., 2002).

Second, most designs are still correlational in nature, and reciprocal causality has not been extensively explored using suitable cross-lagged models (Rain et al., 1991; Judge and Watanabe, 1993; Rode, 2004). In theoretical terms, and in spite of the spillover hypothesis receiving most of the empirical support, no satisfactory theoretical explanation has been offered (Rain et al., 1991). Indeed, research so far has done little to test the underlying psychological process behind the link (Rain et al., 1991; Judge and Watanabe, 1993).

Job Satisfaction Research in Chile

Data on well-being has only appeared recently in Latin America (Montero and Vásquez, 2015), and there is only one paper in which the job-life satisfaction link in Chile is studied: Loewe et al. (2014). Loewe et al. (2014) found support for the spillover hypothesis, showing that Chilean workers attribute most importance to their financial "situation, followed by family, work, and health" (p. 80). However, several limitations emerge from the paper. For example, it is correlational in nature and neither alternative models nor causality was tested. In addition, no underlying mechanisms for explaining the job-life satisfaction link were tested.

A few additional researchers have explored job satisfaction in Chile. For example, Cassar (2010) studied a representative sample of the Oxford Poverty and Human Development Initiative (OPHI) database, and found that the degree of employment protection, workplace facilities and level of independence were positively associated with job satisfaction. Using the same data set, Montero and Rau (2014) found a positive relationship between salaries and job satisfaction, while Montero and Vásquez (2015) showed the impact of reference wages on job satisfaction. Finally, using the CASEN survey (National Socio-Economic Characterization Survey) and OPHI, Montero and Rau (2015) found that part-time work has a negative effect on job and life satisfaction for men, but a positive effect for women. The above-mentioned represent a notable contribution to the job satisfaction literature in Chile. Nonetheless, these studies suffer from certain limitations. They are cross-sectional in nature, they did not explore the underlying psychological process, and more importantly, they did not test the link between job satisfaction and life satisfaction.

[1]It is important to mention that Haar et al. (2014) explored work-life balance and several well-being outcomes across seven cultures (Malaysian, Chinese, New Zealand Maori, New European, Spanish, French, and Italian). However, despite measures of job satisfaction and life satisfaction being included, the authors did not test the associations between both constructs. In addition, Morrison et al. (2011) explored the relationship between national satisfaction and several specific well-being indicators (e.g., job satisfaction and life satisfaction) among a sample representing 95% of the world's adult population, yet although the authors reported the correlation between job satisfaction and life satisfaction (0.26), they did this to the aggregate level. Thus, they did not show the results for every single country. In addition, only the correlation between the constructs was shown, and no suitable statistical model was tested. Therefore, causality may not also be implied.

Summary of Aims and Predictions

With the aim of tackling previous research gaps, we conducted three different studies among Chilean workers. We had three objectives in mind. First, to test whether the cross-sectional positive link (spillover hypothesis) between job and life satisfaction found in the Western world is held among workers from Chile, controlling for several key confounding variables not assessed to date. Second, because the great majority of past research has been carried out using cross-sectional analyses, we used longitudinal designs to test a possible bi-directional causal link between the core variables. Third, and finally, for the first time a comprehensive model was tested. It allowed us to examine the relationship between job and life satisfaction over time while taking into account the possible confounding role of a third variable: basic psychological needs.

Chile is a country with increasing mental health problems at work (MINSAL, 2017). Indeed, the Ministry of Labour in Chile warns that Chilean employees are in danger of serious psychological problems at work (Mutual de Seguridad, 2015). By understanding the job-life satisfaction dynamic we aim to help companies to develop strategies not only for protecting their employees' mental health, but also for improving employees' quality of life and happiness. In addition, because of the close link between life/job satisfaction and productivity, our findings may help to improve companies' profitability and sustainability (Diener and Tay, 2012; Montero and Vásquez, 2015).

Further, based on the previous evidence, we tested the following hypotheses:

(H1) Job satisfaction is positively associated with life satisfaction correlationally (Study 1; Study 2; Study 3).
(H2) Higher job satisfaction predicts higher life satisfaction prospectively and vice versa (longitudinally) (Study 1; Study 2; Study 3).
(H3) Need satisfaction *at work* explains the positive link between job satisfaction and life satisfaction both contemporaneously (correlationally) and prospectively (longitudinally). (Study 2).
(H4) Need satisfaction *in life* explains the positive link between job satisfaction and life satisfaction both contemporaneously (correlationally) and prospectively (longitudinally). (Study 3).

STUDY 1

Method

Procedure

Study 1 was carried out in accordance with the guideline recommendations of the American Psychological Association, British Psychological Society and World Medical Association

Declaration of Helsinki. All subjects gave written informed consent in accordance with the Declaration of Helsinki. The protocol was approved by the Ethics Committee of the Adolfo Ibáñez University.

At baseline (June 2016; T1), participants were invited online to take part in a research project where the core measures for the present paper were collected (job satisfaction and life satisfaction)[2]. Two months later (August 2016; T2), the same participants were asked to complete another online survey with identical measures. Initially, respondents were sent an introductory email containing a brief description of the study, along with a web link to the survey created using Qualtrics software.

Following Simmons et al.'s (2011) guidelines, all target sample sizes were determined in advance in Study 1, and in all further studies. Using a power analysis with G*Power 3.1 (Faul et al., 2009), considering a hypothesized small effect size (0.18; Bosco et al., 2015), power of 0.80, and p-value = 0.05, the desired sample was estimated as a minimum of $N = 187$. Both our cross-sectional data at T1 ($N = 636$) and T2 ($N = 268$), and our longitudinal data ($N = 210$), fulfill the required sample size. This minimum sample size ($N = 187$) also applies to Study 2 and Study 3.

We followed a key rule for collecting T1 data. We informed participants that the online system would be open for only 3 days (due to the original design of Unanue et al., 2017). Participants were informed that the project was part of a longitudinal study and were asked for their consent in participating in future waves. All T1 participants were sent a further email in August 2016 (T2). The rule for collecting T2 data was only slightly different. To be able to find reasonable effect sizes, we considered that it would be important to recruit a large sample aiming to reach a power of 0.80 both cross-sectionally and longitudinally.

Almost all constructs used in Study 1 showed acceptable distributions (George and Mallery, 2010). Skew values were acceptable for life satisfaction (T1: −1.45; T2: −0.05) and job satisfaction (T1: −1.2; T2: −1.03). Kurtosis values were acceptable for job satisfaction (T1: 1.75; T2: 1.34). In the case of life satisfaction, Kurtosis values were acceptable at T2 (0.58), but not at T1 (4.41).

Sample

In total, 636 Chilean working adults (52.8% female) aged from 22 to 71 years (Mean age = 39.76; SD = 8.61) finished the whole survey and completed our T1 measures. Of them, 475 (74.69%) provided their e-mail address for future waves. At T2, 268 participants (55.6% female) aged from 20 to 80 years (Mean age = 40.47; SD = 10.73) answered our core measures (56.42% response rate). Finally, 210 workers (56.2% female) aged from 23 to 71 years (Mean age = 40.16; SD = 9.17) answered both waves.[3]

[2]Other measures (e.g., positive/negative emotions, happiness, trust, materialism, etc.) were collected as part of a broader survey on *soccer and happiness* (Unanue et al., 2017), but they are not relevant to the present research. For that study we collected data from working and non-working adults. However, for the present one, we only used data from employees in Chile. The same applies to Study 2 and Study 3.

[3]Some demographic data for participants who stayed in T1 and T2 may differ between T1 and T2 due to changes in working status between the two waves. The same applies to Study 2 and to Study 3.

Measures

We used the following measures for Study 1.

Job satisfaction

We used a single question: "All in all, how satisfied are you with your job?" Participants answered on an 11-point scale, ranging from "extremely unsatisfied" (0) to "extremely satisfied" (10). Meta-analytic analysis demonstrated that this single question is highly valid for measuring job satisfaction (Dolbier et al., 2005).

Life satisfaction

We used a single question: "All in all, how satisfied are you with your life?" Participants answered on an 11-point scale, ranging from "extremely unsatisfied" (0) to "extremely satisfied" (10). This question is the most extensive single item question designed to measure life satisfaction, and it has shown good psychometric properties (Helliwell et al., 2013).

Demographic variables

At T1, we asked participants to report their age and gender status. However, at T2, we asked participants also to report additional demographic variables such as education, economic sector (mining, transport, etc.), working area (marketing, finance, etc.), managerial functions (whether or not they lead people), monthly personal income, and monthly family income. Our results showed that participants who answered both waves differed in several demographic characteristics such as education (high school education 5.71%, Bachelors degree 31.90%, post-graduate degree 61.43%, other 0.95%); economic sector (health and social services 18.10%, education 14.76%, commerce 7.62%, community services 5.71%, public sector 4.76%, mining 4.29%, financial services 3.81%, manufacturing 3.81%, transport 3.81%, others 33.33%); working area (accounting 0.95%, technology 1.90%, administration 4.29%, finance 5.71%, operations 7.14%, marketing 6.19%, human resources 36.20%, others 37.62%); managerial positions (58%); net personal monthly average income (mean = US$ 5,789.30; SD = 3,664.30); and net family monthly average income (US$1,853.10; SD = 1,396.30). As stated by Judge and Watanabe (1993), what is crucial when studying the link between job and life satisfaction is "the use of extensive controls derived from past theory and research", the lack of which was a limitation in previous studies (p. 940). Thus, we aimed to tackle this limitation by using our extensive number of control variables.

Results

Data Analysis

All constructs of interest were measured at T1 and T2. Descriptive statistics and intercorrelations for all the study variables are shown in **Table 1** (cross-sectional analyses) and **Table 2** (longitudinal analysis). We used AMOS 22 software (Amos Development Corporation, Florida, USA) to estimate an autoregressive cross-lagged model (Finkel, 1995) through path analysis. We used full maximum likelihood estimation in all our analyses. All the paths in Study 1 and all further studies were standardized. Because this was a saturated model, the fit indices were perfect.

Cross-Sectional Analyses

First, we set up a cross-sectional model to test H1, and to determine the size of the association between job satisfaction and life satisfaction at T1 and T2. We controlled for age and gender. At T1 (**Figure 1**), we found that job satisfaction was significantly and positively related to life satisfaction, $\beta = 0.43$, $p < 0.001$. At T2 (**Figure 1**), job satisfaction was also significantly and positively related to life satisfaction, $\beta = 0.49$, $p < 0.001$. These results show a medium effect size (Cohen, 1992) for the association between job and life satisfaction, supporting H1 at both T1 and T2.

Longitudinal Analysis

We used a cross-lagged longitudinal design to disentangle the causal direction between job satisfaction and life satisfaction, aiming to test H2 and H3. Here, we controlled for age and gender, but also for education, economic sector, working area, managerial functions, net monthly personal income, and net monthly family income. A two-factor model where each T2 measure was regressed on both its own lagged measure as well as the other lagged measures was defined. We allowed the observed measures to covary within each time point. Thus, all constructs were represented as potential antecedents and as potential consequences of all other constructs, while controlling for stability effects. Values of R^2 were also acceptable ($p < 0.001$) ranging from 0.49 (life satisfaction) to 0.43 (job satisfaction) ($p < 0.001$). We found that job satisfaction was a significant and positive prospective predictor of life satisfaction, $\beta = 0.21$, $p < 0.01$. In addition, we found that life satisfaction was a significant and positive prospective predictor of job satisfaction, $\beta = 0.23$, $p < 0.001$. These results show that longitudinally, job satisfaction predicts life satisfaction and vice versa, supporting H2. Importantly, the prospective bi-directional link remained above and beyond all our control variables. Paths are reported in **Figure 2**.

TABLE 1 | Descriptives and inter-correlations between all study 1 variables.

	Scale range	*M*	*SD*	1	2	3	4
TIME 1							
1. Gender		1.53	0.50				
2. Age		39.76	8.61	−0.12**			
3. Life Satisfaction	0–10	8.14	1.47	0.04	0.12**		
4. Job Satisfaction	0–10	7.60	2.01	0.04	0.22**	0.45**	
TIME 2							
1. Gender		1.56	0.50				
2. Age		40.47	10.73	−0.22**			
3. Life Satisfaction	0–10	8.10	1.19	−0.02	0.14*		
4. Job Satisfaction	0–10	7.44	1.82	−0.03	0.21**	0.50**	

*$p < 0.05$; **$p < 0.01$.

Study 1 Brief Discussion

Study 1 supported H1 and H2, but also allowed us to tackle several limitations found in the previous literature. Supporting the spillover hypothesis (Tait et al., 1989; Rain et al., 1991; Bowling et al., 2010), we found a cross-sectional and causal positive bi-directional link between job satisfaction and life satisfaction among workers from Chile. Importantly, the correlational and longitudinal links were found while controlling for several demographic and confounding variables not assessed in previous research (age, gender, education, marital status, salary, etc.). Indeed, Judge and Watanabe (1993) argued that when studying the link between job and life satisfaction, the use of extensive controls is crucial. Indeed, our results suggest taking into account the demographic variables as control variables when studying the job-life satisfaction link. Finally, it is worth mentioning that a limitation of Study 1 design is that it did not allow testing a third variable that may be driving the mentioned link. Thus, in Study 2 we tested the confounding influence of need satisfaction at work, whereas in Study 3 we tested the confounding influence of need satisfaction in general life setting.

TABLE 2 | Descriptives and inter-correlations between all study 1 variables, at Time 1 (T1) and Time 2 (T2) (longitudinal data).

	Scale range	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12
1. Gender		1.56	0.50												
2. Age		40.16	9.17	−0.13											
3. Education		5.30	0.96	−0.13	−0.02										
4. Managerial functions		1.42	0.50	0.16*	−0.26**	−0.04									
5. Working area		5.72	2.17	0.07	0.15*	−0.01	0.17*								
6. Economic sector		15.98	5.11	0.22**	0.01	0.09	0.06	0.10							
7. Monthly personal income (US$)		3401.66	2878.96	−0.18*	0.42**	0.04	−0.35**	−0.10	−0.12						
8. Monthly family income (US$)		5789.29	3664.34	0.08	0.18*	0.05	−0.32**	−0.05	−0.04	0.62**					
9. Life Satisfaction T1	0–10	8.33	1.14	0.04	0.21**	−0.09	−0.10	0.03	0.03	0.10	0.18*				
10. Job Satisfaction T1	0–10	7.66	1.89	0.01	0.18**	−0.04	−0.12	0.00	0.05	0.19**	0.25**	0.49**			
11. Life Satisfaction T2	0–10	8.19	1.12	0.09	0.07	−0.06	−0.17*	0.02	0.00	0.15*	0.19*	0.56**	0.43**		
12. Job Satisfaction T2	0–10	7.50	1.84	0.02	0.21**	−0.03	−0.21**	0.04	0.02	0.15*	0.19*	0.46**	0.58**	0.52**	

*$p < 0.05$; **$p < 0.01$.

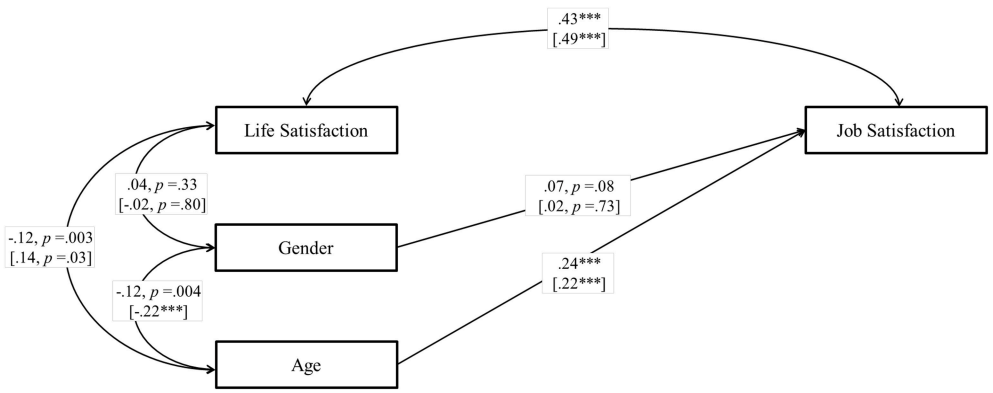

FIGURE 1 | Study 1. Structural correlational model for the association between job satisfaction and life satisfaction at Tl and T2. T2 data are in brackets. Coefficients shown are standardized paths.T1, Time 1; T2, Time 2. ***$p < 0.001$.

