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The psychological challenges of remote working

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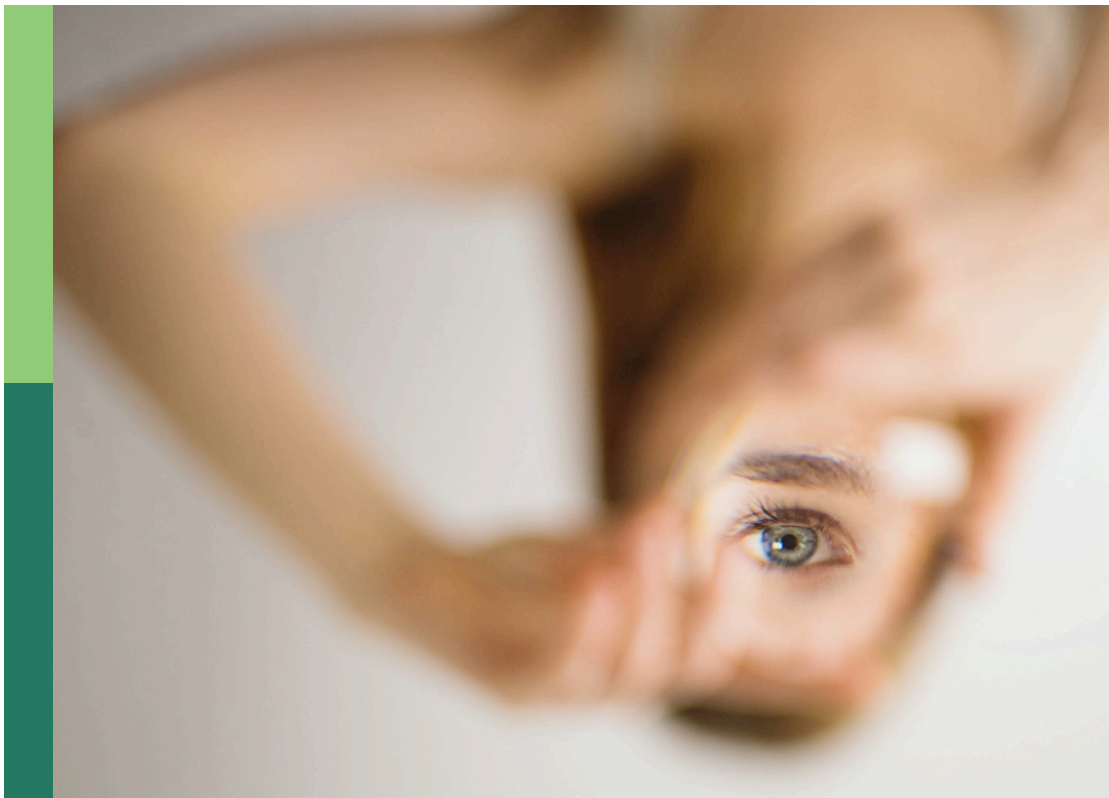

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The psychological challenges of remote working

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Editorial: The psychological challenges of remote working

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remote work, COVID, psychology, challenges, mental health

Editorial on the Research Topic
The psychological challenges of remote working

Prior to the emergence of the gig economy there were industries that involved remote working and extended commuting such as mining and construction; and mobile work driven by telephony, long distance commuting and internet access. Such arrangements contributed to exhaustion, loneliness and family breakdown (Berg et al., 2018). In the gig economy, platform mediated work, whether in its physical form such as food delivery services or through online data analysis has transformed work and industries globally (Ayentimi et al., 2023). Conditions supporting remote and online working include the increasing access to the internet, smart phones and their related technologies, software and cloud computing developments, the rise of global online service providers and the ease of conducting business and shopping online (Wheatley et al., 2021). The significant technological transformation associated with the fourth industrial revolution technologies (Schwab, 2015) has supported working from home, remote working, and mobile work from locations that have internet access.

Interest in examining the psychological effects of remote working was driven by the COVID-19 pandemic that forced millions into work-from-home work arrangements (Kniffin et al., 2021). It represented a significant change in lifestyle, working and living habits. This monumental shift was unplanned and implemented without knowledge of the potential challenges associated with prolonged periods of homeworking (Kowal et al., 2020). This represented one of the most significant changes in working arrangements globally and provided the opportunities for researchers, organization, and governments to assess the consequences of extended working from home arrangements. Researchers have examined the crucial issues that include the impact on employee stress and wellbeing (Saladino et al., 2020; Spagnoli et al., 2020); the management of the workforce and the impact on managers (Carnevale and Hatak, 2020; Ipsen et al., 2022); family and household challenges including work-family conflict (Prikhidko et al., 2020); and employee motivation and engagement (Galanti et al., 2021).

Following COVID, remote and homeworking arrangements will remain embedded in organizational employment practice and it is important to assess he psychological effects of extended remote work for workers, managers, organizations, and households/families. Potential personal challenges include isolation, the blurring of work-life boundaries, surveillance, and being on call (Wheatley et al., 2021). In turn, programs and policies that reduce the psychological risks are essential for organizations and policymakers as remote and home working is extended across all industries. This Research Topic provides a timely, diverse, and detailed examination of the psychological impacts of remote work. Within this Research Topic, nine articles examine the above issues and experiences across countries

through surveys of workers, households, and managers. Each article provides thoughtful suggestions for policies to support remote working and reduce its psychological risks.

Bodini et al. reported positive work-from home benefits across life and work domains among Italian knowledge workers following 18 months of working from home. Explanatory factors that contributed to these positive impacts included home to work commute times, changes in lifestyle arrangements and work-room sharing. The results indicate that inclusion and a sense of community are in improving workers' health and in offsetting the impact of isolation from working at home.

Carvalho et al. assess the impact of boundary controls on the relationship between family-supportive supervision behaviors (FSSB) and life satisfaction for teleworking. They also examine the moderating effect of the country on the relationship (Pakistan vs. Portugal). FSSB was e important to control teleworker boundaries and was linked to life satisfaction FFSB was found to contribute to higher levels of life satisfaction.

He et al. examined the impact of home working on families in China. They indicate that proactive/passive work connectivity behaviors support family harmony through self-efficacy and ego depletion. They r explore the moderating role of family support on this relationship.

Lescarret et al. investigated the determinants of employees' intention to telework in a coworking space, From an online survey of French teleworkers, they found that the perceived lack of working comfort while teleworking impacted the perceived usefulness of teleworking in a coworking space and also affected their future intentions to telework in a coworking space.