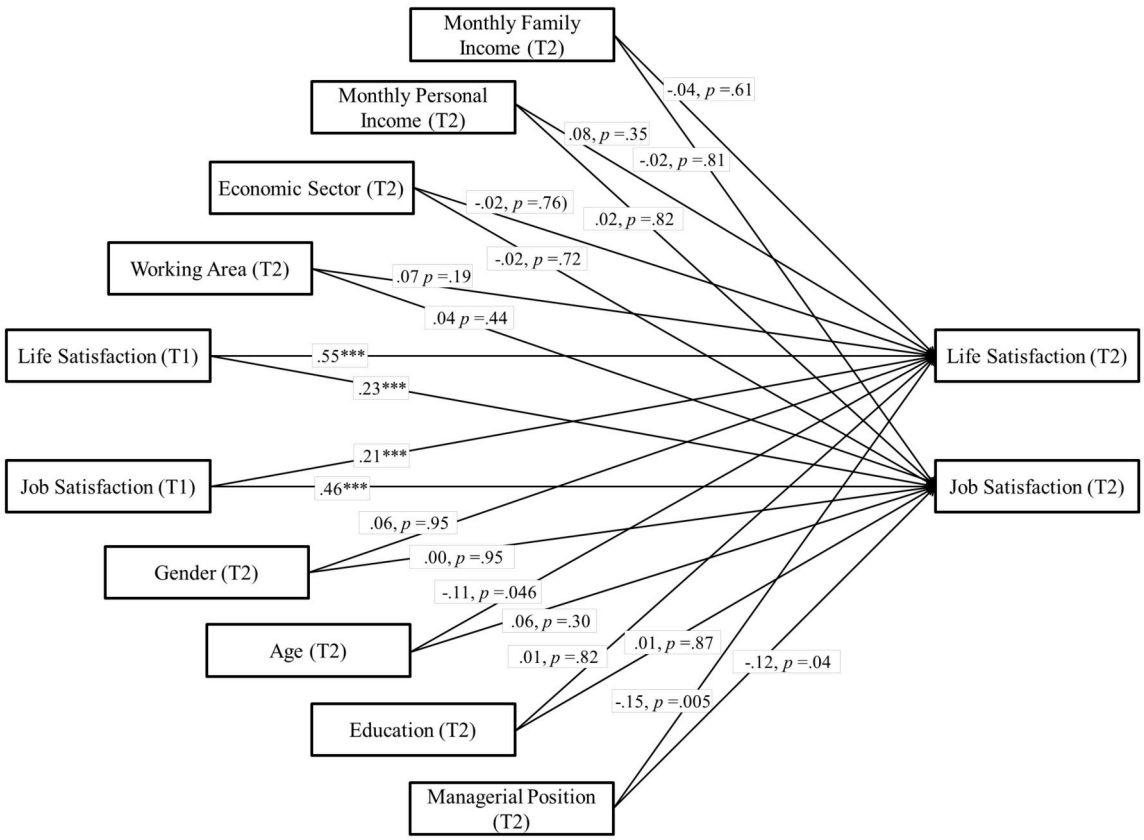

FIGURE 2 | Study 1. Structural longitudinal model for the association between job satisfaction and life satisfaction. Coefficients shown are standardized paths. Error terms and covariances are not shown to enhance visual clarity. Tl, Time 1; T2, Time 2. ***$p < 0.001$.

STUDY 2

Method

Procedure

Study 2 followed the same ethical rules as Study 1. We utilized a cross-lagged longitudinal design with 4 weeks between the two observations and a wide sample of Chilean worker adults. At the baseline (September 2016; T1), participants were invited online to take part in a research project where the core measures for the present paper were collected (job satisfaction, life satisfaction and need satisfaction at work[4]). A university in Santiago provided a mailing list for both Study 2 and Study 3. Participants were

[4]We also collected measures of need frustration, materialism, work outcomes (engagement, burnout, etc.), gratitude and beneficence, but they are not relevant to the present research.

informed that the project was part of a longitudinal study and were asked for their consent to participate in future waves. Four weeks later (October 2016; T2), the same participants were asked to complete another online survey with identical measures. Respondents received an introductory email containing a brief description of the study, along with a web link to the survey created using Qualtrics software.

We followed a key rule for collecting T1 and T2 data. The survey was kept open for only 1 week, and every working day a polite reminder was sent to those respondents who had not answered. Both our cross-sectional data at T1 ($N = 725$) and T2 ($N = 275$), and our longitudinal data ($N = 274$) fulfilled the required minimum sample size according to our power analysis mentioned previously.

Sample

In total, 725 Chilean worker adults (47.9% female) aged from 21 to 72 years (Mean age = 38.03; $SD = 10.01$) finished the whole survey and completed our T1 measures. At T2, 275 participants (47.3% female) aged from 21 to 72 years (Mean age = 39.69; $SD = 10.24$) answered our core measures (37.93% response rate). Finally, 274 workers (47.1% female) aged from 21 to 72 years (Mean age = 39.75; $SD = 10.20$) answered both waves.

All constructs used in Study 2 showed acceptable distributions (George and Mallery, 2010). Skew values were acceptable for life satisfaction (T1: −1.14; T2: −0.98), job satisfaction (T1: −0.69; T2: −0.91) and need satisfaction at work (T1: −0.53; T2: 0.62). Kurtosis values were acceptable for life satisfaction (T1: 1.53; T2: 0.91), job satisfaction (T1: −0.13; T2: 0.62) and need satisfaction at work (T1: 0.09; T2: −0.04).

Measures

Job satisfaction and life satisfaction were measured using the same single items used in Study 1. However, in this study, the job satisfaction question was answered on a scale from 1 to 7. Need satisfaction was measured using the Satisfaction items of the Need Satisfaction and Frustration scales adapted to the work context (Chen et al., 2014). The satisfaction subscale included 12 items: four for autonomy ("I feel my choices on my job express who I really am"), four for competence ("At work, I feel capable at what I do"), and four for relatedness ("At work, I feel connected with people who care for me, and for whom I care"). Participants rated these statements on a 7-point Likert-type scale ranging from *1 (not at all true)* to *7 (very true)*. The internal reliability of the need satisfaction scale was good, both at T1 ($\alpha = 0.90$) and T2 ($\alpha = 0.90$). Chen et al.'s (2014) scale has shown good psychometric properties and demonstrated that the items load in a single factor. Thus, we calculated a need satisfaction mean score by averaging its 12 indicators.

Results

Data Analysis

All constructs were measured at T1 and T2. Descriptive statistics and intercorrelations for all the study variables are shown in **Table 3** (cross-sectional analyses) and **Table 4** (longitudinal analysis). We used AMOS 22 software (Amos Development Corporation, Florida, USA) to estimate an autoregressive cross-lagged model through path analysis (Finkel, 1995). We used full maximum likelihood estimation in all our analyses. Because this was a saturated model, the fit indices were perfect.

Cross-Sectional Analyses

First, we set up a cross-sectional model. At T1 (Supplementary Figure 1), we found that job satisfaction was significantly and positively related to life satisfaction, $\beta = 0.30$, $p < 0.001$. Thus, H1 was supported at T1. Then, to test H3, we included need satisfaction in the model. We allowed need satisfaction to predict both job and life satisfaction. We found that need satisfaction was positively associated with both life satisfaction, $\beta = 0.40$, $p < 0.001$, and job satisfaction, $\beta = 0.64$, $p < 0.001$. In support of H3, when need satisfaction was included in the model, the path between life and job satisfaction becomes non-significant, $\beta = 0.06$, $p = 0.09$ (Supplementary Figure 2). At T2 (Supplementary Figure 1), we found that job satisfaction was significantly and positively associated with life satisfaction, $\beta = 0.40$, $p < 0.001$. Thus, H1 was also supported at T2. Then, to

TABLE 3 | Descriptives and inter-correlations between all study 2 variables.

	Scale range	*M*	*SD*	1	2	3	4	5
TIME 1								
1. Gender		1.48	0.50					
2. Age		38.30	10.01	−0.20**				
3. Life Satisfaction	0–10	7.82	1.72	−0.04	0.03			
4. Job Satisfaction	1–7	5.02	1.34	−0.02	0.15**	0.30**		
5. Need Satisfaction at Work	1–7	5.45	0.94	−0.03	0.14**	0.40**	0.64**	
TIME 2								
1. Gender		1.47	0.50					
2. Age		39.69	10.24	−0.15*				
3. Life Satisfaction	0–10	7.86	1.53	0.00	0.09			
4. Job Satisfaction	1–7	5.07	1.29	0.00	0.24**	0.40**		
5. Need Satisfaction at Work	1–7	5.45	0.91	0.00	0.20**	0.42**	0.73**	

*$p < 0.05$; **$p < 0.01$.

TABLE 4 | Descriptives and inter-correlations between all study 2 variables, at Time 1 (T1) and Time 2 (T2) (longitudinal data).

	Scale range	*M*	*SD*	1	2	3	4	5	6	7	8
1. Gender		1.47	0.50								
2. Age		39.75	10.20	−0.15*							
3. Life Satisfaction (T1)	0–10	7.89	1.58	−0.05	0.04						
4. Job Satisfaction (T1)	1–7	5.05	1.30	−0.07	0.27**	0.28**					
5. Need Satisfaction at Work (T1)	1–7	5.53	0.89	0.02	0.22**	0.41**	0.59**				
6. Life Satisfaction (T2)	0–10	7.86	1.54	−0.01	0.09	0.69**	0.28**	0.35**			
7. Job Satisfaction (T2)	1–7	5.08	1.29	0.00	0.23**	0.31**	0.61**	0.63**	0.40**		
8. Need Satisfaction at Work (T2)	1–7	5.45	0.91	0.01	0.19**	0.37**	0.49**	0.79**	0.42**	0.73**	

*$p < 0.05$; **$p < 0.01$.

test H3, we included need satisfaction in the model. We found that need satisfaction was positively associated with both life satisfaction, $\beta = 0.42$, $p < 0.001$, and job satisfaction, $\beta = 0.74$, $p < 0.001$ (Supplementary Figure 2). In support of H3, when need satisfaction was included in the model, the path between life satisfaction and job satisfaction, although still significant, decreased by almost half of its original value, $\beta = 0.16$, $p < 0.10$.

Longitudinal Analysis

First, we started with a structural cross-lagged reciprocal model for our core variables (job and life satisfaction), following the same strategy as for Study 1. Second, we allowed the three measures to covary within each time point, and we modeled lagged paths from each of the three measures to all three measures at each successive time point. Therefore, all constructs were represented both as potential antecedents and potential consequences of all other constructs, while controlling for stability effects. Supporting H2, we found that job satisfaction was a positive prospective predictor of life satisfaction, $\beta = 0.09$, $p < 0.05$, and that life satisfaction was a significant and positive prospective predictor of job satisfaction, $\beta = 0.14$, $p < 0.001$ (**Figure 3**). R^2 was good for job satisfaction (0.43) and life satisfaction (0.53). Given the important role hypothesized by need satisfaction at work in the job-life satisfaction relationship, we tested a structural model to establish whether need satisfaction influenced both variables (**Figure 4**). In this new model, R^2 was good for job satisfaction (0.50), life satisfaction (0.53), and need satisfaction at work (0.62). We found that need satisfaction at work was a significant and positive prospective predictor of job satisfaction, $\beta = 0.35$, $p < 0.001$ and that life satisfaction was a significant and positive prospective predictor of need satisfaction at work, $\beta = 0.08$, $p < 0.05$. They were the only significant paths. Importantly, after controlling for need satisfaction at work, the reciprocal link between job satisfaction and life satisfaction becomes non-significant, supporting H3. Indeed, job satisfaction did not predict life satisfaction longitudinally, $\beta = 0.07$, $p = 0.17$ and similarly, life satisfaction did not predict job satisfaction longitudinally, $\beta = 0.06$, $p = 0.13$ when controlling for need satisfaction at work.

Study 2 Brief Discussion

The results of Study 2 replicated the findings of Study 1, thus supporting H1 and H2, and, in turn, the spillover hypothesis (Tait et al., 1989; Rain et al., 1991). More importantly, taking a bottom-up approach (Diener and Tay, 2012), we found that the cross-sectional and longitudinal links between job satisfaction and life satisfaction was mediated by need satisfaction at work (Deci and Ryan, 2000). This key finding supports H3. However, despite the important results of Study 2, it only tested the confounding role of need satisfaction in job settings. Thus, Study 3 is aimed to test the role of need satisfaction in general life settings.

STUDY 3

Method

Procedure

Study 3 followed the same ethical rules as Study 1 and Study 2. We used a cross-lagged longitudinal design with 4 weeks between the two observations and a sample of Chilean working adults. At the baseline (September 2016; T1), participants were invited online to take part in a research project including the core measures for the present paper (job satisfaction, life satisfaction and need satisfaction *in life*[5]). Participants were informed that the project was part of a longitudinal study and were asked for their consent to participate in future waves. All T1 participants were sent a further email in October 2016 (T2). Thus, 4 weeks later (October 2016; T2), the same participants were asked to complete another online survey with identical measures. Respondents were sent an introductory email containing a brief description of the study, along with a web link to the survey created using Qualtrics software.

We followed the same rules as in Study 1 for collecting T1 and T2 data. Both our cross-sectional data at T1 ($N = 703$) and T2 ($N = 263$), and our longitudinal data ($N = 258$) fulfilled the required minimum sample size according to the power analysis.

Almost all constructs used in Study 3 showed acceptable distributions (George and Mallery, 2010). Skew values were acceptable for life satisfaction (T1: −1.30; T2: −1.60), job satisfaction (T1: −0.83; T2: −0.87), and need satisfaction in life (T1: −1.14; T2: −1.61). Kurtosis values were acceptable for life satisfaction (T1: 2.06; T2: 2.68), job satisfaction (T1: 0.24; T2:

[5]We also collected measures of flourishing, pro-social behavior, beneficence, work outcomes (engagement, burnout, etc.), and gratitude, but they are not relevant to the present research.

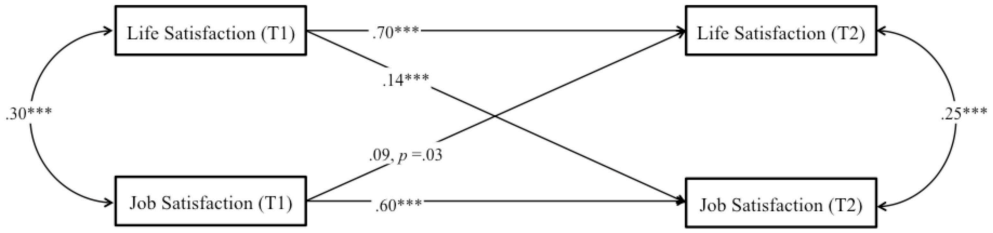

FIGURE 3 | Study 2. Structural longitudinal model for the association between job satisfaction and life satisfaction. Coefficients shown are standardized paths. Error terms are not shown to enhance visual clarity. T1, Time 1, T2, Time 2. ***$p < 0.001$.

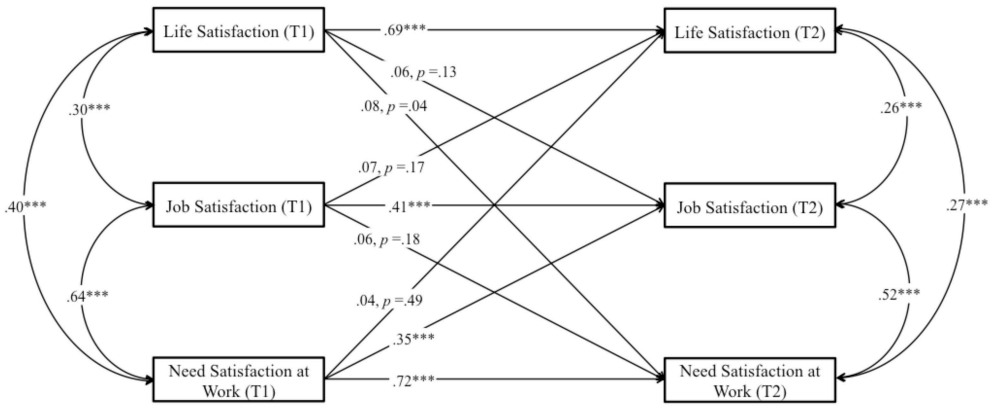

FIGURE 4 | Study 2. Structural longitudinal model for the association between job satisfaction and life satisfaction, and need satisfaction at work. Coefficients shown are standardized paths. Error terms are not shown to enhance visual clarity. T1, Ti me 1; T2, Time 2. ***$p < 0.001$.

−0.01). However, Kurtosis values for need satisfaction in life were acceptable at T1 (1.86), but not at T2 (4.37).

Sample

In total, 703 Chilean working adults (43.2% female) aged from 21 to 69 years (Mean age = 38.45; *SD* = 9.59) finished the whole survey and completed our T1 measures. At T2, 263 participants (44.5% female) aged from 23 to 68 years (Mean age = 39.32; *SD* = 9.72) answered our core measures (37.41% response rate). Finally, 258 workers (44.6% female) aged from 23 to 68 years (Mean age = 39.10; *SD* = 9.63), answered both waves.

Measures

Job satisfaction was measured using the same single items used in Study 2. Life satisfaction was measured using the same single items used in Study 1. Need Satisfaction *in life* was measured using the items of the Need Satisfaction and Frustration scales, but in its original version, which aimed to explore life settings (Chen et al., 2014). The internal reliability of the need satisfaction scale was good, both at T1 ($\alpha = 0.90$) and T2 ($\alpha = 0.93$). We calculated a need satisfaction mean score by averaging its 12 life indicators.

Results

Data Analysis

All constructs were measured at T1 and T2. Descriptive statistics and intercorrelations for all the study variables are shown in **Table 5** (cross-sectional analyses) and **Table 6** (longitudinal analysis). We used AMOS 22 software (Amos Development Corporation, Florida, USA) to estimate an autoregressive cross-lagged model through path analysis (Finkel, 1995). We used full maximum likelihood estimation in all our analyses. Because this was a saturated model, the fit indices were perfect.

Cross-Sectional Analyses

First, we set up a cross-sectional model. At T1 (Supplementary Figure 3), we found that job satisfaction was significantly and positively related to life satisfaction, $\beta = 0.52$, $p < 0.001$. Therefore, H1 was supported at T1. To test H4, we included need satisfaction in the model. We allowed need satisfaction to predict both job satisfaction and life satisfaction (Supplementary Figure 4). Need satisfaction was positively associated with both life satisfaction, $\beta = 0.47$, $p < 0.001$, and job satisfaction, $\beta = 0.72$, $p < 0.001$. However, in support of H4, when need satisfaction was included in the model, the path between job satisfaction and life satisfaction decreased by almost half of its original value, $\beta = 0.30$, $p < 0.001$. At T2 (Supplementary Figure 3), we found that job satisfaction was significantly and positively related to life satisfaction, $\beta = 0.66$, $p < 0.001$. Thus, H1 was supported at T2. To test H4, we included need satisfaction in the model (Supplementary Figure 4). We found that need satisfaction was positively associated with both life satisfaction, $\beta = 0.77$, $p < 0.001$, and job satisfaction, $\beta = 0.66$, $p < 0.001$. In support of H4 at T2, when need satisfaction was

TABLE 5 | Descriptives and inter-correlations between all study 3 variables.

	Scale range	*M*	*SD*	1	2	3	4	5
TIME 1								
1. Gender		1.44	0.50					
2. Age		38.45	9.59	−0.20**				
3. Life satisfaction	0–10	7.71	1.91	−0.06	0.09*			
4. Job satisfaction	0–10	6.69	2.40	−0.12**	0.18**	0.52**		
5. Need satisfaction in life	1–7	5.91	0.80	−0.05	0.07	0.72**	0.47**	
TIME 2								
1. Gender		1.44	0.50					
2. Age		39.32	9.72	−0.17**				
3. Life satisfaction	0–10	7.70	2.16	−0.14*	0.17**			
4. Job satisfaction	0–10	6.71	2.61	−0.18**	0.25**	0.66**		
5. Need satisfaction in life	1–7	5.90	0.91	−0.14*	0.18**	0.77**	0.66**	

*$p < 0.05$; **$p < 0.01$.

TABLE 6 | Descriptives and inter-correlations between all study 3 variables, at Time 1 (T1) and Time 2 (T2) (longitudinal data).

	Scale range	*M*	*SD*	1	2	3	4	5	6	7	8
1. Gender		1.45	0.50								
2. Age		39.10	9.63	−0.17**							
3. Life satisfaction (T1)	0–10	7.76	1.98	−0.13*	0.13*						
4. Job satisfaction (T1)	0–10	6.74	2.47	−0.18**	0.22**	0.62**					
5. Need satisfaction in life (T1)	1–7	5.91	0.81	−0.14*	0.16**	0.74**	0.55**				
6. Life satisfaction (T2)	0–10	7.69	2.17	−0.15*	0.17**	0.85**	0.57**	0.73**			
7. Job satisfaction (T2)	0–10	6.68	2.62	−0.19**	0.24**	0.59**	0.75**	0.63**	0.66**		
8. Need satisfaction in life (T2)	1–7	5.89	0.91	−0.15*	0.17**	0.67**	0.53**	0.84**	0.77**	0.66**	

*$p < 0.05$; **$p < 0.01$.

included in the model, the path between life and job satisfaction decreased to almost half of its original value, $\beta = 0.32$, $p < 0.001$.

Longitudinal Analysis

First, we started with a structural cross-lagged reciprocal model for our core variables (job and life satisfaction), following the same strategy as for Study 2. Second, we allowed the three measures to covary within each time point, and we modeled lagged paths from each of the three measures to all three measures at each successive time point. Thus, all constructs were represented as potential antecedents and consequences of all other constructs, while controlling for stability effects. Supporting H2, we found that job satisfaction was a positive prospective predictor of life satisfaction, $\beta = 0.08$, $p < 0.05$, and that life satisfaction was a significant and positive prospective predictor of job satisfaction, $\beta = 0.18$, $p < 0.001$ (**Figure 5**). R^2 was good for job satisfaction (0.56) and life satisfaction (0.70). Then, given the role hypothesized by need satisfaction in the job-life satisfaction relationship, we ran a structural equation model to assess whether need satisfaction influenced both variables aiming to test H4 (**Figure 6**). In this model, R^2 was good for job satisfaction (0.60), life satisfaction (0.72), and need satisfaction (0.71). We found that need satisfaction in life was a significant and positive prospective predictor of both job satisfaction, $\beta = 0.29$, $p < 0.001$ and life satisfaction, $\beta = 0.22$, $p < 0.001$. Moreover, we found that job satisfaction was a significant and positive prospective predictor of need satisfaction in life, $\beta = 0.09$, $p < 0.05$. No other significant prospective paths were found. After controlling for need satisfaction, the reciprocal link between job satisfaction and life satisfaction became non-significant, supporting H4. We found that job satisfaction does not predict life satisfaction longitudinally, $\beta = 0.05$, $p = 0.21$ and life satisfaction does not predict job satisfaction longitudinally, $\beta = 0.08$, $p = 0.99$, when controlling for need satisfaction.

Study 3 Brief Discussion

Study 3 results also replicated Study 1 findings, thus supporting H1 and H2. In addition, taking a top-down approach (Heller et al., 2002), it was found that the cross-sectional and causal bi-directional positive link between job satisfaction and life satisfaction is rooted in need satisfaction in life (Deci and Ryan, 2000). This key finding supports H4.

GENERAL DISCUSSION

So, returning to our initial question—Are job satisfaction and life satisfaction related?—we can say that despite the limitations of previous research, three hypotheses have emerged to explain their possible association (Rain et al., 1991; Heller et al., 2002, p. 288): the segmentation, compensation, and spillover

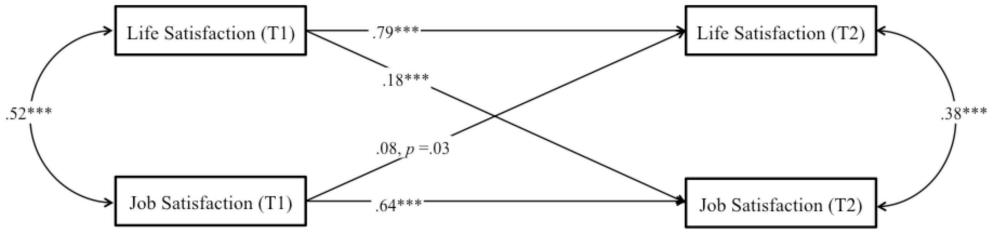

FIGURE 5 | Study 3. Structural longitudinal model for the association between job satisfaction and life satisfaction. Coefficients shown are standardized paths. Error terms are not shown to enhance visual clarity. T1, Time 1; T2, Time 2. ***$p < 0.001$.

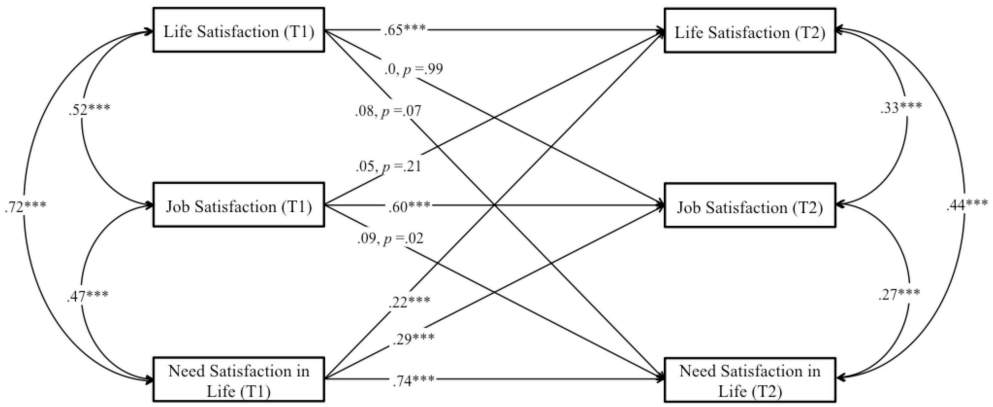

FIGURE 6 | Study 3. Structural longitudinal model for the association between job satisfaction and life satisfaction, and need satisfaction at life. Coefficients shown are standardized paths. Error terms are not shown to enhance visual clarity. Tl, Time 1; T2, Time 2. ***$p < 0.001$.

hypotheses. The segmentation hypothesis suggests that there is no association between both variables. The compensation hypothesis states that either high job satisfaction or high life satisfaction compensates for the dissatisfaction in the other area (i.e., there is a negative association). Finally, the spillover hypothesis claims that both variables are positively associated. We have tested these hypotheses through three studies involving both cross-sectional and longitudinal analysis among workers in Chile.

Consistently, Study 1, Study 2, and Study 3 showed that job satisfaction and life satisfaction are positively related both cross-sectionally and longitudinally bi-directionally, thus supporting the spillover hypothesis. Study 1 found that job satisfaction predicts increases in life satisfaction, which in turn predict increases in job satisfaction, and vice versa, thereby creating a virtuous circle in both individual and organizational well-being. Importantly, the link holds when controlling for age, gender, education, economic sector, working area, managerial functions, net monthly personal income, and net monthly family income. Thus, Study 1 aimed to approach Judge and Watanabe (1993) suggestion. He stated that when studying the link between job and life satisfaction, the use of extensive controls is crucial. Studies 2 and 3 replicated the findings of Study 1 in independent samples. Therefore, our results support the spillover hypothesis in the case of Chile and also show that this relationship is bi-directional.

However, a novel contribution of our research is the fact that the association between job satisfaction and life satisfaction may be spurious, and that a third variable could have an effect: basic need satisfaction (Deci and Ryan, 2000). Across two longitudinal studies (Studies 2 and 3), we can see that when need satisfaction is included at the same time as job satisfaction and life satisfaction, the job-life satisfaction bi-directional link becomes non-significant over time. These results were found using both a bottom-up approach (Study 2: need satisfaction *at work*) and a top-down approach (Study 3: need satisfaction *in general life settings*). This "spurious association" hypothesis has been proposed before (Heller et al., 2002; Rode, 2004), but only with regard to personality variables as mediators (e.g., Big Five, core self-evaluations). However, our research is the first attempt to test the role of the psychological needs for autonomy, competence and relatedness as stated by self-determination theory (Deci and Ryan, 2000). The results show that need satisfaction plays a key role in the process. Thus, our results support previous theorizations and findings in that a third variable may be driving the job-life satisfaction link.

Studying Chile allows us to extend previous research mostly done in the Western world. Our aim is for our results to be able to help companies to develop strategies not only for protecting their employees' mental health, but also for improving the employees' quality of life and happiness. Indeed, this issue is especially important in Chile, a country where the Ministry of Labor has

recently warned that employees are in danger of serious mental health problems (Mutual de Seguridad, 2015). In addition, as mentioned previously, due the strong link between life/job satisfaction and productivity, we hope our findings may also help companies to increase their profitability and sustainability (Diener and Tay, 2012; Montero and Vásquez, 2015).

Practical Implications for People and Organizations

What can be drawn from our research? Job satisfaction and life satisfaction are strongly related to several desirable outcomes both in life and at work (Diener and Tay, 2012). For example, whereas job satisfaction has been associated with higher job performance, organizational citizenship behavior and life satisfaction and lower absenteeism and turnover intentions (Heller et al., 2002; Erdogan et al., 2012), life satisfaction has been associated with higher career satisfaction, organizational commitment and job satisfaction (Diener and Tay, 2012). Our results show a key mechanism which companies may use if they wish to have happier and more engaged and productive workers: organizations should help employees to satisfy their psychological needs for autonomy, competence, and relatedness. Further, companies should help workers to feel that their behavior is volitional and meaningful (autonomy satisfaction); that they are effective and efficient in their behavior (competence satisfaction) and feel connected, appreciated and understood by important others (relatedness satisfaction) as stated by self-determination theory (Deci and Ryan, 2000; Van den Broeck et al., 2016).

Therefore, helping workers to feel that they are able to decide what to do, as well as feeling good at daily activities, and having meaningful and deep relationships with people who is important for them, are key nutrients for satisfying their psychological needs, making them more satisfied not only with their lives, but also with their jobs (Deci and Ryan, 2000; Van den Broeck et al., 2016). Thus, when companies help employees to satisfy their needs for autonomy, competence and relatedness, organizations might start a virtuous circle of flourishing both in employees' lives and at work. However, a vicious circle is also possible. If employees feel low need satisfaction, or even worse, feel that their psychological needs are frustrated (Unanue et al., 2014; Van den Broeck et al., 2016), companies may start a dangerous circle of employees' unhappiness.

Despite previous arguments supporting the importance of need satisfaction, recent research by Di Fabio and colleagues (Di Fabio and Palazzeschi, 2015; Di Fabio and Kenny, 2016a,b) has highlighted the importance of other employees' psychological resources (life resources and job resources) for promoting both job satisfaction and life satisfaction. Di Fabio and Kenny (2016a) recognize that decent work and well-being require the needs for "power, relationship, and self-determination" to be satisfied (similarly to self-determination theory postulates). However, there are a set of additional flexible life and work skills that also need to be developed. In work settings, for example, career management and self-management skills are crucial (e.g., maintaining their employability, intentionality, life-long learning, autobiographical reasoning, meaning-making, and building resilience). In life settings, for example, the development of self and reflexivity are additional key elements in this process. Further, the authors developed the *Positive Self and Relational Management* (PS&RM) model and found that Positive Lifelong Life Management (e.g., hedonic and eudaimonic well-being), Positive Lifelong Self-Management (e.g., individual level resources and self-insight in the work context), and Positive Lifelong Relational Management (e.g., relational adaptation in work and life) are the key resources that people should develop for happier lives and jobs. Other psychological resources for protecting and promoting well-being have been explored recently. For example, Di Fabio and Kenny (2016b) has shown that trait of emotional intelligence is associated with higher life satisfaction, above and beyond fluid intelligence and personality traits. In addition, Di Fabio and Palazzeschi (2015) have explored the role of resilience (among other variables): they show that resilience is associated with higher life satisfaction above and beyond fluid intelligence and personality trait.

All the skills mentioned previously draw upon psychological resources, and when developed, could help employees to foster their well-being both in life and at work. This process would complement the powerful role of need satisfaction. Thus, based on previous findings, future perspectives for intervention could focus not only on the satisfaction of the needs for autonomy, competence and relatedness, but also on developing career management and self-management skills, as well as emotional intelligence and resilience. A few programs have emerged recently in Chile for dealing with the promotion of well-being in the workplace. For instance, the Universidad Adolfo Ibáñez has launched a Graduate Program in Organizational Happiness, the *Diploma en Felicidad Organizacional* (DFO; UAI, 2016). The DFO has become a successful program aimed at training managers and consultants in the business skills and psychological resources needed for promoting well-being both in their lives and in their companies. In addition, the Chilean Ministry of Labor has developed an instrument for measuring mental health risks in the work place, called *Protocolo de Vigilancia de Riesgos Psico-sociales* (MINSAL, 2017). Depending on the companies' results with regard to employees' mental health, companies could be forced by law to implement programs to protect their employees' happiness.

Limitations and Future Research

We should acknowledge some limitations in our research.

First, all our measures are self-reported, which increases the risk of common-method bias. However, self-report measures are justifiable when studying constructs that are self-referential, such as job satisfaction, life satisfaction and need satisfaction (Van den Broeck et al., 2016). In addition, we put in place several a priori controls (Podsakoff et al., 2003; Conway and Lance, 2010) in order to mitigate common-method bias: protecting respondent anonymity, explaining that there would be no right or wrong answers, and allowing participation at the location of the respondents' choice (home, office, etc.). Nonetheless, future research could consider using an additional source of data, such as asking "significant others"

to triangulate information, although previous research (Heller et al., 2002) has shown that self-report measures of job satisfaction and life satisfaction do not differ significantly from measures collected from "significant others," which gives support to the use of self-reported information in our three studies.

Second, following our first concern, the use of self-reported data may be problematic due to shared method variance. However, in our longitudinal analyses, we modeled stability paths from all T1 to all T2 measures. This procedure helps to avoid the possibility that shared method variance might inflate the cross-lagged paths across time. Third, given that the great majority of our participants were all university graduates, we should be cautious about generalizing these findings to poorer and less educated groups. Fourth, and finally, despite the strong evidence showing that job satisfaction is a temporal antecedent of life satisfaction and vice versa—and that need satisfaction explains this link, our longitudinal design still does not rule out the possibility of a third, different, unmeasured variable that influences both constructs.

Importantly, despite the previous limitations, our results considerably strengthen the case not only for a causal path from job satisfaction to life satisfaction, but also for the confounding role of basic need satisfaction in the link mentioned. We presented the first research to date in a Latin American context, showing that job satisfaction and life satisfaction are reciprocally, positively and prospectively linked to each other, but that the link may be spurious due to the important role played by need satisfaction.

AUTHOR CONTRIBUTIONS

All authors listed have made substantial, direct and intellectual contribution to the work. WU, MG, DC, JO and AM conceptualized the study, chose the theoretical framework and measures. WU, MG and DC designed overall study. All authors wrote several sections of the initial draft, carried out analysis and interpreted results. All authors wrote, read and revised the final paper and approved it for publication.