Maden-Eyiusta and Alparslan demonstrated a mediating role for psychological empowerment in the relationship between self-leadership and work role performance in remote work settings in Turkey. They also demonstrated partial support for the moderating role of supervisor close monitoring of employees. The study outlines the motivational process through which self-leadership results in improve work role performance.

Potgieter and Ferreira, through a survey of African and European participants, reported a close association between career adaptability and career wellbeing and the perceived value-orientated psychological contract.

Redaelli et al. investigated to what extent perceived COVID-19-crisis intensity (PCCI) results in parental burnout as manifested through exhaustion, emotional detachment from one's children and sense of parental inefficacy. The mediating role of work–family conflict (WFC) and the buffering effects of family-supportive organizational perceptions (FSOP) during the pandemic were also explored.

Tautz et al. investigated transformational leadership and health-oriented leadership among two cohorts (leaders and employees) in remote work settings in Germany. Both groups were asked to report their experiences of working from home as compared to working in traditional office settings. Participants reported that lack of social presence, limited informal chats, communication difficulties and a lack of mutual trust that inhibits transformational and health-oriented leadership.

van Gelder et al., reported that workplace innovation in the context of the Netherlands is positively associated with engagement via its effect on meaningful work but that it is not associated with exhaustion. Work–life segmentation preference amplifies the relationship between meaningful work and engagement and exhaustion. Line managers with strong work–life segmentation preference and a low score on meaningful work experience have less engagement and more exhaustion than line managers with a high score on meaningful work when working from home.

Author contributions

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

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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References

Ayentimi, D. T., Abadi, H. A., and Burgess, J. (2023). Decent gig work in Sub Sahara Africa? *J. Indust. Relat.* 65, 112–125. doi: 10.1177/00221856221111693

Berg, J., Furrer, M., Harmon, E., et al. (2018). *Digital Labour Platforms and the Future of Work Towards Decent Work in the Online World*. Geneva: ILO.

Carnevale, J. B., and Hatak, I. (2020). Employee adjustment and well-being in the era of COVID-19: implications for human resource management. *J. Bus. Res.* 116, 183–187. doi: 10.1016/j.jbusres.2020.05.037

Galanti, T., Guidetti, G., Mazzei, E., Zappalà, S., and Toscano, F. (2021). Work from home during the COVID-19 outbreak: the impact on employees' remote work productivity, engagement, and stress. J. Occup. *Environ. Med.* 63, e426–e432. doi: 10.1097/JOM.0000000000002236

Ipsen, C., Kirchner, K., Andersone, N., and Karanika-Murray, M. (2022). Becoming a distance manager: managerial experiences, perceived organisational support, and job satisfaction during the COVID-19 pandemic. *Front. Psychol.* 13, 916234. doi: 10.3389/fpsyg.2022.91623

Kniffin, K. M., Narayanan, J., Anseel, F., Antonakis, J., Ashford, S. P., Bakker, A. B., et al. (2021). COVID-19 and the workplace: implications, issues, and insights for future research and action. *Am. Psychol.* 76, 63. doi: 10.1037/amp0000716

Kowal, M., Coll-Martín, T., Ikize, G., Rasmussen, J., Eichel, K., Studzińska, A., et al. (2020). Who is the most stressed during the COVID-19 pandemic? Data from 26 countries and areas. *Appl. Psychol. Health WellBeing* 12, 946–966. doi: 10.1111/aphw.12234

Prikhidko, A., Long, H., and Wheaton M. G. (2020) The effect of concerns about COVID-19 on anxiety, stress, parental burnout, and emotion regulation: the role of susceptibility to digital emotion contagion. *Front. Public Health* 8, 567250. doi: 10.3389/fpubh.2020.567250

Saladino, V., Algeri, D., and Auriemma, V. (2020). The psychological and social impact of Covid-19: new perspectives of wellbeing. *Front. Psychol.* 11, 577684. doi: 10.3389/fpsyg.2020.577684

Schwab, K. (2015) "The Fourth Industrial Revolution". Foreign Affairs. Available online at: https://www.foreignaffairs.com/world/fourth-industrial-revolution (accessed October 15, 2022).

Spagnoli, P., Molino, M., Molinaro, D., Giancaspro, M. L., Manuti, A., Ghislieri, C., et al. (2020). Workaholism and technostress during the COVID-19 emergency: the crucial role of the leaders on remote working. *Front. Psychol.* 11, 620310. doi: 10.3389/fpsyg.2020.620310

Wheatley, D., Hardill, I., and Buglass, S. (2021) Preface: The rapid expansion of remote working in Wheatley, D., Hardill, I. and Buglass, S. *Handbook of Research on Remote Work and Worker Well-Being in the Post-COVID-19 Era*. IGI Global, xix-xxxiii

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Family supportive supervisor behavior and work-family boundary control in teleworkers during a lockdown: Portugal and Pakistan comparison

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The imposition of telework due to the COVID-19 pandemic brought with it the need for individuals to readjust their work-non-work boundaries. In this crisis situation, individuals' needs to manage these boundaries may have been influenced by contextual factors, such as family-supportive supervisor behaviors (FSSB) and macro-structural aspects, such as the country to which the teleworkers belong. This study tests the mediating effect of boundary control on the relationship between FSSB and satisfaction with life and examines the moderating effect of the country (Pakistan vs. Portugal) in the relationship between FSSB and boundary control. With a sample of 108 Portuguese and 118 Pakistani individuals, the results were analyzed using Process tool. FSSB was found to be important for teleworkers to control their boundaries and for their satisfaction with life and this control was also seen to contribute to higher levels of life satisfaction. Differences between the two countries were observed: boundary control mediates the relationship between FSSB and satisfaction with life for Pakistani teleworkers and these workers are more dependent on FSSB to exercise boundary control than Portuguese teleworkers. This study highlights the importance of considering contextual factors when implementing telework. Practical implications are discussed.

KEYWORDS

family supportive supervisor behavior, telework, lockdown, boundary control, satisfaction with life, COVID-19 pandemic

Introduction

Within the context of the COVID-19 pandemic, individuals' working methods underwent radical changes, namely an abrupt shift to telework (Carnevale and Hatak, 2020). Telework may be defined as a working arrangement away from the conventional workplace, which relies on information and communication technologies for the

accomplishment of tasks (Sinclair et al., 2020). In a telework situation, control of the work-family boundary (Clark, 2000) is more easily challenged as workers share the family and workspace, thus making it more difficult to psychologically distance themselves from work and control the boundaries between the two domains (Sinclair et al., 2020). Given that many companies plan to maintain telework in the post-pandemic period, it is important to understand how an organizational context that is conducive to the adoption of this work arrangement may be created.