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Employee Wellbeing: Evaluating a Wellbeing Intervention in Two Settings

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This research presents two studies conducted to evaluate the Wellbeing Game in two different contexts: In a student sample and in an organizational setting. Study 1 investigated the efficacy of the Wellbeing Game, in terms of its effect of wellbeing, stress, and an image valence test, among 60 university students. The results showed that after playing the Wellbeing Game, students reported a significant positive change in wellbeing compared to those who did not play the Wellbeing Game, but there was no decrease in stress or any change in classification of image valence. Study 2 evaluated the Wellbeing Game in an organizational context. Employees ($n = 52$) in a financial organization played the Wellbeing Game for 4 weeks and answered survey questions about wellbeing and stress at the beginning and end of this period. The results showed that after playing the Wellbeing Game, employees reported lower stress levels, and higher wellbeing levels for those who felt that it had helped them connect more with colleagues. The results from the two studies provide preliminary support that the Wellbeing Game may be an effective wellbeing intervention tool in both an organization and a non-organizational context.

Keywords: the Wellbeing Game, the Five Ways to Wellbeing, changes in wellbeing, longitudinal studies, experimental studies

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INTRODUCTION

The developed world is now, to a large extent, driven by the knowledge economy, where an increasing number of jobs focus on technology and information production requiring employees with specialized skillsets, making individuals difficult to replace (Hellgren et al., 2008). Supporting and retaining employees is therefore important for organizational success.

The typical person spends one quarter of their adult life at work, and for many work a key life pursuit. Feeling good and functioning well at work are therefore key components of a person's overall wellbeing. Experiencing a high level of wellbeing is associated with a range of positive organizational attitudes. These include superior work performance (Lyubomirsky et al., 2005), low turnover intentions, low actual turnover (Boehm and Lyubomirsky, 2008), greater effort and thought put into work, less absenteeism and fewer work related injuries (Keyes and Grzywacz, 2005). Given that work affects wellbeing, and that wellbeing is important for organizational success, it is in an organization's best interests to support and promote wellbeing at work (Dewe and Cooper, 2012; Hone et al., 2015).

Despite the many positive organizational attitudes associated with employee wellbeing, organizations have traditionally focused on reducing employee stress rather than increasing employee wellbeing (Hone et al., 2015). Stress occurs when there is a perceived imbalance between

personal resources and perceived demands in a given situation (Lazarus and Folkman, 1984). Stress is linked to decreased productivity and therefore reduced profit (Ford et al., 2011), prompting organizations to focus on implementing stress reduction interventions (Kelloway and Day, 2005).

Traditional workplace wellbeing interventions have focused on individual stress management, but evidence suggests that traditional stress interventions are often ineffective in the long term and do not result in improved organizational outcomes (LaMontagne et al., 2007; Baumeister and Alghamdi, 2015; Vanhove et al., 2016). Stress and wellbeing constitute separate, but related, constructs. Just as the absence of mental illness does not equate mental health (Keyes, 2005), the absence of stress does not equate wellbeing. However, evidence suggests that flourishing may provide a buffer against the negative effects of stress (Keyes and Grzywacz, 2005), indicating that investment in promotion of wellbeing may contribute to stress reduction while also producing additional benefits associated with flourishing at work (Hone et al., 2015).

One effective way to increase wellbeing is to incorporate five broad categories of positive activities in our day-to-day lives (Aked et al., 2009), which have been empirically related to flourishing (Hone et al., 2015). These five categories, named the Five Ways to Wellbeing have been labeled *Connect*, *Be Active*, *Take Notice*, *Keep Learning*, and *Give*. To encourage their adoption, The Five Ways have been incorporated in an online tool: The Wellbeing Game. The present study investigates whether engaging with the Wellbeing Game is related to higher levels of wellbeing and a change in the perception of positive stimuli, and explores whether the Wellbeing Game can be used as an organizational tool to support higher wellbeing and lower stress, as well as the improvement of organizational attitudes.

WELLBEING AT WORK

Wellbeing has been defined according to two main, but distinct, perspectives. According to the hedonic perspective, wellbeing is described as happiness (Ryan and Deci, 2001). This perspective emphasizes the importance of three components: Life satisfaction, the presence of positive mood, and the absence of negative mood (Diener et al., 1998).

In the second, eudaimonic, perspective wellbeing is described in terms of self-actualization, proposing that true happiness is found in expressing virtue (Dewe and Cooper, 2012). The eudaimonic perspective views engagement in activities which foster human growth, such as autonomy, personal growth, self-acceptance, life purpose, mastery, and positive relatedness, as essential to wellbeing (Ryff and Keyes, 1995).

The present study draws on research which proposes that a combination of both perspectives is more accurate, as wellbeing can be viewed as a multidimensional phenomenon that encompasses both eudaimonic and hedonic aspects (Fisher, 2014). In the present study, wellbeing is conceptualized as the combination of feeling good (hedonism) and functioning well (eudemonia) (Aked et al., 2009).

Wellbeing at work refers to a subjective perception of general satisfaction with and positive feelings toward work. It has also been suggested that conceptualizations of wellbeing at work (and in general) should include a component of social relationships, as this is a key component of an individual's positive experiences at work (Fisher, 2014). Research shows that employees with a high level of wellbeing put greater thought and effort into their work (Canaff and Wright, 2004; Keyes and Grzywacz, 2005; Day and Randell, 2014). Poor psychological health, such as depressed mood, anxiety and fatigue, are related to decrements in cognitive resources, and increased focus on negative or irrelevant information (Ford et al., 2011), which in turn is related to poorer performance (Taris, 2006). Poor psychological health is also related less energy and motivation to engage in positive behaviors at work, resulting in poorer contextual performance related outcomes such as organizational citizenship behaviors (Cropanzano et al., 2003; Ford et al., 2011). Employee wellbeing has been linked to several positive organizational attitudes, including team cohesion, job, and engagement (Bakker, 2015). Promoting wellbeing has the potential of benefiting both the employee and the organization.

WORKPLACE WELLBEING INTERVENTIONS

Traditionally, workplace wellbeing interventions have aimed at reducing stress among employees (Hone et al., 2014). Such interventions have focused on reducing either perceptions of stress, sometimes in combination with increasing employees' ability to cope with stress, which, in turn, has been assumed to increase wellbeing. Organizational interventions are aimed at one or more levels, typically categorized as the primary, secondary, or tertiary levels (Tetrick and Quick, 2011). Primary interventions focus on the organization and aim to reduce or eliminate stressors; secondary interventions focus on changing an individual's perception of, or reaction to a stressor; and tertiary interventions aim at rehabilitating individuals who are suffering from strain in response to stressors (Tetrick and Quick, 2011). Although tertiary stress interventions may provide a short-term improvement in terms of stress reduction for those already suffering from work stress, they do not appear to have a long term effect on individual stress coping, nor on organizational attitudes (Noblet and Lamontagne, 2006). The present study investigates the efficacy of a type of intervention which combines the primary and secondary levels by encouraging individuals to engage in positive activities which promote wellbeing.

THE FIVE WAYS TO WELLBEING

The present study investigates the utility of a wellbeing promoting framework called the Five Ways to Wellbeing, implemented through an online tool, the Wellbeing Game. The Five Ways to Wellbeing framework was developed to provide a simple framework to promote mental wellbeing in the general community (Aked et al., 2009). The term "Five Ways" is analogous to a public health campaign in the UK focusing on "Five Fruits and Vegetables a Day" (Aked et al., 2009). The specific "five ways" in the framework were based on scientific

evidence on categories of activities that relate to wellbeing. The categories of activities in the framework are *Connect*, *Be Active*, *Take Notice*, *Keep Learning*, and *Give*, and are centered on the importance of social relationships, physical activity, awareness, learning, and giving. These specific actions have been selected for four reasons: They are evidence based, have universal appeal, target the individual, and provide variety, choice, and self-direction in one's daily life, and in the promotion of wellbeing (Aked et al., 2009).

Connect involves connecting with others. Developing social connections supports and enriches everyday life as social relationships promote wellbeing and protect against mental ill health (Diener and Seligman, 2002). Feeling close to and valued by other people is a fundamental human need which contributes to functioning well in the world; connecting with people is a key way to wellbeing (Aked et al., 2009).

Be Active involves exercising or engaging in some physical activity in an enjoyable way that is suited to individual mobility and fitness levels. Regular physical exercise is linked to a greater sense of wellbeing (Hone et al., 2015). Furthermore, engagement in physical activity increases self-efficacy, perceived ability to cope, and provides a sense of mastery, and thereby promotes wellbeing (Aked et al., 2009).

Take notice involves being curious, being be aware of personal emotions and of the world, and reflecting on experiences (Aked et al., 2009). Taking notice is a form of mindfulness, which can be described as being aware of sensations, thoughts, and feelings, and which has been related to wellbeing (Brown and Ryan, 2003).

Keep Learning involves trying something new or setting a challenge that one will enjoy achieving (Aked et al., 2009). The continuation of learning throughout life increases self-esteem, and encourages social interaction and a more active life, which in turn has been shown to increase wellbeing (Feinstein and Hammond, 2004). The goal-directed behavior associated with learning, as well as the activity of learning itself, is important for wellbeing (Aked et al., 2009).

Give involves doing something nice for someone, a friend, a stranger, or the community. Giving back to the wider community create a sense of connectedness with others, which in turn promotes wellbeing (Aked et al., 2009), by being intrinsically rewarding (Ryan and Deci, 2001).

These Five Ways to Wellbeing are designed to promote positive feedback loops in order to reinforce the engagement in similar and more frequent wellbeing-promoting activities and behaviors (Aked et al., 2009). The Five Ways encourages behaviors which promote both the hedonic and eudaimonic perspective of wellbeing. There is empirical support for a link between the Five Ways activities and flourishing; those who engage in these behaviors are more likely to experience a state of high wellbeing characteristic of flourishing (Hone et al., 2015). While it has not been investigated, the Five Ways categories of activities could be incorporated into the workplace as a way of promoting employee wellbeing (Aked et al., 2009). This could be facilitated by the Wellbeing Game (Mental Health Foundation, 2016), an online tool based on the Five Ways to Wellbeing, which can be used by individuals and organizations to increase their engagement in wellbeing-related activities.

THE WELLBEING GAME

The Wellbeing Game is a free online game designed by The Mental Health Foundation of New Zealand (Mental Health Foundation, 2016) using the Five Ways to Wellbeing as a framework for players to reflect on the positive aspects of their lives. The aim is to make players aware of the wellbeing-enhancing activities they already engage in that to support their own wellbeing and encourage further engagement in such activities. Players log activities which they have taken part in over the course of the day via the online social media platform in the Wellbeing Game. Players then categorize these activities according to one or more of the Five Ways to Wellbeing. The Wellbeing Game draws on aspects of primary psychosocial interventions by developing relationships within teams which promote good functioning and a good social climate. Through the promotion of mindfulness and the building of positive emotions the Wellbeing Game also includes aspects of secondary interventions. Additionally, the Wellbeing Game teaches techniques to address the symptoms of strain, such as physical exercise or seeking social support.

The Wellbeing Game uses gamification to encourage engaging in the Five Ways to Wellbeing through. Gamification enhances a non-game activity with elements typical to a game in order to invoke a game-like experience and thereby increase motivation to partake in the activity (King et al., 2013). The Wellbeing Game applies gamification of the Five Ways to Wellbeing by incorporating a points system, a leaderboard, and rewards in the form of badges in order to increase motivation to engage in the Five Ways, and reinforcing the use of the Five Ways. Points are given based on the length of time for activities logged, and virtual badges are rewarded when specific thresholds are passed.

Gamification can be understood in terms of operant conditioning. The Wellbeing Game uses positive reinforcement to strengthen the likelihood of similar future behaviors occurring (Kapp, 2012). For example, when an activity is logged, points are given, encouraging the player to continue to engage in and logging activities in order to earn more points. Furthermore, when certain point thresholds are passed, badges are given. As the player does not know exactly when the badges will be rewarded, this random reinforcement schedule further increases the desire to engage in the Wellbeing Game.

THE CURRENT STUDY

In the present study we investigate whether playing the Wellbeing Game is associated with an increase in players' wellbeing. To investigate this, two studies were conducted. Study 1 was conducted in a student population to test the assumption that the Wellbeing Game works by altering perceptions of visual stimuli. Study 2 was conducted in an organizational context to investigate the effectiveness of the Wellbeing Game in an organizational context. Participants in both studies completed base-line measures of wellbeing, played the Wellbeing Game for a set period of time, and then completed the wellbeing measures again. In Study 1, participants completed a picture categorization task. In Study 2, participants completed an

organizational attitudes survey measuring relationships between team members, job engagement, and turnover intentions, as well as a post-intervention survey on perceptions of The Wellbeing Game within the organization. This included perceptions of the Wellbeing Games intrusiveness, alignment with the organizations' values, organizational support for the Wellbeing Game, and its ability to increase connections within the organization.

STUDY 1

An evaluation of the 2014 version of the Wellbeing Game indicated that wellbeing increased significantly after playing the Wellbeing Game (Green, 2015). This increase can be explained by two psychological theories: The Broaden and Build Theory (Fredrickson, 2001) and mindfulness theory (Brown and Ryan, 2003).

The Broaden and Build theory states that the function of positive emotions is to broaden a person's thought-action repertoire to build personal resources. A thought-action repertoire refers to a person's set of actions that follow thoughts. Thoughts accompanied by negative emotions are followed by a narrow set of actions. Conversely, positive emotions are followed by a broad set of actions. For instance, joy may be followed by celebrating or sharing with friends (Fredrickson, 2001). The Wellbeing Game encourages players to take part in activities which they enjoy, thereby creating positive emotions. These positive emotions will broaden an individual's mind-set, allowing broader and more creative thinking. In turn, this alters perceptions of potentially stressful situations by allowing a person to frame these situations differently, and increases their resilience in these situations (Fredrickson, 2001). Thus, by being encouraged by the Wellbeing Game to engage in the Five Ways to Wellbeing, players will experience more positive emotions.

The Wellbeing Game also draws on mindfulness techniques. Mindfulness refers to a present-centered attention and awareness, which allows a person to interpret an event as it is, free from personal bias (Brown and Ryan, 2003). This helps a person to function well by increasing engagement in activities of value, thus, it increases wellbeing (Shapiro et al., 2008). When a person is mindful, attention is given to the present moment. The Wellbeing Game supports mindfulness by encouraging players to take notice of the positive experiences in their lives, and by helping players interpret events in a more positive way, wellbeing is facilitated (Aked et al., 2009). It is expected that by increasing the frequency of positive emotions and experiences, the Wellbeing Game will contribute to higher levels of wellbeing.

In Study 1, we investigate the following hypotheses:

Hypothesis 1a: Those who have played the Wellbeing Game for 1 week will report an increase in levels of wellbeing as compared to those in a control group.

It is also expected that by playing the Wellbeing Game, the perception of personal resources will increased, which should contribute to fewer perceptions of stress. Therefore, we hypothesize:

Hypothesis 1b: Those who have played the Wellbeing Game for 1 week will report a reduction of stress as compared to those in a control group.

By increasing the frequency of positive emotions and decrease in personal biases, the Wellbeing Game should influence players perceiving stimuli in a more positive light. Therefore, we hypothesize:

Hypothesis 1c: Those who have played the Wellbeing Game for 1 week will categorize an increased number of stimuli as positive, rather than neutral or negative, compared to those in a control group.

Study 1 Method

Participants

The participants were 60 students from the University of Canterbury. The experimental group included 32 participants (24 female and 8 male), and the control group included 28 participants (20 female and 8 male). The mean age across groups was 21.48 (SD = 3.57).

Participants were recruited using a variety of methods. These included advertisements placed around the University of Canterbury as well as in an online research participant forum, through a verbal request to 100 level Psychology laboratory groups, and an email sent to undergraduate Psychology and Commerce students sent by the respective department administrators. During recruitment, potential participants were informed that they would complete two computer based tasks 1 week apart, and that they may also be required to complete a 5 min task once a day during this week. The name or purpose of this task was not disclosed. They were also informed that after completing both stages of the experiment, participants would be compensated with a $10 voucher and placed in the draw to win one of five $130 shopping vouchers.

After signing up, participants were randomly assigned to either the experimental or control condition (the groups were balanced for gender). Participants were then assigned a unique participant number which allowed for each participant to be tracked over time. This number also identified the participant's group membership (experimental vs. control group).

Measures and Materials

Wellbeing

The Short Warwick-Edinburgh Mental Wellbeing Scale (SWEMWBS; Stewart-Brown et al., 2009) was used to measure subjective wellbeing and psychological wellbeing, covering both the hedonic and eudaimonic perspectives of wellbeing. Participants were asked to specify the extent to which they had felt the way described in each of the seven SWEMWBS items over the past 2 weeks. Responses were recorded on a five point Likert type scale (1 = none of the time, 5 = all of the time). A sample item was "I've been feeling optimistic about the future". The reliability of the scale in this study at Time 1 was Cronbach's $\alpha = 0.72$ and the reliability at Time 2 was Cronbach's $\alpha = 0.78$.

Stress

A question designed for the purpose of this study was asked in order to assess self-perceived stress. A single item was used in

order to increase face validity and to optimize participation by reducing the length of the survey. The question developed was "Stress means a situation in which a person feels tense, restless, nervous or anxious or is unable to sleep at night because his/her mind is troubled all the time. How often do you experience this kind of stress?" Responses were recorded on a five point Likert type scale (1 = none of the time, 5 = all of the time).