The boundary theory (Clark, 2000) highlights boundary control, i.e., the ability to decide on how to combine or separate work tasks and family/personal life tasks (Kossek et al., 2012) as one of the important factors for achieving work-family balance. Studies have underlined how this control is essential for employees' wellbeing since, by allowing individuals to have the power to make decisions on how to balance the performance of their multiple roles, they may feel that they are responding to the most relevant dimensions of their life (Thomas and Ganster, 1995; Thompson and Prottas, 2006).

Despite their importance for effective management of the work-family relationship, few studies have analyzed the factors that can facilitate the control of work-family/personal life boundaries (e.g., Kossek et al., 2012; Capitano et al., 2019). The literature has highlighted family supportive supervisor behavior [family-supportive supervisor behaviors (FSSB), Hammer et al., 2009; Crain and Stevens, 2018] as a key contextual resource for harmonizing this relationship as it enables individuals to manage their family and work responsibilities, preventing stressful situations and ensuring higher levels of wellbeing (Crain and Stevens, 2018). In fact, by manifesting a set of supportive behaviors beyond the work context, such as offering time flexibility to teleworkers, FSSB can be a resource that offers individuals the opportunity to decide on their work and non-work boundaries (i.e., control of their boundaries) (Capitano et al., 2019). Although prior studies (Thomas and Ganster, 1995; Thompson and Prottas, 2006) have already shown the relevance of supervisor support for boundary control, this study has the advantage of analyzing supervisor support for the work-family relationship (FSSB, Hammer et al., 2009), which has an additional effect on the management of these two domains beyond the effect of general supervisor support (Hammer et al., 2009, 2013). Additionally, this study analyzed this effect in the context of telework, i.e., in a context where professional and family roles tend to overlap more and, consequently, are more difficult to manage.

However, although the relationship between FSSB and satisfaction with life or subjective wellbeing is analyzed in a number of studies (e.g., Straub, 2012; Newman et al., 2014; Rathi and Lee, 2017; Yucel and Minnotte, 2017; Shi et al., 2019), there are no studies on the factors that may explain this relationship, especially in a telework context. The teleworking during confinement needs to be framed since for most workers it was an imposition and there was no prior preparation for work in this modality. Thus, teleworkers in this period faced the challenge of dealing with a new way of working and often without specific conditions for this, such as having adequate space. In addition, other household members could be at home at the same time, which can pose added challenges in meeting work and family demands at the same time (Rudolph et al., 2021). Thus, the first objective of this study is to analyze the potential explanatory role that boundary control has in the relationship between FSSB and satisfaction with life in the context of lockdown-induced telework.

Each country is marked by a distinct cultural context (Hofstede, 1980) which has been defined by the literature as a macro-level determining factor in how individuals manage their work and family life (Hammer et al., 2009; Lu et al., 2009; Kossek et al., 2012). Moreover, some studies have pointed to the importance of understanding the specific context of telework in light of cultural patterns (Peters and den Dulk, 2003; Masuda et al., 2012). The analysis of each country, as a consequence of its cultural patterns, has been encompassed in dimensions such as individualism-collectivism, i.e., referring to the extent to which the individual is emphasized over the group in a culture (Hofstede, 1980) and power distance, i.e., the extent to which the less powerful members of institutions and organizations within a country expect and accept power to be distributed unequally (Hofstede, 1980). In general, it is argued that telework will be more easily implemented in countries with individualistic cultural contexts and with more power decentralization since independence and autonomy are regarded as core values (Peters and den Dulk, 2003; Masuda et al., 2012). The Global Leadership and Organizational Effectiveness (GLOBE) project by House and colleagues (House et al., 2004) validates Hofstede's (1980) typology and identifies these and other dimensions to distinguish specific aspects of different countries' cultures. This study collected data in two countries with distinct cultural patterns: Portugal and Pakistan. According to GLOBE, Portugal is a more individualist country with more decentralized power while Pakistan is a more collectivist country with more centralized power. The study by Lu et al. (2009) shows how supervisors' emotional support in employees' family life may be more important for countries with a collectivist culture when compared to an individualist culture. Thus, in a context of imposed telework due to lockdown, where supervisors needed to redefine their support and employees their work-family boundaries, different reactions would be expected according to the country in question. Thus, the second objective of this study is to analyze the extent to which belonging to two countries (Portugal vs. Pakistan) with different cultures may condition the relationship between FSSB and the perception of boundary control.

This study offers several contributions to the theory and organizational management of the work-family interface. Firstly, it should be noted that the data collected for this

study, namely through workers in lockdown and, consequently, in telework, may provide important knowledge for action in crisis contexts. More specifically, it may contribute to an understanding of the role of the supervisor and boundary control as important resources in this context of telework and subsequently lead to the establishment of practical action strategies. Secondly, from a theoretical point of view, this model emphasizes the potential effect that a contextual variable, namely FSSB, may have on an individual variable, which has not been studied extensively in the literature on the work-family relationship, i.e., boundary control (Clark, 2000). Furthermore, the comparison between Portugal and Pakistan will allow for a better understanding of the realities of these two countries with regard to telework, FSSB and boundary control, thus contributing to the design of more tailored intervention strategies. Overall, cross-cultural studies help enhance international understanding, encourage collaboration, and improve communication (Nadeem and de Luque, 2018), which is also the aim of this study.

Theoretical framework

The mediation role of boundary control

Telework has long been termed a family-friendly practice, therefore associated with benefits such as enhanced work-family balance afforded by the flexibility to balance the two domains and more autonomy in the management of work tasks (Sardeshmukh et al., 2012). However, prior to the pandemic, many companies had not yet implemented this practice and it thus emerged as an imposition for which employers and workers were not prepared (Desilver, 2020; Sinclair et al., 2020). In fact, the abrupt shift to telework during lockdown had distinct contours. Firstly, telework is a measure regarded as voluntary, however, during lockdown it became mandatory (Sinclair et al., 2020). In addition, some factors may have hindered telework during lockdown, such as couples' dual employment where they were both teleworking and their children were also at home in a situation of distance learning due to the closure of schools. Thus, many were forced to respond to the demands of work and support their children simultaneously (Rudolph et al., 2021). Moreover, the differentiation of workspace and time has traditionally served to configure the different roles played by individuals (Clark, 2000). A typical example is that of a worker performing work tasks in the workspace for a specific period of hours (e.g., Monday–Friday, 9–5) who is physically absent from the workplace when involved in non-work tasks such as during the evenings and weekends (Allen et al., 2014). Therefore, it may be said that during the lockdown period telework caused not only the absence of physical boundaries but also temporal boundaries which, in turn, leads teleworkers to be constantly thinking about work or performing professional tasks beyond the actual work schedule (Grant et al., 2013).

The telework phenomenon during lockdown may be understood by considering how the boundaries between the work and family (personal life) domains are managed by individuals in order to achieve balance (Clark, 2000). Boundaries may be physical, temporal or psychological and are influenced by flexibility, i.e., the extent to which spatial and temporal boundaries are pliable, and permeability, i.e., the extent to which a person physically located in one domain may be psychologically or behaviorally engaged in another domain. According to Clark (2000) and Kossek et al. (2012), the effective management of these boundaries depends on the extent to which individuals feel able to control them. For example, for individuals to prevent work from invading their family life, it is fundamental that they feel in control of their leisure time and can turn off their professional mobile phone to avoid being contacted (e.g., by supervisors, colleagues or clients). Likewise, to prevent family from invading their professional life, it is equally crucial that individuals feel they can control their thoughts and worries when they are working, to concentrate solely on performing their professional tasks. In fact, it is this control that enables individuals to behave according to their preferences and the demands of their roles in these two domains: high levels of control translate into congruence between their behaviors, preferences and/or role demands, while the opposite occurs when control is low (Capitano et al., 2019).

For the above reasons, during lockdown boundary control naturally took on particular relevance for workers' wellbeing. In fact, control over the time, frequency and direction of boundary transitions between the work and family spheres is an important resource for individuals that will help them to effectively manage the various roles and, consequently, develop feelings of self-efficacy (Kossek and Lautsch, 2012). Moreover, it is when individuals feel they have control over the work-family boundaries that they perceive an alignment with their identity and values (Kossek, 2016) and obtain satisfaction from the performance of their life roles (Capitano et al., 2019), thus achieving high levels of wellbeing.

Satisfaction with life represents one of the indicators of subjective wellbeing and may be defined as a cognitive process characterized by individual judgment on quality of life in terms of self-imposed criteria (Diener et al., 1985; Pavot and Diener, 1993). People report high satisfaction with life when their life circumstances are in line with these criteria (Pavot and Diener, 1993). Thus, boundary control is expected to be a relevant variable to explain the extent to which teleworkers are satisfied with their life.

On the other hand, the boundary theory (Clark, 2000) highlights that individuals' management of the work-family boundaries is dependent on situational factors,

namely *border-keepers*, among whom direct supervisors are particularly relevant (Park et al., 2011). In fact, supervisors may display varying degrees of flexibility whether by adapting professional conditions to each individual's family situation or encouraging/discouraging them to use family support policies and practices.

FSSB may be observed through the family support behaviors adopted by the supervisor in order to help employees balance their work and family lives (Hammer et al., 2009). These behaviors, divided into emotional, instrumental support behaviors, role modeling and creative management of the work-family relationship, may be important for individuals to feel that they control the boundaries between the domains. For example, emotional support is when individuals feel their needs are being taken into consideration and that they can communicate with the source of support whenever necessary (Hammer et al., 2009), which may generate the feeling of support from their supervisor to adapt/modify their work schedule. In turn, role-modeling behaviors are related to how supervisors provide examples of strategies and behaviors that foster the effective integration of work and family responsibilities (Hammer et al., 2009). Therefore, if supervisors display flexible boundary-adjusting behaviors, their employees will also be more encouraged to do so. Instrumental support refers to how the supervisor responds to employees' specific needs regarding the work-family relationship by providing services or resources so that they can effectively manage their responsibilities in these two domains (Hammer et al., 2009). More specifically, if an individual needs to deal with a family demand during working hours, the supervisor can work with the team to readjust the worker's schedule to meet that need. Finally, creative management of the work-family relationship, which is more proactive and strategic in nature, involves restructuring work to facilitate workers' effectiveness (Hammer et al., 2009). This creative management may involve, for example, the use of a collaborative platform to facilitate communication among team members in a telework arrangement, facilitating not only the performance of the professional activity, but also the adjustment to each worker's family/personal life by avoiding excessive meetings.

Several studies have corroborated the beneficial effect of supervisor support for both work-family boundary management and workers' wellbeing (Crain and Stevens, 2018). For example, the study by Thomas and Ganster (1995) showed that supportive practices, including supervisor support, increased the perception of control over work and family matters and that this perception of control translated into lower levels of work-family conflict, job dissatisfaction, depression, somatic complaints, and blood cholesterol. Thompson and Prottas (2005) also showed that supervisor support was beneficial for individuals to increase their perception of control over the work-family boundaries and that this perception was fundamental for satisfaction with life. Although supervisor support was not geared specifically toward the work-family relationship in these studies, and they were not conducted in a context of telework, they still offer consistency to the following hypothesis:

> H1: The relationship between FSSB and satisfaction with life in lockdown-induced telework is mediated by perceived control of the work-family boundaries.

The moderating role of country (Portugal and Pakistan) in the family-supportive supervisor behaviors and boundary control relationship

Several authors have highlighted the importance of each country's culture, not only in relation to how people balance their work and family (Powell et al., 2009; Allen et al., 2015) but also in the adoption of organizational practices that allow workers to establish a balance between their work and family life, namely telework (Peters and den Dulk, 2003; Masuda et al., 2012).