Stimuli Categorization Task

The International Affective Picture System (IAPS) is a database of standardized pictures designed for the study of emotion. Each picture has a standardized valence (unpleasant to pleasant), arousal (calm to excited), and dominance (low control to high control) score, ranging from 1 to 9 (Lang et al., 1999). This study used a total of 60 pictures. The picture categories differed in terms of valence ratings. 20 pictures portrayed positive scenes (e.g., family, smiling faces, animals), 20 portrayed neutral scenes (e.g., neutral faces, household objects), and 20 portrayed negative scenes (e.g., sad/angry faces, wreckages, aggressive/attack pictures). The cut-off for each category was predetermined by a classification used in previous research in New Zealand (Flood et al., 2015). Positive pictures were those with a normed valence rating of 6 or above, neutral pictures were those with normed valence ratings above 4 and below 6, and negative pictures were those with a normed valence rating of 4 or less. Arousal and dominance ratings were kept neutral (a rating between 4 and 6) across these categories.

To select these pictures, the IAPS database was ordered on the standardized valence score. Pictures with positive (above 6) or negative (below 4) arousal or dominance ratings were removed. The remaining pictures were split into three categories; those with positive valence ratings, those with neutral valence ratings, and those with negative valence ratings. 20 pictures were selected from each of these three categories. The pictures were then visually inspected and any depicting mutilation or erotica were excluded and replaced with the picture with the most similar valence rating. This was done in order to avoid exposing participants to unnecessary sensitive content. The mean valence ratings of the positive, negative and neutral categories were $M = 6.64$, ($SD = 1.689$), $M = 4.91$ ($SD = 1.769$) $M = 3.29$ ($SD = 1.678$) respectively.

The 60 pictures were randomly ordered with each picture appearing once, but in the same order for all participants.

Manipulation Check

All participants completed a survey at the end of the study asking whether they had been asked to play, and whether they had played, the Wellbeing Game as part of the study. This was used to ensure that those in the control group had not played the Wellbeing Game.

Intervention

Those randomized into the experimental condition, were instructed to play the Wellbeing Game, which was accessed online and free of charge at www.thewellbeinggame.org.nz. To sign up to the Wellbeing Game, players clicked the "Get Started For Free!" button, and they then entered a nickname, email address, password and real name. Gender, age, and ethnicity are then entered and the terms and conditions have to be accepted before the sign up process is complete. Finally, players completed a wellbeing survey (SWEMWBS) before beginning the Wellbeing Game. In this study, participants were instructed to enter their participant number as their real name in order to allow data from the Wellbeing Game to be matched with their experimental data. They were also informed that the wellbeing survey was the same as the survey used in the experiment.

After completing the wellbeing survey, players had the option to join a team, but in the current study, participants played the Wellbeing Game as individuals, therefore they were all instructed to create their own team. In this study, participants created their own team name, indicated that their team is based at a tertiary education facility, and were instructed to call the name of their organization "UCExperiment." This allowed for easy identification of the players taking part in the experiment, compared to any potential players from the University of Canterbury who were not part of this research. Once sign-up was completed, players were ready to play the Wellbeing Game.

To log an activity players type in a "what did you do" box, indicate how long the activity took, and select the appropriate Ways to Wellbeing (one or more). Once the activity is logged, players are congratulated for completing an activity, and badges are given. In one instance, three badges were received, the Learner Plate, Student of Curiosity, and Ox of Wellbeing. These are given when predetermined landmarks are passed throughout the Wellbeing Game, for instance logging the first activity. These badges are used as rewards for progressing through levels in the Wellbeing Game.

Finally, the Leader Board, Team, and Diary tabs can be viewed to show information on which team is winning, the teams' activities, and personal wellbeing activities, respectively.

Procedure

During the first part of the study, participants were individually seated in front of a computer in a room free from distractions at the University of Canterbury, and asked to turn off any personal electronic devices. An information sheet about the experiment was and participants were given the chance to ask questions before signing an informed consent form.

Different information sheets were used for the experimental group and for the control group. These were identical, with the exception for the experimental group being informed that they would take part in an intervention (the name or purpose was not given). Both information sheets contained a small element of deception: Participants were informed that they were taking part in an image categorization experiment, rather than an experiment investigating the efficacy of the Wellbeing Game.

Once this form was signed, the experimenter opened the E-Prime software used to run the experiment and entered the participant number and then instructed the participants to enter their age and gender when prompted. Participants were informed that once they clicked "enter" on screen, the task would begin. The experimenter then left the room and participants began the task which was the same for all participants (experimental and control).

Information onscreen informed the participants that they would complete the survey section of the task, followed by a task involving the categorization of images. Following the last item of the survey, participants were informed that the survey section was finished and that the image categorization section would follow. Participants were then given the following instructions: "*You are asked to categorize each picture into either a positive, negative, or neutral category, dependent on how you interpret that picture. Some of the pictures may prompt emotional experiences, others may seem relatively neutral. Your categorization of each picture should reflect your immediate personal experience, and no more. There are no right or wrong answers, so simply* ***respond as quickly as you can,*** *based on your immediate feeling toward the picture.*" This was followed by a description of each of the arrow keys and for which images to use these keys.

Following the completion of three practice images, participants were informed that they were about to begin the actual test, and to remember to respond as quickly as possible. Images were then presented one by one in three blocks of 20 images. Each image remained on screen until a response was recorded. Participants were given a 30 s break in between blocks with a 10 s countdown timer appearing onscreen to signal the end of the break was approaching.

Following the completion of this image categorization task, participants exited the room as instructed to inform the experimenter that the task had been completed. Participants in the control condition were reminded that they would need to return in 1 weeks' time to re-complete the task before receiving their incentive and then dismissed. Participants in the experimental condition re-entered the room with the experimenter and were briefed on the intervention.

Information was provided on how to sign up to play the Wellbeing Game, and how to play it, and the requirement to play every day for the following 7 day period. After the participants were dismissed they were sent an email containing this information, as well as the link to the Wellbeing Game (www.thewellbeinggame.org.nz) and a link to information on the Five Ways to Wellbeing (www.mentalhealth.org.nz/home/ways-to-wellbeing). These participants were sent a reminder text message on days 3, 5, and 7.

Seven days after completing Time 1 testing, participants returned and completed the same survey and image categorization task as at Time 1, the only difference being that all participants (experimental and control groups) completed the task in groups, ranging in size from one to eight participants. Participants were seated in individual cubical workstations in a computer lab at the University of Canterbury. Participants were unable to see the other participants' screens. The same instructions were given as at Time 1 with the addition of the request to not talk, and to wait until all participants had completed the task before leaving. Participants were also asked to complete the manipulation check survey following the completion of the computer based task. Participants were then read a short debrief information sheet which explained the purpose of the experiment more fully. After this they were given the opportunity to ask any question. Finally, the participant incentives were distributed.

Ethics approval for this research was received from the University of Canterbury Human Ethics Committee.

STUDY 1 RESULTS

This study aimed to investigate whether playing The Wellbeing Game is related to changes in wellbeing, stress, or in how positively participants categorize stimuli. The experiment employed a 2 × 2 mixed repeated measures design. Playing The Wellbeing Game or not playing The Wellbeing Game was the between-subjects variable (experimental vs. control). The repeated measures dependent variables were survey responses, and image category placement.

The responses to the manipulation check survey were checked against each participant's group assignment. No contamination of the control group had occurred.

The assumption of normality was checked by observing the normal Q-Q plots of each of the groups for each of the dependent variables, and all data was deemed sufficiently normal. Assumption of homogeneity of variance between the control and experimental groups was also tested at Time 1 and Time 2, was met for the wellbeing scores and the picture categorization task, as indicated by non-significant Levene's test. For the stress scores, the assumption of homogeneity of variance between the control and experimental groups was met in Time 1 as shown by non-significant Levene's test, $F_{(1, 58)} = 3.55$, $p = 0.065$, but not at Time 2, as shown by a significant Levene's test, $F_{(1, 58)} = 7.86$, $p = 0.007$, log transformed data at Time 1 and Time 2 data was used to resolve this issue. The assumption of homogeneity of variance between the control and experimental groups of this transformed data was met after this transformation, as shown by a non-significant Levene's test at Time 1, $F_{(1, 58)} = 1.51$, $p = 0.0.224$, and at Time 2, $F_{(1, 58)} = 3.31$, $p = 0.074$. The log-transformed data was therefore used in the analysis of the stress scores.

Hypothesis 1a—Changes in Wellbeing

Hypothesis 1a suggested that those playing the Wellbeing Game for 1 week would report an increase in wellbeing compared to a control group. A repeated measures ANOVA with a between (experimental vs. control group) and a within subjects variable (wellbeing scores) was used to test for a statistically significant difference between the mean wellbeing scores of the groups after the intervention.

The ANOVA showed that the main effect of group on wellbeing was non-significant, as was the main effect of time on wellbeing. However, in line with Hypothesis 1a, there was a significant interaction effect of game participation and time, $F_{(1, 58)} = 4.39$, $p < 0.05$ $\eta p^2 = 0.07$. The experimental group saw an increase in wellbeing at Time 2 ($M_{Time1} = 3.353$ [$SD_{Time1} = 0.67$] vs. $M_{Time2} = 3.579$ [$SD_{Time2} = 0.56$) and the control group experienced a very small decrease ($M_{Time1} = 3.414$ [$SD_{Time1} = 0.49$] vs. $M_{Time2} = 3.352$ [$SD_{Time2} = 0.62$]).

Hypothesis 1b—Changes in Stress

Hypothesis 1b suggested that those playing The Wellbeing Game for 1 week would report a decrease in stress compared to a control group. A repeated measures ANOVA with a between

(experimental vs. control group) and a within subjects variable (stress scores) was used to test for a statistically significant difference between the mean stress scores of the groups after the intervention.

The ANOVA showed that the main effect of game participation on stress was non-significant, as was the main effect of time on stress. There was also no significant interaction effect between game participation and time point on stress, indicating that stress scores did not change as a function of the Wellbeing Game, and Hypothesis 1b was not supported.

Hypothesis 1c—Changes in Picture Categorization

This analysis tested Hypothesis 1c, suggesting that those who played the Wellbeing Game would place more pictures in a more positive category than those who did not play the Wellbeing Game. To place a picture in a more positive category would entail either a change from a negative to a neutral categorization; a change from a neutral to a positive categorization; or a change from a negative to a positive categorization.

The categorization task responses were first checked for errors. A minimum of 300 ms is required to process and response to visual stimuli (Greenwald et al., 2003). Therefore, responses faster than 300 ms were identified as failures to inhibit a response and removed from further analysis. This resulted in the removal of a total of 17 responses (0.21%) from 11 different participants (5 experimental and 6 control).

Data was inspected to ensure that participants had used the correct response keys. To do so, a marking variable was created for each participant which showed whether each picture had been correctly categorized according to the standardized valence score determined by the International Affective Picture Systems (IAPS; Lang et al., 1999). Participants who had incorrectly categorized 50% or more pictures at either Time 1 or Time 2 were excluded from further analysis, based on the assumption that if the positive and negative response keys were used the wrong way around, a participant who would have otherwise categorized every picture correctly would unintentionally categorize 67% of pictures incorrectly (the 20 neutral pictures would be unaffected). However, when the correct keys are used, the most likely source of error is miscategorizing a neutral picture or a picture that was bordering on the neutral category (negative rating between 3.5 and 4, positive rating between 6 and 6.5). With the pictures used, this accounts for only 39% of stimuli. Therefore, the cut off for exclusion was set at 50% to allow for some variation in valence perception but to exclude data which was not valid. Also, it was determined that this error should not be corrected for by reversing responses (i.e., replace "positive" responses for "negative" responses and vice versa), to avoid introducing further error into the data, These participants were therefore deleted from further analysis (Time 1 and Time 2 data). This resulted in the removal of 10 participants (5 experimental and 5 control).

A Rating Index was calculated using the remaining data. Each response was assigned a value which reflected the participant's category placement of each stimulus picture. A negative response was assigned the value −1, a neutral response was assigned the value 0, and a positive response was assigned the value 1. The mean categorization rating was then calculated for each participant which reflected the proportion of images placed in each category. The categorization index had a range of −1 to 1, with −1 meaning all images were categorized as negative, and 1 meaning all images were classed as positive.

A repeated measures ANOVA with a between (experimental vs. control group) and a within subjects variable (picture categorization) was used to test for a significant difference between picture categorization between the experimental and control groups after playing the Wellbeing Game.

The results showed that there were no significant main effects of group or time, and there was no significant interaction between group and time point, $F_{(1, 48)} = 0.33$, $p = 0.569$, $\eta p^2 = 0.07$. However, when inspecting the means for the different groups, there was an indication that those in the experimental group to categorize pictures more positively in Time 2 than in Time 1 ($M_{Time1} = -0.156$ [$SD_{Time1} = 0.167$], $M_{Time2} = -0.123$ [$SD_{Time2} = 0.164$]) and for those in the control group to categorize stimuli more negatively ($M_{Time1} = -0.185$ [$SD_{Time1} = 0.179$], $M_{Time2} = -0.196$ [$SD_{Time2} = 0.181$]).

The mean number of pictures placed into each of the three categories was then inspected. This showed a consistent trend. At Time 2, the experimental group placed fewer pictures in the negative group and more in the positive and neutral categories, and the control group placed more pictures in the negative category, and fewer in the positive and neutral categories (**Table 1**). However, a repeated Multivariate Analysis of Variance (MANOVA) where the repeated measured variables were positive category placement, neutral category placement, and negative category placement and the between subject variable was game participation (experimental vs. control) showed that these differences were all non-significant. Thus, Hypothesis 1c was partially supported.

Study 1 Discussion

Study 1 investigated whether students would report higher levels of wellbeing and lower levels of stress after playing the Wellbeing Game compared to a group of students not playing the Wellbeing Game. Study 1 also investigated whether students would change their likelihood to perceive stimuli as positive after playing the Wellbeing Game, as indicated by a picture categorization task. Hypothesis 1a was supported; students playing the Wellbeing Game reported an increase in wellbeing. However, Hypothesis 1b was not supported; those playing the Wellbeing Game did not report a decrease in stress. Hypothesis 1c, suggesting that student players would place more images in a more positive category after playing the Wellbeing Game was also not supported. However, there was an indication that those in experimental condition placed more images in the positive category and that those in the control condition placed more images in the negative category after the intervention. The finding that playing the Wellbeing Game may be related to increased wellbeing is consistent with the evaluation of the 2014 version of the Wellbeing Game which found a significant increase in self-reported wellbeing (Green, 2015). There was a major methodological difference between these studies. In the current study, participants played

TABLE 1 | Means and standard deviations of the number of pictures placed in each category across T1 and T2.

Stimulus Valence	Experimental Group				Control Group				*F*	*p*
	T1		T2		T1		T2			
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*		
Positive	17.15	6.22	17.20	6.11	16.55	6.50	16.25	5.570	0.072	0.789
Neutral	16.69	6.66	17.68	7.01	16.00	5.81	15.40	10.01	0.015	0.902
Negative	26.15	6.20	24.96	6.28	27.35	6.23	28.20	8.051	0.013	0.911

F and p-values refer to the interaction between group and time on category placement.

the Wellbeing Game individually, whereas in the evaluation by Green (2015), a significant portion of participants played the Wellbeing Game in a team. Green (2015) found that there was no difference in the change in wellbeing for those who played the Wellbeing Game in a team and those who did not. The team aspect of the Wellbeing Game may not be a central aspect contributing changes in wellbeing.

The positive change in wellbeing is also in line with research linking engagement with the Five Ways to Wellbeing to higher levels of flourishing (Hone et al., 2015). However, that previous research (Hone et al., 2015) used a cross sectional design, whereas the longitudinal (albeit with a short timeframe) design of the current study indicates that engaging with the Five Ways to Wellbeing through the Wellbeing Game may potentially effect changes in wellbeing over time.

While wellbeing increased for those in the experimental condition, it actually decreased for those in the control condition who did not play the Wellbeing Game. The intervention took place during the last weeks of the University year, and many participants had final tests and assignments due during the Time 2 survey. Therefore, it may be reasonable that wellbeing would decrease at this point in time among those who did not engage in any wellbeing-promoting activities. However, in the experimental group, who played the Wellbeing Game, it seems that wellbeing was actually improved, despite the time of year. This may be an indication that this intervention could be promoted to at-risk-members of society, for example students during exam time, to prevent a reduction in wellbeing.

The heavy workload experienced by participants due to end of year tests and assignments may explain why Hypothesis 1b was not supported; there was no change in stress after playing the Wellbeing Game. This finding aligns with research that shows that wellbeing and stress exist on separate, although overlapping spectrums (Keyes, 2005).

After playing the Wellbeing Game, players did not place *significantly* more pictures in a more positive category compared to those who did not play the Wellbeing Game. However, on visual inspection those in the experimental condition placed slightly fewer pictures in the negative category after having played the Wellbeing Game, and those in the control condition to place slightly more pictures in the negative category at Time 2. This pattern of change in picture categorization may be interpreted in light of the significant patterns in the changes of wellbeing. Wellbeing increased for those who played the Wellbeing Game and decreased for those who did not. While this result needs further investigation in a different, larger sample, it may be an initial indication that changes in how stimuli are perceived do relate to the changes in wellbeing.

It is possible that the small changes in picture categorization patters, would have been statistically significance if more time was spent playing the Wellbeing Game, as the mechanisms assumed to link the Wellbeing Game to increases in wellbeing may take time to have any observable effect. Changes in positive emotions and behaviors works in two stages. First, positive emotions result in a broader thought-action repertoire, then as a result, personal resources are built through engagement in a wider variety of activities. Small incremental changes in the availability of personal resources overtime eventually result in a large effect (Fredrickson and Joiner, 2002). Based on this, it is reasonable to expect more of an increase in wellbeing than the perception of the valence of the stimuli in the categorization task, since a key aspect of wellbeing is experiencing positive emotions.