The culture of each country is characterized as a set of beliefs, values and norms shared by individuals with a common historical experience, and which influence their behavior (Hofstede, 2005). Two dimensions of this culture have been highlighted as influencing the adoption of telework: collectivism/individualism and power distance. In an individualist culture, behaviors and beliefs are mostly determined by the person, whereas in collectivist cultures loyalty to the group has the strongest influence on individuals' behaviors (Hofstede, 1980). Thus, as telework restricts the daily and direct contact between worker-supervisor and worker-co-workers, this work arrangement is less likely to be adopted in collectivist cultures (Gajendran and Harrison, 2007). Moreover, in countries with collectivist cultures, workers tend to place more value on the roles played within the family context and feel they should spend more time in the family setting (Aryee et al., 1999; Masuda et al., 2012). Thus, the imposition of telework in countries with a collectivist culture can create a paradoxical situation, as workers are at home in the space usually dedicated to the family domain which they value most, but with the obligation of performing their professional role. Conversely, telework is likely to be more frequently adopted by organizations in countries with an individualist culture (Masuda et al., 2012). Since this work arrangement is associated with greater employees' autonomy (i.e., control over when and how to perform work tasks and work-family balance choices), it is more accepted in an individualist culture (Peters and den Dulk, 2003; Masuda et al., 2012). Gajendran and Harrison (2007) also argue that the adoption of telework implies workers having suitable conditions, such as technological support and physical space (e.g., office) to work in their homes. In more collectivist

countries, homes tend to be shared by more family members and there is a greater likelihood of boundary blurring, which makes it more difficult to manage the work-family boundaries (Masuda et al., 2012).

As far as power distance is concerned (Hofstede, 1980), its presence implies high power centralization among few people and many layers of supervision in vertical hierarchies, hindering the adoption of telework (Peters and den Dulk, 2003) since as already mentioned, this work arrangement fosters workers' autonomy, allowing them to make decisions.

In light of the abrupt shift to telework in the context of the pandemic and considering the aforementioned factors, it may be inferred that for Portugal (more individualistic and less distant from power) compared to Pakistan (more collectivistic and more distant from power) (Nadeem and de Luque, 2018; GLOBE, 2020) this change was more easily adopted by workers. Thus, in comparison with Pakistan, so much dependence on supervisor support for the work-family relationship so that workers can adjust the time, frequency and direction of their transitions (i.e., boundary control) between the two domains is less likely in Portugal. On the other hand, in Pakistan, as the culture places greater importance on group dependency and power is more centralized, the implementation of telework is likely to be more difficult and consequently there will be greater dependence on the support of the supervisor for workers to be able to control their establishment of work-family boundaries. Therefore, as an illustrative example, in the situation of a sudden shift to telework due to COVID-19, the Portuguese teleworker may have taken the freedom to choose work/non-work time boundaries more autonomously while the Pakistani worker may have needed prior approval from his or her supervisor to do so. The study by Lu et al. (2009) found that FSSB was more important in helping workers to balance their work and family life in collectivist cultures. More specifically, it was found to have a more mitigating effect on work-family conflict in Taiwan (collectivist) than in the United Kingdom (individualist).

In view of the above, it was established that:

> H2: The relationship between FSSB and boundary control is moderated by the country, to the extent that this relationship is significantly stronger for Pakistani teleworkers compared to Portuguese teleworkers.

Materials and methods

Procedure

This study was disseminated by the Human Resources department of several companies in the service sector, both in Portugal and Pakistan, which shifted to full-time telework during the first COVID-19 lockdown. The snowball method was also used to obtain participants for both samples. The questionnaire was approved by Ethics Committee of Faculty of Psychology, University of Lisbon. Participation in the study was voluntary and participants were guaranteed anonymity. In both countries data were collected between 15 March and 15 April, 2020, through participants' responses to a questionnaire composed by 20 questions in total and with two sections—a first section with demographic questions and a second section of questions structured with scales described below. The questionnaire was available on the Survey Monkey platform.

Sample

The sample consisted of 226 workers from various areas who were teleworking due to lockdown. Of these workers 108 (47.8%) were Portuguese and 118 (52.2%) Pakistani. The sample was non-probability and was composed of 55.3% female workers (Portugal: 63%; Pakistan: 48.3%).

Measures

Family supportive supervisor behaviors

This variable was measured through 8 items (FSSB; Hammer et al., 2009) scale (e.g., My coordinator/direct supervisor has been concerned about my wellbeing and I have been able to rely on my coordinator/direct supervisor to help me solve conflicts between my professional and personal/family tasks). The participants were asked to rate each item on a Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), with high scores on these scales indicating high levels of supervisor support. This variable revealed good internal consistency, both for the Portuguese and Pakistani samples (α = 0.94 and 0.91, respectively).

Boundary control

Three items from the Boundary Control scale (Kossek et al., 2012) were used (e.g., I have controlled whether I am able to keep my work and personal/family life separate and I have controlled how I combine my work and personal/family life activities throughout the day). Participants were asked to rate each item on a Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Thus, high scores on these scales indicated high levels of individuals' perception of boundary control. This scale revealed an internal consistency of 0.81 for the Portuguese sample and 0.74 for the Pakistani sample.

Satisfaction with life

The Satisfaction with Life Scale (SWLS; Diener et al., 1985) was used to measure this variable. This scale had previously

been adapted and validated for the Portuguese population (Neto et al., 1990; Simões, 1992) and had also been used in Pakistan (Naseem, 2018). This 5-item scale (e.g., In many ways (my life) is close to my ideal and If I could live my life again, I would barely change anything), revealed an internal consistency of 0.79 for the Portuguese sample, and 0.80 for the Pakistani sample. The participants responded using a 7-point Likert scale (1 = Strongly disagree to 7 = Strongly agree).

Control variables

Previous studies suggest that there may be differences in results depending on the gender of participants as far as FSSB (Huffman and Olson, 2017) and boundary control (Straub et al., 2019) are concerned. Thus, to avoid alternative explanations for the results, the gender of the participants was controlled, coded into a categorical variable for statistical purposes, where 0 = Female; 1 = Male. Furthermore, the results may also be affected by workers having children or not, both at the level of FSSB (Hammer et al., 2009) and at the level of boundary control (Mellner et al., 2014).

In Pakistan, the scales in the original English version were used while in Portugal the Portuguese version was used, and the Brislin method (1980) was used in the translation of those with no previous version.

Data analysis

First, due to the fact that all the measures were assessed as self-reports, a confirmatory factor analysis was conducted to examine whether the measures indeed represented different constructs. Confirmatory factor analyses (CFA) (Brown, 2015), with structural equation modeling were implemented with Mplus 7.2 (Múthen and Múthen, 1998–2015). The maximum likelihood estimation provides the well-known global fit statistics for structural equation modeling methods: comparative fit index (CFI; satisfactory values of 0.90 and above), Tucker–Lewis index (TLI; satisfactory values of 0.90 and above) and root mean squared error of approximation (RMSEA; satisfactory values below 0.08) (van de Schoot et al., 2012).

The measures of central tendency and dispersion and the internal consistency indices (i.e., Cronbach's alpha) were then calculated for the variables under study, as well as Pearson's correlations between all the variables (**Table 1**). Finally, hypothesis testing was conducted, using the SPSS Process tool, where the proposed mediation and moderation were analyzed. More specifically, Process model 7 was used (Hayes, 2012), which tests a mediated moderation model. The bootstrapping method (5,000) was also used, a non-parametric method based on resampling, which is repeated multiple times, and makes it possible to estimate the distribution of the sample in terms of direct and indirect effects (Bollen and Stine, 1990).

Results

Sample description

As aforementioned, the sample of this study was non-probability and was composed of 55.3% female workers (Portugal: 63%; Pakistan: 48.3%). Regarding marital status, most of the workers were married or in a stable union (55.3%—Portugal: 49.1%; Pakistan: 61%) and 50% (Portugal: 41.7%; Pakistan: 57.6%) of the respondents had children. Finally, prior to lockdown, most of the workers (64.6%—Portugal: 53.7%; Pakistan: 78%) had never experienced a telework situation, 18.6% (Portugal: 27.8%; Pakistan: 10.2%) worked 1 day a week from home, 8% (Portugal: 10.2%; Pakistan: 5.9%) worked 1 or 2 days a week from home and 4.9% (Portugal: 4.6%; Pakistan: 5.1%) were teleworking all week.

Confirmatory factor analysis

The theoretical model comprising the FSSB, boundary control and satisfaction with life latent variables proved to be adequate [$\chi^2(102) = 218.19$, $p < 0.001$; TLI = 0.60; CFI = 0.65; RMSEA = 0.07; SRMR = 0.07]. When comparing the theoretical model with the one-factor model, the fit indices were found to be lower and below the threshold in the one-factor measurement model (IFI = 0.67; TLI = 0.61; CFI = 0.66; RMSEA = 0.16; SRMR = 0.16), compared to the theoretical measurement model. Furthermore, the chi-square of the one-factor model proved to be significantly higher [$\chi^2(104) = 701.75$, $p < 0.001$], and the difference between the two models was significant [$\Delta\chi^2(2) = 483.56$, $p < 0.001$]. Taking this into account, it may be assumed that the theoretical measurement model is more suitable for the analysis of the data in the two samples.

Hypothesis testing

The first hypothesis of this study proposed a mediating effect of boundary control on the relationship between FSSB and satisfaction with life. As may be seen in **Tables 2**, **3**, the relationship between FSSB and boundary control is positive and significant ($B = 0.37$, $p < 0.001$) and the relationship between boundary control and satisfaction with life is also positive and significant ($B = 0.12$, $p < 0.001$), and there is also a positive and significant direct relationship between FSSB and satisfaction with life ($B = 0.17$, $p < 0.001$). When analyzing the indirect effects values, it was found to be 0.05 for Pakistan, which is significant (CI = [0.00, 0.10]), and 0.01 for Portugal, which is non-significant (CI = [−0.03, 0.04]). Thus, Hypothesis 1 was partially supported.

As regards the moderating effect of country on the relationship between FSSB and boundary control, the

TABLE 1 Mean, standard deviation (SD) and correlations (N = 226).

	Portugal						Pakistan					
	Média	DP	*R*				Média	DP	*r*			
			1.	2.	3.	4.			1.	2.	3.	4.
1. Sex[a]	–	–					–	–				
2. Children	–	–	−0.29**				–	–	0.20*			
3. FSSB	3.36	0.82	0.08	0.09			3.08	0.83	−0.11	0.05		
4. Boundary control	3.47	0.82	0.11	0.08	0.08		3.11	0.91	0.03	0.01	0.33**	
5. SWL	3.49	0.66	0.11	−0.18	0.10	0.19*	3.38	0.73	−0.14	−0.17	0.33**	0.17

[a]Dummy variable (0 = women and 1 = men). *$\rho < 0.05$; **$\rho < 0.001$. FSSB, Family Supportive Supervisor Behavior; SWL, Satisfaction with Life.

TABLE 2 Mediation and moderation analysis of studied variables (N = 226).

	Boundary control ($R^2 = 0.34$; $p < 0.001$)				Satisfaction with life ($R^2 = 0.34$; $p < 0.001$)			
	B	SE	*T*	*p*	*B*	SE	*t*	*p*
FSSB	0.37	0.09	3.95	0.0001	0.17	0.05	3.19	0.0016
Boundary control	–	–	–	–	0.12	0.05	2.40	0.0170
Country	1.32	0.45	2.90	0.0040	–	–	–	–
FSSB*Pakistan	0.37	0.09	3.95	0.0001	–	–	–	–
FSSB*Portugal	0.06	0.10	0.56	0.58	–	–	–	–

TABLE 3 Analysis of conditional indirect effects of FSSB on satisfaction with life.

Mediator (boundary control)	Satisfaction with life		
	B	Boot SE	IC (95%, bias-corrected bootstrap)
Pakistan	0.05	0.02	[0.00, 0.10]
Portugal	0.01	0.02	[−0.03, 0.04]

interaction was found to be significant for the Pakistani sample (B = 0.37, CI = [0.19, 0.56]), but not for the Portuguese sample (B = 0.06, CI = [−0.13, 0.25]). The indirect effects are significant in the case of Pakistan (B = 0.05, CI = [0.00, 0.09]) but not for the Portuguese sample (B = 0.01, CI = [−0.02, 0.00]). The moderate mediation index was not found to be statistically significant (Index = 0.04, CI = [−0.10, 0.00]). Thus, although moderate mediation was not found for the two countries, moderation was observed in the case of the Pakistani sample (as was the mediation).

Figure 1 shows that as far as the Pakistani is concerned, boundary control is higher when there is a higher level of support from the FSSB, However, the same is not observed for the Portuguese culture, where boundary control remains practically the same, regardless of the level of FSSB. Thus, the Pakistani culture appears to increase the impact of supervisor support on the work-family relationship, since when this support is high, the boundary control is significantly higher. Therefore, through this positive effect, it may be inferred that the Pakistani culture strengthens the relationship between supervisor support for the work-family relationship and boundary control, and this relationship is not so culture-dependent for Portuguese workers. Thus, Hypothesis 2 is supported.