Additionally, mindfulness is a state which takes much practice to achieve. Although many workplace mindfulness training programs take only a few hours to complete, daily practice is required in order to become a mindful person, with many people viewing mindfulness as a lifelong pursuit (Brown and Ryan, 2003). Therefore, it is likely that more exposure to the Wellbeing Game may be needed before any increase in the perception of positive stimuli would occur.

STUDY 2

Study 1 investigated whether students playing the Wellbeing Game would report increases in wellbeing, decreases in stress, and increases in the perception of stimuli as positive. Since Study 1 utilized a student sample, it is important to investigate whether the Wellbeing Game can be used in an organizational setting as well. Given that employee wellbeing is likely influenced to a large extent by activities in the workplace, implementing the Five Ways to Wellbeing in the workplace setting by encouraging employees to play the Wellbeing Game may be related to positive outcomes. In Study 1 participants only played the Wellbeing Game for a week, which may be too short of a time period to affect any large changes. However, Study 1 showed that participants playing the Wellbeing Game was reported positive outcomes, even over the short time period, and it is expected that playing the Wellbeing Game should be related to a positive change in wellbeing among employees playing the Wellbeing Game at work.

Study 2 Hypotheses

Study 2 tests the following hypotheses:

> *Hypothesis 2a:* Employees playing the Wellbeing Game will report higher levels of wellbeing after playing the Wellbeing Game for a month.

It is expected that by playing the Wellbeing Game, perceptions of availability of personal resources should be increased which should decrease perceptions of stress.

> *Hypothesis 2b:* Employees playing the Wellbeing Game for 1 month will report lower levels of stress.

Finally, engaging in the Five Ways to Wellbeing is linked to flourishing (Hone et al., 2015), which is relates to more positive organizational attitudes such as low turnover intentions and high job engagement and more positive relationships between team members.

> *Hypothesis 2c*: Employees playing the Wellbeing Game for 1 month will report a positive change in employee attitudes toward the organization, including lower turnover intentions, higher job engagement and more positive evaluations of relationships between team members.

Study 2 Method

Participants

The participants were 52 employees from a large financial organization in New Zealand. This organization was approached in collaboration with the Mental Health Foundation of New Zealand who was responsible for contacting the organization's Wellbeing Champion (the person in charge of promoting wellbeing within the organization). Participants volunteered to participate in response to a request from the Wellbeing Champion in the organization. 157 employees completed the pre-game survey, and 54 employees completed the intervention and the post-game survey.

Measures

Wellbeing

The Short Warwick-Edinburgh Mental Wellbeing Scale (SWEMWBS; Stewart-Brown et al., 2009). The reliability of the scale in this study at Time 1 was Cronbach's $\alpha = 0.86$ and the reliability at Time 2 was also Cronbach's $\alpha = 0.86$

Stress

Study 2 used the same question as the one used in Study 1. This single-item measure was in this study to ensure comparability across studies, and that as little of the organization's time was used as possible.

Organizational Attitudes

Three items were used to measure three organizational attitudes which were perceived relationships between team members, turnover intentions, and job engagement. Single-item measures were used in order to minimize the time commitment in order to increase the likelihood of participants completing the survey. To assess perceived relationships, the following question was used: "There are good relationships between team members" (Senior and Swailes, 2007); for the turnover intentions: "I am happy to stay with this organization for the next 2 years" (designed for this study) and for job engagement: "I am highly engaged in this job" (Saks, 2006). Responses to these items were recorded on a five point Likert type scale (1 = strongly disagree, 5 = strongly agree).

Perceptions of the Wellbeing Game

Four additional questions were included in the post-game survey at the conclusion of the Wellbeing Game period, in order to assess players' perceptions of how well they thought the Wellbeing Game was integrated in their everyday work, and their general experience of the Wellbeing Game. These were "How does the Wellbeing Game relate to regular work activities—is the Wellbeing Game intrusive?" (1 = intrusive, 5 = integrative). "Does the Wellbeing Game make sense given what your organization stands for? (mission, vision, values)" (1 = not at all, 5 = to a large extent). "Do people support the Wellbeing Game in your organization? (1 = not at all, 5 = to a large extent). "This Game has enabled me to connect more with others" (1 = strongly disagree, 5 = strongly agree). These questions were designed in collaboration with the Mental Health Foundation of New Zealand for the purpose of this study.

Intervention

The Wellbeing Game was the same as in Study 1, except for that in this study participants played the Wellbeing Game for 4 weeks, and in teams, and were encouraged by the organization to engage with the Wellbeing Game. Participants were instructed to join the team assigned to them by the organization's Wellbeing Champion.

Procedure

At the beginning of the month during which the Wellbeing Game was played, the organization's wellbeing champion, who was in contact with the Mental Health Foundation, emailed participants the Wellbeing Game set up information. When setting up an account, participants completed the wellbeing, stress and organizational attitudes survey. Participants then played the Wellbeing Game for a period of 1 month. At the completion of the month, participants were sent a post-game email from the Wellbeing Champion. This email contained information on the winners of the Wellbeing Game, the number of teams that played and total hours logged. A request to complete the post-game survey, containing the same questions as the pre-game survey with the addition of the four post-game questions was included in this email. Participants then completed the post-game survey which included the same measures as the pre-game survey.

Study 2 Results

The study tested whether employees playing the Wellbeing Game within an organization for a 1 month period would report higher levels of wellbeing, lower levels of stress, as well as more positive organizational attitudes.

Hypothesis 2a—Changes in Employee Wellbeing

Hypothesis 2a suggested that after playing the Wellbeing Game, employees would report higher levels of wellbeing. The results indicate an increase in means, suggesting that wellbeing increased after the Wellbeing Game was played for the month. The mean wellbeing at Time 1 was 3.75 ($SD = 0.48$) and the mean wellbeing

at Time 2 was 3.84 ($SD = 0.51$). However, a paired samples t-test showed that when using the traditional cut-off of 0.05 for significance [$t_{(51)} = -1.642$, $p = 0.11$], this was not a statistically significant difference. However, the probability that the results represent there being no difference at all is still quite small ($p = 0.11$), suggesting that there is some difference over time in wellbeing scores.

Participants had commented to the organization and in the survey that they perceived the Wellbeing Game to be effective. To explore these comments empirically, four repeated measures Analyses of Covariance (ANCOVAs) were conducted. The covariates included in the post-game survey were included to shed some light on under what conditions participants found the Wellbeing Game effective. The repeated measures variable was wellbeing at Time 1 and at Time 2, and the covariates used were the four Post Survey question. Given the small number of participants, the five possible groups that could be created using the survey responses (1—5 Likert type scale) were collapsed into three groups (1 and 2 were combined to create a Disagree category; 4 and 5 were combined to create an Agree category) to increase the number of participants in each group. There was no significant difference between the groups when controlling for either of the Intrusive, Makes Sense, or Support for Game questions. However, when controlling for the degree to which employees felt the Wellbeing Game had enabled them to connect more with others (Connect), the increase in wellbeing was significant [$F_{(1, 49)} = 4.212$, $p = 0.021$, $\eta p^2 = 0.147$]. When plotted, this shows that those who felt the Wellbeing Game helped them to connect more with others reported an increase in wellbeing (Connect responses of 4 or 5 [Agree]), but that those who did not think the Wellbeing Game helped them connect reported stable, or a slight decrease in, wellbeing levels (see **Figure 1**).

Hypothesis 2b—Changes in Employee Stress

Hypothesis 2b suggested that after playing the Wellbeing Game, employees would report lower levels of stress levels. The mean stress score at Time 1 was 2.92 ($SD = 0.74$) and the mean stress at Time 2 was 2.75 ($SD = 0.76$), and a paired samples t-test indicated that stress levels were significantly lower at Time 2, [$t_{(51)} = -2.021$, $p = 0.049$], providing support for Hypothesis 2b.

Hypothesis 2c—Organizational Attitudes

Hypothesis 2c suggested that playing the Wellbeing Game in an organization would influence employees' perceptions of three organizational attitudes. These were perceptions of the quality of the relationships between team members, turnover intentions, and job engagement. To test this hypothesis, three repeated measures analyses of variance (ANOVAs) were conducted. No significant changes were found in any of the three organizational attitudes.

As a follow-up test based on research suggesting that organizational attitudes may improve when wellbeing is high (Hone et al., 2015), three repeated measures ANCOVAs were run using the Time 2 wellbeing measure as a covariate and the three organizational attitudinal variables as the dependent variables. However, no significant differences in any of these organizational attitudes were found. Hypothesis 2c was not supported.

Study 2 Discussion

Study 2 investigated whether those playing the Wellbeing Game in an organization would report increased wellbeing, higher job engagement, decrease turnover intentions, and more positive relationships between team members. Three hypotheses were investigated. The support for Hypothesis 2a, suggesting that employees would report higher wellbeing after playing the Wellbeing Game, was mixed. Wellbeing was significantly higher after playing the Wellbeing Game, but only for those who felt the Wellbeing Game had helped them make more connections with colleagues. This suggests that the extent to which the Wellbeing Game facilitates social connections is important for its efficacy. Positive social connections has been related to higher levels of wellbeing (Diener and Seligman, 2002), which may explain why the increase in wellbeing was only observed for those who also felt that social connections were also improved after playing the Wellbeing Game.

Hypothesis 2b was supported; after playing the Wellbeing Game employees reported lower levels of stress. This finding is in line with previous research which suggests that primary (interventions targets at the organization) and secondary (interventions targets at the individual) stress management interventions are effective at reducing stress, particularly in the short term (Noblet and Lamontagne, 2006). The Wellbeing Game is a combination of primary and secondary interventions, which both promote proactive behaviors and assists in reframing perception of stressors, thus contributing to lower stress. The results of Study 2 suggests that the Wellbeing Game may have some efficacy in contributing to lower levels of employee stress.

Finally, there was no change in any of the organizational attitudes after playing the Wellbeing Game; Hypothesis 2c was not supported. Wellbeing may be a prerequisite for more positive work-related attitudes and behaviors (cf. Cropanzano et al., 2003; Ford et al., 2011), such as higher job engagement, fewer turnover intentions, and more positive relationships between team members. Since, the increase in wellbeing was not substantial, and perhaps this explains why there was no improvement in the work-related outcomes.

In a comprehensive review of resilience interventions, the only study which found no effect used an online intervention (Robertson et al., 2015), which is explained by the limited engagement in the online platform. Participants in Study 1 (the student sample) were informed that they had to play the Wellbeing Game daily in order to receive their incentive, making it more likely that they would engage in the Wellbeing Game. However, in Study 2 there was no tangible incentive for participants to play the Wellbeing Game. Therefore, there may have been less engagement in the Wellbeing Game in Study 2 compared to Study 1, partially explaining that wellbeing was not significantly higher after playing the Wellbeing Game in Study 2.

It is possible that the competitive team aspect of the Wellbeing Game actually contributed to a lack of increase in the perception of the quality of the relationships between colleagues. The team aspect of the Wellbeing Game is expected

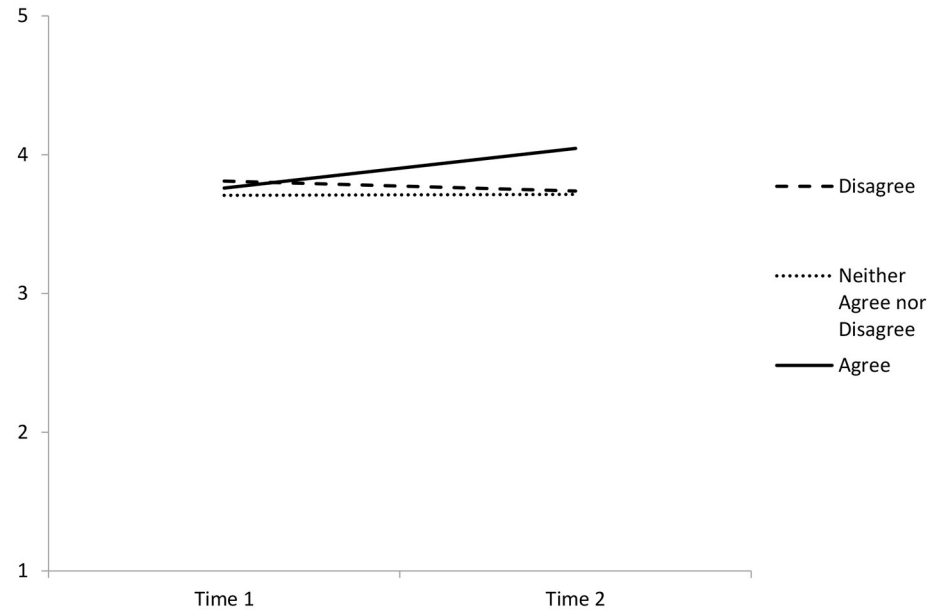

FIGURE 1 | Wellbeing scores at Time 1 and Time 2 when the degree to which the Wellbeing Game was perceived to increase connections with others was controlled for.

to help facilitate social connections, and wellbeing only increased among those Study 2 who felt that social connections had been improved. Not all players felt that social connections had been improved. Furthermore, comments from players indicated some dissatisfaction with the competitive element of the Wellbeing Game, and perhaps the competitive aspect impeded social connections for some. Green (2015) found that there was no significant difference in the increase in wellbeing between those who played in a team and those who did not, and further investigation should be conducted to ascertain the function of the team aspect of the Wellbeing Game.

GENERAL DISCUSSION

Combining the results from the two studies, the findings show that those playing the Wellbeing Game reported less stress and somewhat higher wellbeing after playing the Wellbeing Game. By encouraging the use of activities within the Five Ways to Wellbeing framework, it appears that the Wellbeing Game contributes to an increase in the frequency of positive emotions. These positive emotions encourage a person the engagement in varied, novel, and exploratory thoughts and actions (Fredrickson, 2001), which build personal resources and resilience to stress. The positive emotions associated with engaging with the Wellbeing Game should motivate players to continue to pursue positive activities which can be linked to The Five Ways, creating a cyclic relationship where playing the Wellbeing Game contributes in positive emotions which lead to engagement in more positive activities, which in turn lead to more positive thoughts. Furthermore, as the Wellbeing Game is expected mindful awareness, which is related to positive emotions, and which in turn should encourage more positive activities. This builds personal resources, including resilience to stress and wellbeing (Fredrickson, 2001). The current study presents preliminary evidence for this type of positive gain spiral (Fredrickson and Joiner, 2002), but more longitudinal research is needed to explore this further.

STRENGTHS AND LIMITATIONS

The study may have a few limitations which should be taken into account when interpreting the results. In Study 1, the same picture stimuli were used in Time 1 and Time 2 and these were presented in the same order. Thus, participants may have remembered the pictures, making a change in category placement less likely. However, changing the order of the picture presentation could have influenced the category placement. If a very negative photo was presented before a neutral photo, the negative feelings induced by the negative photo may have had an effect on the perception of the following images. Therefore, keeping the same order was the best option as this would not introduce a new, potentially confounding variable.

Additionally, the experiment in Study 1 was not carried out in a lab which meant that the independent variable could not be isolated from other potential confounding variables. Therefore, other events occurring in the participants' lives may have affected the results. This non-lab setting is both a strength and a potential limitation. Although this lack of isolation means that not all extraneous variables could be controlled for, it adds an element of reality to the research. In practice the Wellbeing Game is not used in an isolated environment. Therefore, the fact that the results show that the Wellbeing Game is effective in a real world environment strengthens the utility of this research.

In Study 2, no control group was used, making any comparison between those who played the Wellbeing Game in an organization and those who did not play could not be made. However, given the organizational context in which the Wellbeing Game was played, a comparable control group free from contamination would have been extremely difficult to achieve. The Wellbeing Game is a resource that is provided free to the public, and it is likely that other members of the organization may have been made aware of the Wellbeing Game, and there would be no way to stop these people from playing themselves. While the use of a true control group may have been impractical in this study, it is possible that future research can use other control mechanisms, such as the use of a waitlist or phased intervention.

The sample size used was a limitation in both studies. The small number of participants means that the power of both studies is limited. As only 60 and 52 participants were used in Study 1 and Study 2 respectively, there may not have been enough power to identify any differences between groups. This means that the non-significant findings may actually be due to a lack of power rather than a true absence of a difference. However, this is the first quasi-experimental evaluation of the Wellbeing Game, and future research should explore the findings of this study using a larger sample size.

Both studies utilized single-item measures. While a single-item may be less ideal than a multi-item scale, a single item was preferred as it decreased survey length. Also, the item was specifically developed for the current study in order to clarify to the meaning of the word "stress." Many of the existing stress measures ask about stress indirectly and in the present study it was important to assess participants' own view of their stress experiences. Furthermore, single item measures have been found to be reliable when measuring self-reported stress (Fisher et al., 2016), and in both studies it was of practical importance to make the survey as short as possible to ensure organizational participation and facilitate survey completion rates.

Both studies utilized a longitudinal design, measuring the dependent variables both before and after an interventions. The time frames used may have influenced the magnitude of the change between the two time points. Longitudinal research should ensure that the study time frames correspond with the underlying mechanism of the change in order to avoid insufficient time for a change to occur, or to not allow too much time before re-testing that any effects have dissipated (Taris and Kompier, 2014). Although the underlying mechanisms contributing to how the Wellbeing Game works (based on mindfulness and Broaden and Build theories) take time to have an effect, a 1 week period was chosen in Study 1 based on the assumption students were unlikely to commit to playing the Wellbeing Game for longer than a week. While this is a short timeframe, previous research indicates that playing the Wellbeing Game at least three times resulted in an increase in wellbeing (Green, 2015), and this supported that 1 week could be sufficient. However, there was no indication in the previous research as to over how long of a period these three game-plays occurred; it is possible that they occurred over longer than 1 week.

Study 2 used a 4-week timeframe, which is consistent with the timeframe used in the Green (2015) study, but in a much smaller sample, which may explain why the results of Study 2 differed from those of Green (2015), and Study 1. However, there was indication that wellbeing was higher among some of those playing the Wellbeing Game in Study 2, and future research should investigate the effect of the Wellbeing Game on perception of stimuli over a longer period of time and in larger samples.

CONCLUSION

This research presented two studies of the evaluation of the Wellbeing Game in a student context. This research is also the presents first time that the Wellbeing Game was used and evaluated in an organizational setting. The results showed that after playing the Wellbeing Game students reported higher wellbeing, and employees reported lower stress levels. Additionally, the results showed that the Wellbeing Game has was related to lower stress and higher wellbeing among employees when social connections are improved as a function of the Wellbeing Game. The finding that the Wellbeing Game is more effective in an organization when the degree to which employees feel it helped strengthen connections with those around them is important, highlighting the importance of social support in organizations. Organizations should ensure that wellbeing interventions work to increase the quality of workplace relationships. Finally, this research is the first to investigate the mechanisms behind how the Wellbeing Game works to increase wellbeing by using a quasi-experimental setting. Future studies can build on the design of the current study to further explore the mechanisms behind the Wellbeing Game. Overall, the present study indicates that the Wellbeing Game is a cost-effective tool of engaging students and employees in positive activities with the potential of improving wellbeing in their everyday lives.

AUTHOR CONTRIBUTIONS

As the first author AK was involved in all steps of the process, and was the primary writer of the text. As the primary supervisor of AK's Master's thesis, KN has been involved in the design, data collection and analysis, as well as the write up of the text. KN, along with the two co-authors, have also been involved in adapting the manuscript from the original thesis. As associate supervisor SM has been involved in the design and analysis of Study 1, as well as data collection and analysis of Study 2, and has contributed to the write-up. As associate supervisor JK has been involved in the design and analysis of Study 2, as well as data collection of Study 2, and has contributed to the write-up.

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How to Measure the Intervention Process? An Assessment of Qualitative and Quantitative Approaches to Data Collection in the Process Evaluation of Organizational Interventions

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Organizational interventions aiming at improving employee health and wellbeing have proven to be challenging to evaluate. To analyze intervention processes two methodological approaches have widely been used: quantitative (often questionnaire data), or qualitative (often interviews). Both methods are established tools, but their distinct epistemological properties enable them to illuminate different aspects of organizational interventions. In this paper, we use the quantitative and qualitative process data from an organizational intervention conducted in a national postal service, where the Intervention Process Measure questionnaire ($N = 285$) as well as an extensive interview study ($N = 50$) were used. We analyze what type of knowledge about intervention processes these two methodologies provide and discuss strengths and weaknesses as well as potentials for mixed methods evaluation methodologies.

Keywords: organizational interventions, qualitative methods, quantitative methods, research methodology, mixed methods, process evaluation

INTRODUCTION

The evaluation of organizational interventions targeting employee health and wellbeing has been found to be a challenging task (Murta et al., 2007). The use of process evaluation, defined as the evaluation of "individual, collective or management perceptions and actions in implementing any intervention and their influence on the overall result of the intervention." Nytrø et al. (2000) has served to increase focus on the evaluation of the specific intervention processes and not only the outcomes. Although several evaluation frameworks (Nielsen and Abildgaard, 2013; Nielsen and Randall, 2013) have been suggested it has proven to be methodologically challenging to evaluate the processes of implementation of organizational interventions (OIs; Nielsen and Randall, 2013). Two distinct approaches to process evaluation data collection are commonly used. One is a quantitative approach where either standardized or intervention-specific questionnaire items are included in a follow-up questionnaire, and are later integrated into statistical models of implementation and effect (e.g., Nielsen et al., 2007; Nielsen and Randall, 2009, 2012). The other is the collection

of qualitative data; often specifically as a supplement to quantitative data, using semi-structured interviews with employees and managers, (Dahl-Jørgensen and Saksvik, 2005; Nielsen et al., 2006), observations of intervention activities (Brannan and Oultram, 2012), or long-term field observations (Czarniawska-Joerges, 2007). Qualitative process evaluation has been used extensively to understand the context of interventions outcomes (e.g., Mikkelsen and Saksvik, 1998; Saksvik et al., 2002; Nielsen et al., 2006; Aust et al., 2010). Each data source has its methodological strengths and weaknesses and the concurrent mixed methods use of both quantitative and qualitative approaches has been proposed as a potential middle ground (Dahl-Jørgensen and Saksvik, 2005; Nielsen and Randall, 2013). Mixed methods is here defined "as a method [which] focuses on collecting, analyzing and mixing both quantitative and qualitative data in a single or series of studies. Its central premise it that the use of [both] approaches in combination provides a better understanding of research problems than either approach alone" (Creswell and Plano Clark, 2011, p. 5). Although much is written about evaluation research in general (Lipsey and Cordray, 2000; Rossi et al., 2004; Pawson, 2013), and mixed methods evaluation in general (Rallis and Rossman, 2003; Nastasi et al., 2007) the particularities and methodological considerations of using qualitative and quantitative data in mixed methods based process evaluation have been sparse (Nastasi et al., 2007), particularly concerning the specifics of evaluating OIs (Nielsen and Abildgaard, 2013). Using a case of an OI in the Danish postal service where questionnaires and semi-structured interviews were used for process evaluation data collection, we compare the epistemological properties of both methods and assess the benefits of different ways to collect process information.

The aim of the present study is to examine the type of knowledge about the intervention process that may be produced by quantitative and qualitative data and discuss how these sources best can be applied in mixed methods designs. It is hence not a study of different forms of mixed methods designs (for such literature see Nastasi et al., 2007; Teddlie and Tashakkori, 2009; Creswell and Plano Clark, 2011) but instead an assessment of the properties and potential roles of specific data sources in mixed methods OI evaluation. We employ a sequential mixed methods analysis to identify a set of factors in the quantitative data that function as an analytical framework with which we comparatively analyze the qualitative data. This approach will help us accentuate what knowledge about the intervention each data collection methods may provide, and allows us to discuss differences and similarities.

Mixed Methods OI Evaluation

Though OI evaluation has historically focused on whether the interventions improve working conditions on quantitatively measured outcomes (Griffiths, 1999) mixed methods approaches have become a commonly chosen evaluation design. A archetypical design would be the use of surveys to measure effects of the intervention (Bambra et al., 2007; Egan et al., 2007) and a, often minor (Egan et al., 2009), degree of interviews/observation to assess the process and implementation. Though this approach will cover process and effect evaluation, researchers are advocating using more methodologically rigorous qualitative methods (Griffiths, 1999; Egan et al., 2009; Nielsen and Abildgaard, 2013), as well as more integrated mixed methods approach (Nielsen et al., 2010) to iteratively collect and analyze data from different methods to improve the assessment of the intervention process (such as Nielsen et al., 2015). Additionally, in recent years scholars have more extensively included quantitative process measures (Havermans et al., 2016) which is a further argument for the necessity increased clarity of which methods are most appropriate for different mixed methods evaluation tasks. To complement the focus on stronger mixed methods methodology in OI evaluation the present study serves to shed light on what type of knowledge of the intervention is gained from qualitative and quantitative process evaluation data.

Quantitative Process Evaluation Data Collection

A commonly used way to quantify perceptions of intervention processes is the development and use of process evaluation scales (Havermans et al., 2016). Although generic scales to measure, for instance, managerial conduct and leadership (Carless et al., 2000) exist, the quantitative process evaluation approach focuses on developing scales to measure managerial attitudes and actions related directly to the intervention in question. Established intervention measures include the Intervention Process Measure (IPM; Randall et al., 2009) and the Healthy Change Process Inventory (Tvedt et al., 2009). Other approaches include using items to quantitatively assess certain key aspects of the intervention such as employees' participation in activities (Füllemann et al., 2015), perceived legitimacy of a change program (Biron et al., 2010), stakeholder support (Sørensen and Holman, 2014) or degree of implementation (Eklöf and Hagberg, 2006; Hasson et al., 2014). A review of the process variables used in organizational stress management intervention evaluation showed a substantial heterogeneity in the level of measurement and the constructs that are assessed (Havermans et al., 2016).

On one hand, caution is needed when using unvalidated or tailored scales (Cox and Ferguson, 1994), on the other, using context specific measures has been recommended by Randall et al. (2009), and seems especially promising as many strongly emphasize the need to take contextual differences into account (Johns, 2001; Biron et al., 2010; Nielsen and Abildgaard, 2013; Nielsen et al., 2014).

To demonstrate the potential use of quantitative process data, we analyze the questionnaire data for psychometrically valid factors, hence identifying scales. Identifying process factors via questionnaires offers opportunities to (1) ask the entire population about the intervention process, (2) link processes to outcomes and (3) test whether the process factors are generic, e.g., that line manager support is an important process factor across a range of interventions. This will contribute to our understanding of how process questionnaires are best put to use in conducting evaluation of complex OIs, and we hence pose the following research question:

Research question 1: What information about the intervention process is gained from quantitative process evaluation?

Qualitative Process Evaluation Data Collection

The other approach, qualitative evaluation, is based on collecting and analyzing data of a very different nature. Interviews, focus groups, logbooks observations, field notes, documents, photographs, video and audio, are all valid sources, though semi-structured interviews seems to be the conventional method used in numerous studies (Mikkelsen and Saksvik, 1998; Nielsen et al., 2006, 2007; Aust et al., 2010; Biron et al., 2010; Greasley and Edwards, 2015). The semi-structured interview, being based on a prefixed interview guide with the possibility of additional follow-up questions (Kvale, 2007) allows the researcher to cover both contextual factors and intervention implementation. Other methods of choice include logbooks of activities (Gilbert-Ouimet et al., 2011; Hasson et al., 2012), consultants' written reports of activities (Aust et al., 2010), electronic communication (Biron et al., 2010) and workplace observations supplemented with field notes or unstructured interviews (Mikkelsen and Saksvik, 1998).

Qualitative process evaluation has often been used to explain puzzling results from quantitative effect evaluation. For instance, in Aust et al. (2010), the intervention group's working conditions deteriorated compared to the control group. Interviews indicated this deterioration was likely caused by disappointment that the OI did not deliver the expected improvements in working conditions. Nielsen et al. (2006) demonstrated how compensatory rivalry caused one control group to improve whereas unpopular concurrent changes caused the intervention to fail in one intervention group. Greasley and Edwards (2015) used extensive qualitative interviews pre- and post-intervention to assess managerial commitment and its relation to intervention success. Studies such as these demonstrate the usefulness of qualitative methods to explain unexpected effects and advance our understanding of intervention mechanisms.

In summary, it is well established that qualitative data can shed light on novel phenomena relevant to interventions, but the type of knowledge and how it differs from quantitative methods has not yet been addressed in relation to OI projects. To assess the characteristics of the knowledge gained from conducting process evaluation interviews, we aim to analyze the same constructs identified in the quantitative analysis to make comparison possible and pose the second research question:

Research question 2: What information about the intervention process is gained from qualitative process evaluation?

By answering these two research questions we contribute to the growing and diverse literature on the use of qualitative and quantitative process evaluation data in mixed methods designs by providing conceptual clarity about the epistemological properties of both methods. As we analyze the same concepts using the same intervention with different data sources we are able to compare the contributions, strengths and weaknesses of both methods. We subsequently discuss the extent of, and limits to, data collection, and how these methods can be combined in mixed methods designs regarding OI projects specifically.

MATERIALS AND METHODS

The Organizational Intervention

The OI used a cluster randomized design in four postal areas divided in two Regions in the Postal Service. Postal service mail carriers and their line managers participated in the intervention. The OI was implemented in a participatory fashion where activities were adapted to suit the participating employees and managers. The researchers randomized the two Regions into an initial intervention group (Region 1) and a waitlist control group (Region 2) that would implement an adapted version, based on experiences from the initial OI in Region 1. In both regions the OI focused on addressing current work environment challenges as well as improving the systems for managing the long term developments of the working conditions. The key intervention components comprised an interview and questionnaire based assessment of working conditions, a detailed evaluation of health and safety practices, a prioritization workshop, and a daylong action planning workshop. In addition, ongoing steering committee meetings were held to monitor progress of activities and make decisions regarding the OI. A detailed presentation of the intervention can be found in Nielsen et al. (2013).

Quantitative Evaluation

Process Items

The process questionnaire contained 22 items based on the IPM questionnaire but tailored to the specific context as recommended by Randall et al. (2009). Response options were five point Likert-type scales ranging from "strongly disagree (1)" to "strongly agree (5)." A list of the process items can be found in **Table 1**.

Statistical Analyses

The existence of district scales within the items was examined using exploratory factor (EFA) with varimax rotation ($N = 285$ response rate 89%) analysis. Several items displayed a significant ($p < 0.05$) right skewed tendency, these were included based on a visual inspection, but due to the skewness principal component analysis was chosen over maximum likelihood estimation as recommended by Fabrigar et al. (1999). The EFA analyzes followed the procedures from the original IPM development.

Qualitative Evaluation

The Interviews

At least two employees from each team were interviewed, in larger teams one individual and one group interview (with three employees) was conducted. The interviews were conducted at the end of the implementation phase 3 months prior to the follow-up questionnaire and followed a semi-structured interview guide. For each work team the research team selected at random a number of informants equivalent to 10% of the work team, in case the informant was not available on the day of the interview, the next person on the personnel list was selected. In total, 22 employees in Region 1 (16 individual and 2 groups) and 28 employees in Region 2 (19 individual and 3 groups) were interviewed. The interviews were tape recorded and lasted

TABLE 1 | Exploratory factor (EFA) factor structure.

Scales and constituent items	MEAN (*SD*)	Item total correlation	Common alities	Factor loadings			
				1	2	3	4
Line manager attitudes and actions							
My Line manager has involved the employees in the organization level intervention (OI) process	3.11 (0.98)	0.81	0.76	0.83	0.17	0.18	0.08
My Line manager has clearly explained what the benefits of the OI were	2.95 (0.97)	0.87	0.85	0.88	0.14	0.24	0.03
My Line manager has taken responsibility for implementing the OI	3.03 (0.95)	0.89	0.87	0.89	0.19	0.20	−0.02
My Line manager has prioritized to work with the OI	2.94 (0.96)	0.86	0.83	0.88	0.16	0.18	−0.03
The Area manager has done a lot to involve the employees in the implementation of the OI	2.73 (1.00)	0.77	0.68	0.78	0.15	0.22	0.07
My Line manager has done a lot to involve the employees in the implementation of the OI	2.78 (1.03)	0.79	0.72	0.78	0.14	0.29	0.11
Improved psychosocial work environment							
I have gained a broader understanding of psychosocial work environment and wellbeing	3.22 (0.92)	0.74	0.74	0.29	0.24	0.77	0.09
I have changed my attitude toward how wellbeing and psychosocial work environment is to be handled in my workplace	3.11 (0.91)	0.73	0.81	0.19	0.07	0.86	0.17
I have gained more influence in relation to implementing changes	2.92 (0.85)	0.74	0.75	0.31	0.25	0.77	0.01
During the last year the dialog about wellbeing and psychosocial work environment has improved	3.00 (0.92)	0.66	0.65	0.39	0.33	0.62	−0.07
Information about changes							
During the last year I have received information about changes in the company	3.53 (0.82)	0.76	0.74	0.21	0.80	0.20	0.12
During the last year I have received information about the prospects for the company	3.62 (0.86)	0.78	0.80	0.10	0.86	0.20	0.10
During the last year I have received information about changes in my team	3.59 (0.78)	0.79	0.78	0.15	0.85	0.14	0.09
During the last year I have received information about the prospects for my team	3.40 (0.87)	0.72	0.71	0.22	0.80	0.15	0.05
Need for OI							
I think we have had a need to work on improving the psychosocial work environment and the wellbeing in my team	3.38 (0.98)	0.31	0.82	−0.07	0.03	0.06	0.90
The questionnaire from the OI has focused on the things that are important for me in my work	3.30 (0.92)	0.31	0.58	0.24	0.34	0.11	0.63

between 45 min and 1 h. The interview guide focused on the following three major topics; the intervention program and perceptions about the OI (sample question "which changes do you see the OI has brought about?"), changes in the workplace (sample question "How have your daily work tasks and schedule changed during the last year?") and hindering and facilitating factors in the context (sample question "Which conditions in your workplace have made it difficult to achieve positive outcomes from the OI?").