Discussion

This study examined the mediating role of boundary control in the relationship between family supportive supervisor behavior (FSSB) and satisfaction with life among teleworkers during lockdown. As expected, the results suggest that FSSB is important for teleworkers to control their boundaries and, in turn, this control is important for teleworkers to assess their lives positively. Moreover, in a direct manner, FSSB also contributes to this positive evaluation of the life of teleworkers. When analyzing the indirect effect, it was found to be significant only for Pakistan, i.e., mediation

only occurred in this country. Furthermore, the moderating role of the country in the relationship between FSSB for the work-family relationship and boundary control was analyzed and showed that, as expected, FSSB had a more prominent role in the boundary control of the Pakistani teleworkers with a more collectivist culture and a greater distance to power.

This result emphasizes the importance of boundary control for teleworkers, since it grants them the freedom to harmonize their behaviors and/or role preferences/requirements (Clark, 2000; Kossek et al., 2012; Capitano et al., 2019). This boundary control proved to be an important factor for individuals to positively evaluate their lives, as shown in other studies, albeit not focused on teleworkers (Piszczek, 2017; Straub et al., 2019). Hence, especially in the context of lockdown due to COVID-19, when telework was imposed without previous preparation for many employees and in a situation of lack of work conditions to teleworkers (e.g., children at home, lack of space) (Sinclair et al., 2020; Rudolph et al., 2021), the boundary control was crucial to maintain healthy workers. On the other hand, the results of this study point to FSSB as a relevant contextual variable for the achievement of this boundary control, which is in line with the Boundary Theory (Clark, 2000), more specifically due to the importance this theory attributes to border keepers in boundary management. Moreover, beyond its direct weight in boundary management, FSSB has a positive effect on teleworkers' satisfaction with life. Although not focusing on teleworkers, prior studies have also shown the direct relationship between FSSB and satisfaction with life (e.g., Straub, 2012; Shi et al., 2019).

Despite the afore-mentioned relationships being significant, it should be noted that the mediation effect was not observed for the Portuguese workers, which appears to suggest that boundary control is not so important to explain the impact of supervisor support on satisfaction with life among these workers. A possible explanation may be that individuals perceive the organization where they work as having a "family-friendly" culture and therefore satisfaction with life is only dependent on FSSB and not so much on how individuals control their work-family boundaries. Supervisor support is therefore a more salient feature. This may occur due to the fact that the perception of family support on the part of the organizations and FSSB are related and have been highlighted as key antecedents to work-family balance (Mills et al., 2014).

When analyzing the moderating effect of the country (Portugal vs. Pakistan) on the relationship between FSSB and boundary control, FSSB was found to be essential for the Pakistani teleworkers, which was not the case for the sample of Portuguese workers. This result is in line with the idea that for countries with more collectivist cultures, adaptation to telework is more complex and more role blurring may be created (Masuda et al., 2012). Pakistani teleworkers with collectivist values may be more dependent on their work group (Hofstede, 1980) and the sudden shift to telework may have caused greater disruption since this work arrangement implies working alone. Moreover, for Pakistani teleworkers, supervisor support proved to be crucial, which is in keeping with the idea that these workers are less autonomous in decision making and need more supervisor support to define when, where and how they can transition across boundaries. At the same time, this study shows

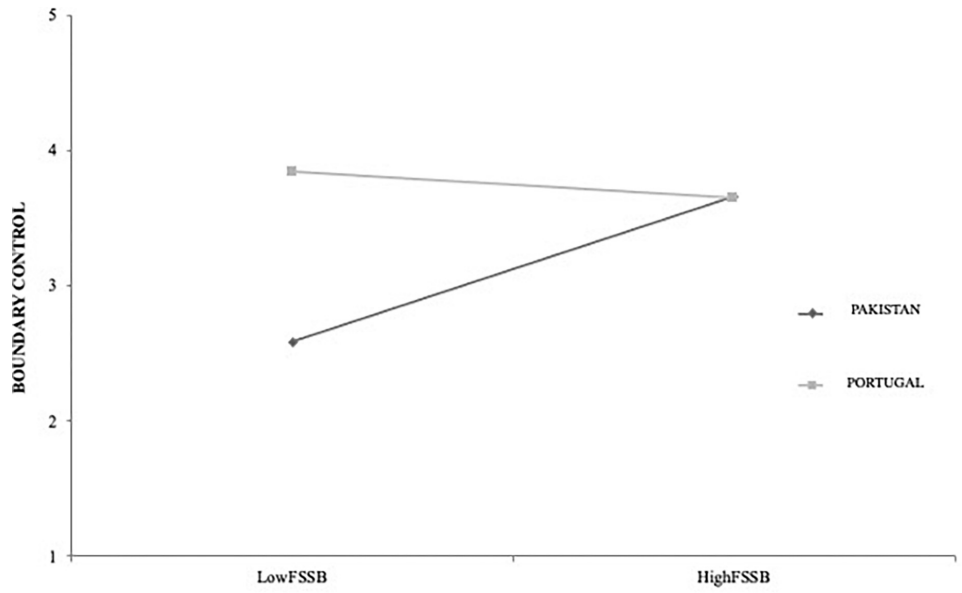

FIGURE 1
The moderated role of country in the relationship between FSSB and Boundary Control.

how the need for supervisor support/approval in countries with cultures with a greater power distance (Hofstede, 1980) may be more accentuated. In contrast, Portuguese workers, belonging to a more individualist culture, assert their greater boundary control autonomy and are thus not so dependent on supervisor support. Although the study by Lu et al. (2009) did not focus on teleworkers or boundary control, it also showed how the supervisor's emotional support for the work-family relationship was a variable to which a collectivist country (Taiwan) attached more importance in order to reduce work-family conflict, when compared to a more individualist country (i.e., United Kingdom).

Limitations and future studies

This study has some limitations. Firstly, the fact that the study is cross-sectional only provides information on the positive or negative nature between the variables and their statistical significance and not necessarily the existence of a causal relationship between them. In order to analyze the latter, a longitudinal study would need to be conducted. Furthermore, it might have been interesting to have collected data at the beginning and end of the lockdown period to ascertain whether there were any changes in the two countries, namely in relation to supervisor support and boundary control. Another limitation is related to the fact that the data were collected by means of a questionnaire that assessed the individuals' perceptions. Thus, the data obtained are subjective and may be subject to bias and social desirability, despite the fact that anonymity was guaranteed, and therefore may not correspond to reality. In order to overcome this limitation, several sources could be used for comparison and for a better understanding of the reality under study. Additionally, given the small sample size (N = 226), it is not possible to generalize the results. Furthermore, this sample is composed exclusively of individuals in a telework situation due to lockdown and it would therefore be interesting in future studies to conduct research involving other conditions (for example, individuals who work in a face-to-face regime, or teleworking under normal conditions), in order to compare the results.