Qualitative Analytical Approach

Thematic analysis (Boyatzis, 1998; Braun and Clarke, 2006) was used to analyze the interview material. To assess the difference in methodological properties between qualitative and quantitative process measures we developed a thematic framework based on the factors derived from the exploratory factor analysis. The analysis focused on what qualities of the OI the interview data could illuminate. Once the thematic factors were identified in the factor analysis, all interviews were thoroughly read through and all parts relevant to specific themes were collected, subsequently an account illustrating both the breadth and depth of each theme was produced. We aimed to identify aspects relevant for understanding the working mechanisms of the OI, the personal perceptions and narratives of the OI and in that sense produce detailed contextual accounts of the OI.

RESULTS

RQ1: What Information about the Intervention Process Is Gained from Quantitative Process Evaluation?

To identify what knowledge about the intervention the process items can provide we initially conducted exploratory factor analysis to identify constructs and scales for further analysis. In order to achieve a good factorial fit, six items were excluded due to high loadings on several factors (loadings > 0.2). The data had acceptable properties for conducting factor analysis (KMO $= 0.89$; Bartlett's Test of Sphericity $p < 0.000$).

The factor analysis also revealed a factor structure consisting of four factors explaining 75.4% of the variance in the data. Correlation between factors and statistics from the factor analysis is presented in **Table 2**.

Line Manager's Actions and Attitudes

This factor consists of consists of six items which are measuring managerial actions and attitudes supporting the intervention. Cronbach's alpha $= 0.94$. This factor explained 46.39% of the variance in the data.

Improved Psychosocial Work Environment

This factor consists of four items and covers the exposure to the intervention as well as proximal measures for intervention mechanisms (e.g., improved dialog and understanding of psychosocial work environment). Cronbach's alpha $= 0.87$. This factor explained 13.8% of the variance in the data.

Information about Changes

This factor includes four items focusing on having received adequate information about changes relevant to the team. Cronbach's alpha $= 0.89$. This factor explained 8.23% of the variance in the data.

Need for OI

The last factor includes two items focusing on having received adequate information about changes relevant to the team. Inter-item Correlation $= 0.31$. This factor explained 6.67% of the variance in the data.

What Knowledge Is Gained from the Questionnaires?

To answer RQ1; reducing the quantitative process questionnaire items into four distinct factors facilitated the development distinct scales, and hence provided a shortlist of the most important aspects of implementation. The quantitative data emphasized that managerial attitudes and behaviors are of particular importance (by explaining most of the variation, and also having a particularly high internal reliability). The quantitative process questionnaire provided a reduction of the complexity of the intervention into a more manageable number of components representing different aspects of the program.

An argument for the validity of the results is the fact that factors to a large extent overlap with the results found in the original IPM validation, especially the "Line manager's attitudes and actions" and "Improved psychosocial work environment" are comprised of a subset of items from the original IPM scales. The last factor "Need for OI" is based on two items about the work environment screening questionnaire and the intervention, and has a low inter-item correlation compared to items in the others factors likely due to the two items being targeted at different, but still somewhat related, areas of perceived need (i.e., the need for a new questionnaire, and the need for the OI in general).

It is a result that is supporting quantitative measurement of OI processes that the identified constructs are in correspondence with the general literature, which has documented the distinct role of line managers, (Nielsen, 2013), the importance of information (Mattila et al., 2006), the necessity of perceived change (Semmer, 2011; Nielsen and Randall, 2012) and needs assessment (Bartholomew et al., 1998). The EFA also provided four psychometrically valid factors for use in subsequent quantitative analysis. Observing the four scales, information about changes was by the respondents rated more positively than the others, which would indicate that employees were more positive with regards to this intervention area compared to the other factors. The fact that information about changes and improvements in work environment were clearly distinct factors likewise suggests that the perceptions of information about changes in general and perceptions about the outcome of the OI did not stem from the same underlying construct. In summary, the quantitative data identifies constructs, and a quantification of their validity, reliability and interrelatedness, which can be further applied in future studies.

TABLE 2 | Descriptive statistics and inter-correlations between the scales.

Scale	*M*	*SD*	1	2	3	4
Line manager attitudes and actions	2.93	0.87	1			
Improved psychosocial work environment	3.06	0.76	0.60**	1		
Information about changes	3.53	0.72	0.41**	0.50**	1	
Need for OI	3.34	0.77	0.21**	0.27**	0.34**	1

$^{**}P < 0.01$.

Research Question 2: What Information about the Intervention Process Is Gained from Qualitative Process Evaluation?

To assess the type of information about the process that interviews may provide we analyzed the four constructs identified in the quantitative results and compared the information to that found in the qualitative data on the same topics. We first analyzed the line manager's actions and attitudes relating to the OI, second we looked closer at the perceptions about improvements in psychosocial work environment, third, we assessed experiences relating to information about changes in the workplace, and finally, we analyzed the experiences related to need for the OI. Quotes illustrating each theme can be found in the appendix labeled "Data Sheet 1".

Line Manager's Actions and Attitudes

When the interviewees were asked about actions and attitudes of their line manager in relation to the OI they confirmed the crucial role of line managers. They elaborated on how the actions of line managers both helped and hindered implementing the OI. A majority of employees problematized the scarcity of time and the fact that line managers often prioritized focusing on other tasks than conducting and following up on OI activities.

Interviewees expanded on this perspective and underlined the key role of line managers in making sure OI progress was taking place, and that continuous communication about the intervention process was happening. Some employees expressed positive attitudes toward management's actions during the OI, but often commented negatively on how the line managers had problems keeping their own promises. The interviews, compared to the quantitative factor, demonstrated how these everyday aspects external to the OI affected the employees' perceptions of how the line managers were capable of supporting the implementing the OI.

Improvements in Psychosocial Work Environment

Many employees experienced positive developments during the implementation of the OI, most concretely improved social relations and team climate. Others agreed on the development but were not sure if it was due to the OI. Some employees expressed disappointment with regards to having spent too much time and energy on assessment and too little on developing actions. These disappointments were linked to difficulties regarding what activities stemmed from the OI and how they related to changes in working conditions.

Some expressed a hesitance about ascribing too clear causality between the OI and the improvements that could be observed, and others commented that the OI did lead to practical improvements though not on a large scale. Many interviewees likewise commented on the OI and presented their perceptions of its working mechanisms. This demonstrates how interviews can help researchers explain why and how an OI works. For example, a clear positive factor in the interviews regarding the outcome of the intervention was, for some, a feeling of being involved and participating in the development and follow-up on activities. The clear difference to the quantitative factor is the substantial doubt and hesitance expressed by the employees with regards to intervention causality. Similarly opinions and suggestion regarding weighing of the energy spent on different components of the intervention is a parameter more easily assessed by explorative qualitative methods.

Information about Changes in the Workplace

When asked about information about changes in the workplace, respondents talked about several interrelated issues: information about the OI activities, problems of assigning time for information distribution and general information about changes. Regarding the OI, some respondents experienced a lack of information and hence did not know where the process was headed. One interviewee explained that information did not come about by itself, one needed to actively seek out information and another employee problematized the balancing act of having limited time to seek information.

A consistent theme in the interviews was that changes in the company on a both organizational and team level significantly affected the OI and that information about these changes was insufficient. Not only did the interviewees report several cases of restructuring of work tasks but also of layoffs. These disturbances were even seen by interviewees as being used by line and area managers as excuses for not focusing sufficiently on the implementation of the OI. A problem that was raised about concurrent projects, especially during the layoffs, was that the information and developed practices were fleeting. Several interviewees hence articulated a reluctance to commit themselves to novel projects as many had substantial previous experiences with change failure. This theme demonstrated that though employees positively rated the information regarding changes in the questionnaire, their daily experiences of lack of information and navigating in a complex organization proved difficult. Likewise the interviews highlighted that the juxtaposition of wanting more information and the cost of having to spend time on acquiring it.

Need for the OI

Interviewees presented a lot of statements about how they perceived the need for specific aspects of the OI such as the format

of being involved, developing action plans and participating. Some experienced that there had been a need for a new way of working with screening and action planning in smaller groups, while others would have preferred that everyone was participating in the activities.

In the interviews talk about the OI was also often linked to experiences with other similar activities and how they had often been forgotten in the long run. Some excused not having had sufficient time and resources for the OI due to concurrent organizational changes such as layoffs, merging teams or changing managers.

A general assessment was that the process and outcome questionnaire used in the OI was too long but some relevant aspects were identified. Some interviewees did not remember completing the questionnaire, but they often explain that they had likely done it and since forgotten about it. A group of interviewees explained that the questionnaire is superseded by concurrent events such as managerial change.

The final theme was very different in the interviews than the two items in the questionnaire. Interviewees in the semi-structured interviews did not restrain themselves to only answering the questions regarding the need for the OI, but instead gave accounts of the contextual setting that they had to assess the need for an OI in. They expressed change fatigue and compared the OI to previous failed projects and an annual attitude surveys that suffered from a lack of follow-up. Thus, the interviews provided important information about what factors employees consider before deciding whether to commit to an OI.

What Knowledge Is Gained from the Interviews?

The accounts and narratives identified in the four categories have a quality of being what Geertz (1973) and others have label "thick descriptions," meaning that it is not only the direct thoughts and actions that are covered but also a detailed description of how they fit in a social context. The mental models of how employees perceive the intervention to work in their organizational context is similarly important to uncover in order to establish what mechanisms the participants' perceive that the OI is working through (Pawson, 2013).

In the interviews we are offered explanations of how the OI fared in the practical reality of the daily postal life with hindrances such as canceled meetings, forgotten questionnaires, and unsupportive line managers. Such information is paramount in the task of providing a detailed assessment of whether an intervention as such has failed (theory failure), or it has not been adopted adequately to have had a chance to be effective (implementation failure; Nielsen et al., 2006). It allowed us to investigate, not only the degree of implementation, but also which contextual factors have caused the OI to function as it did.

A further central quality of the interviews is that they reveal how the intervention became embedded in the larger narrative of the company and became a part of the intervention history of the company. How the intervention is seen by participants compared to previous similar projects is a key result of the interviews.

DISCUSSION

The aim of this paper was to examine what information about the intervention process is to be gained from quantitative (RQ1) and qualitative (RQ2) process evaluation. The results in this paper have shown that for RQ1 the EFA analysis identified four distinct factors in the data, providing a set of scales for potential further inquiry and comparison. The qualitative data assessed in RQ2 in contrast demonstrated how the intervention fit the organization, and provided colorful context specific details about the intervention.

Integrating Qualitative and Quantitative Data

A central question in mixed methods research has been how data are combined and what role different sources play in analyses (Bryman, 2007; Johnson et al., 2007; Nastasi et al., 2007; Teddlie and Tashakkori, 2009; Creswell and Plano Clark, 2011). The relevance of using a thorough qualitative assessment of the context and perceptions as well as a quantitative assessment of implementation and proximal effect of change processes seems to intuitively speak for a methodological approach where both methods are used to approximate the details of the intervention process in question (Greene et al., 1989; Rallis and Rossman, 2003; Nastasi et al., 2007). Studies have shown the potential of mixed methods by drawing on both types of process data in combination with outcome measures to get a precise estimate of processes and effects (e.g., Mikkelsen et al., 2000; Dahl-Jørgensen and Saksvik, 2005; Nielsen et al., 2006, 2015; Aust et al., 2010; Sørensen and Holman, 2014). These studies can be seen as using a form of mixed methods, labeled by Bryman (2006) as complimentary mixed methods, which demonstrates how the use of one data type (qualitative in this case) to show depth and detail can complement and nuance the results from another data type showing breadth and representativeness (quantitative in this case). The current study, however, sheds light on specific aspects of the use of qualitative and quantitative data in mixed methods evaluations of organizational interventions.

The Usefulness of Questionnaire Measurement in Mixed Methods Designs

The fact that the quantitative process evaluation results presented a psychometrically valid factor structure with constructs that were mirrored in the qualitative data shows speaks for the validity of this method and the validity of the following characteristics: First of all a key quality of quantitative measurement is that researchers can gain valuable information about key issues from a large proportion of the sample using few resources. If intervention outcomes are measured using pre- and post-intervention questionnaires, one should not overlook the practicality of also measuring process using questionnaire items. Compared to conducting lengthy interviews or focus groups it is convenient for respondents to also answer a number of process questions that measure key constructs known to be relevant for implementation and that can be linked to quantitative outcome evaluation (Murta et al., 2007; Semmer, 2011; Nielsen

and Abildgaard, 2013). Quantitative process measurement also allows for integration of process and outcome evaluation in longitudinal, mediation/moderation models with tools such as structural equation modeling (Ullman and Bentler, 2003).

Several studies have shown that interventions do not necessarily affect the entire intervention group, or have similar effects in all subgroups (Nielsen et al., 2006; Semmer, 2011). The use of quantitative data also enables for comparison of items of implementation across different contexts or intervention instances which is a substantial quality of quantitative process evaluation data.

Understanding the Qualities of the OI Process and Context

First and foremost the qualitative interviews provided a more detailed narrative contextual account of the themes identified in the factor analysis, which gives the reader a richer understanding of the intervention and its context than the quantitative methods. The qualitative data shed light on how organizations and their members do not exist in a historical vacuum; the intervention is compared to past activities and concurrent events. The assessment of the organizational narratives that the intervention is seen through is a central quality to provide evaluation researchers and their audiences a more nuanced understanding of the "how" and "why" of intervention processes.

Qualitative data is also central for conducting a thorough process evaluation because aspects not measured in the quantitative questionnaires are likely to be affecting the results. This was seen in quotes where the employees explained nuanced aspects of line managers actions, how line managers were focusing on other aspects, how information was somehow both needed, but not wanted badly enough to call for action. Complex aspects of organizational reality, such as these, need to be uncovered using a qualitative assessment, as quantitative methods have difficulties illuminating these aspects. Similarly the interviews reveal a substantial insecurity about which outcomes are related to which activities, a problem that is not easily assessed with the questionnaires. Identifying such problematic gaps in implementation is a key benefit of explorative qualitative assessment that helps push implementation and evaluation of OIs further.

Another issue was how employees were focused on the increasing problems of downsizing and organizational change in the postal service. Conducting interviews where questions were posed about the general state of the organization made it possible to analyze how the changes were perceived, and hence how the changes might influence the outcome of the OI.

Implications for Mixed Methods Process Evaluation

The results from this study first of all confirm the relevance and need for application of mixed methods designs to the process evaluation of organizational interventions, as different methodological tasks are better handled by applying different methods. Though this study demonstrates that it is possible to combine data sources to a mixed methods analysis of specific constructs it also puts weight behind the argument that each method would be suboptimal on its own (Greene et al., 1989; Rallis and Rossman, 2003; Nielsen et al., 2006): It is complex to accurately rate and compare degrees of implementation and support among of groups of employees using the qualitative data, and with the quantitative data novel contextual events are difficult to assess (Rallis and Rossman, 2003).

A key aspect of intervention evaluation projects is that they are linked to time limited events (i.e., the specific OI implementation), and it hence appears that researchers often conduct entirely parallel data collection designs (examples include Saksvik et al., 2002; Nielsen et al., 2006; Aust et al., 2010) possibly due to lack of time for crossover of results and adjustment of data collection strategy. In contrast to the parallel design the results from this study suggest that there are potential benefits from sequentially harnessing methods to improve the evaluation, or even using reiterative cycles of mixed methods application (Nastasi et al., 2007). The results from quantitative analyses can be used to guide, not only qualitative analysis (as was done in this study) but also the qualitative data collection to ensure that specific aspects that have been found to be puzzling are being qualitatively uncovered (Nastasi et al., 2007; Creswell and Plano Clark, 2011). Likewise interviews can be used to guide survey development to both select items and scales or even develop tailored items based on interview content (c.f. Nielsen et al., 2014).

Knowing how to balance the utilization of an efficient separate qualitative/quantitative data collection and potentially more complex and time consuming mixed methods approaches where results from different data sources are used to inform further data collection, is not an easy task (Bryman, 2007; Mertens, 2011). The question is hence not whether or not mixed methods should be used, but instead which mixed methods design is most appropriate. Here a starting point could be to examine the program theory (Pawson, 2013) underpinning the OI and consider which aspects are most appropriately and comprehensively covered by different methods.

Strengths and Limitations

The present study used data from an OI conducted in two regions in one company. Though this is a clear limitation of the generalizability of the results, the fit with general findings in the literature suggest that the results are still usable for other researchers. As this is a study of evaluation methods, generalizability of the concrete findings is not a key quality of the study and therefore we consider the amount of data adequate.

Another limitation is that the process data collection in the intervention is very thorough in the qualitative part and perhaps not as thorough in the quantitative where only 16 items were used to measure the process. The quantitative results presented a limited picture of the intervention, but we might be able to legitimate more complex analyses if we had included more items. The survey was conducted after the interviews and hence the adaptation of the IPM would be influenced by crucial elements of the interviews.

CONCLUSION

We suggest that researchers venturing into mixed methods evaluation designs carefully consider what aspects of the intervention process should be assessed by which data collection method. Qualitative process data has the potential to tie together meaning, context and narratives of the intervention and the organization. Quantitative process data in contrast has the potential to represent a larger sample of individuals' opinions in a cost effective manner, tie together evaluation across contexts and link process and outcome measures. Both are applicable in OI evaluation but researchers must use them wisely to harness their strengths as they have different methodological presuppositions and answer different questions.

AUTHOR CONTRIBUTIONS

JA and KN conducted the intervention and collected the data for the study. JA wrote the draft of the paper and conducted the qualitative and quantitative analyses. PS and KN contributed substantially to its development, refinement of the analyses, presentation and discussion of the results.

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SUPPLEMENTARY MATERIAL

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