Furthermore, although a moderating effect of the country was found, another limitation of this study is the fact that the cultural differences between Portugal and Pakistan in terms of collectivism/individualism and power distance are not very marked. However, the values for the dimensions used to justify the cultural differences between Portugal and Pakistan, i.e., collectivism/individualism and power-centeredness, may not correspond to the specific reality of the individuals who participated in the study. Thus, questions related to these dimensions could be included in the questionnaires to obtain more reliable data, and a highly diversified sample would be required. It might also be interesting to conduct a study with other countries with more contrasting cultural values. Another limitation of this study is the fact that no distinction was made between the individuals who had previous telework experience and those who only adopted this work arrangement as a result of pandemic-induced telework. Therefore, it would be interesting in future studies to ascertain the impact this factor may have had on supervisor support for the work-family relationship and on boundary control.

Practical implications

Despite the above-mentioned limitations, some of the findings' practical implications for the organizational context may be highlighted. This study confirms the important role of supervisor support for the work-family relationship and of boundary control for teleworkers' wellbeing, i.e., satisfaction with life. Firstly, the direct effect of supervisor support for the work-family relationship on boundary control highlights the importance of supervisors considering the needs and demands of employees outside the workplace, especially in telework, where they can be more difficult to identify if there is no effective communication. To this end, as suggested by Perrigino and Raveendhran (2020), supervisors should identify the needs and preferences of their employees in order to work with them to adjust the temporal and psychological boundaries between work and personal life in light of their differences.

On the other hand, the mediating role of boundary control highlights the importance of implementing practices that ensure greater boundary control for all employees, not forcing a specific boundary management strategy, as employees will experience greater wellbeing if they are free to control their own boundaries between work and family, as opposed to responding to supervisor pressure (Piszczek, 2017). Furthermore, this research highlights the importance of training supervisors in the use of supportive work-family relationship behaviors, as they can be essential for employees to control boundaries. In this regard, Mills et al. (2014) state that the mere existence of training is able to promote a positive work-family climate, even before the learned techniques are practically transferred to the work context.

Additionally, this study also shows that macro contextual factors need to be considered when seeking to design better solutions for teleworkers, namely the culture of each country. More specifically, organizations' design of family support mechanisms should reflect the cultural values of the country in question (Peters and den Dulk, 2003; Masuda et al., 2012).

Due to the increased prevalence of telework triggered by the pandemic, which implies a greater distance between employees and supervisors, organizations should invest in promoting the wellbeing and satisfaction of their employees, using the practices suggested in this study.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Comissão de Deontologia da Faculdade de Psicologia da Universidade de Lisboa. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

Author contributions

VC involved in writing, analysis, and editing process. HI involved in data collection and revision process. MC involved in the conceptualization, data collection, and original draft preparation. MS involved in the first draft of the article. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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References

Allen, T. D., Cho, E., and Meier, L. L. (2014). Work–family boundary dynamics. *Annu. Rev. Organ. Psychol. Organ. Behav.* 1, 99–121. doi: 10.1146/annurev-orgpsych-031413-091330

Allen, T. D., French, K. A., Dumani, S., and Shockley, K. M. (2015). Meta-analysis of work–family conflict mean differences: Does national context matter? *J. Vocat. Behav.* 90, 90–100. doi: 10.1016/j.jvb.2015.07.006

Aryee, S., Fields, D., and Luk, V. (1999). A cross-cultural test of a model of the work–family interface. *J. Manag.* 25, 491–511. doi: 10.1177/014920639902500402

Bollen, K. A., and Stine, R. (1990). Direct and indirect effects: Classical and bootstrap estimates of variability. *Soc. Methodol.* 20, 115–140. doi: 10.2307/271084

Brown, T. A. (2015). *Confirmatory factor analysis for applied research*, 2nd Edn. New York, NY: The Guilford Press.

Capitano, J., McAlpine, K. L., and Greenhaus, J. H. (2019). "Organizational influences on work–home boundary permeability: A multidimensional perspective," in *Research in personnel and human resources management*, eds M. R. Buckley, A. R. Wheeler, J. E. Baur, and J. R. B. Halbesleben (Bingley: Emerald Publishing Limited), 133–172.

Carnevale, J. B., and Hatak, I. (2020). Employee adjustment and well-being in the era of COVID-19: Implications for human resource management. *J. Bus Res.* 116, 183–187. doi: 10.1016/j.jbusres.2020.05.037

Clark, S. C. (2000). Work/family border theory: A new theory of work/family balance. *Hum. Relat.* 53, 747–770. doi: 10.1177/0018726700536001

Crain, T. L., and Stevens, S. C. (2018). Family-supportive supervisor behaviors: A review and recommendations for research and practice. *J. Organ. Behav.* 39, 869–888. doi: 10.1002/job.2320

Desilver, D. (2020). Working from home was a luxury for the relatively affluent before coronavirus—Not any more. world economic forum. Available online at: https://www.weforum.org/agenda/2020/03/working-from-home-coronavirus-workers-future-of-work/ (accessed June 2022).

Diener, E. D., Emmons, R. A., Larsen, R. J., and Griffin, S. (1985). The satisfaction with life scale. *J. Pers Assess.* 49, 71–75. doi: 10.1207/s15327752jpa4901_13

Gajendran, R. S., and Harrison, D. A. (2007). The good, the bad, and the unknown about telecommuting: Meta-analysis of psychological mediators and individual consequences. *J. Appl. Psychol.* 92, 1524–1541. doi: 10.1037/0021-9010.92.6.1524

GLOBE (2020). *Results - Portugal Results GLOBE Project. GLOBE Project.* Available online at: https://globeproject.com/results/countries/PRT?menu=list#list (accessed June 2022).

Grant, C. A., Wallace, L. M., and Spurgeon, P. C. (2013). An exploration of the psychological factors affecting remote e-worker's job effectiveness, well-being and work-life balance. *Empl. Relat.* 35, 527–546. doi: 10.1108/ER-08-2012-0059

Hammer, L. B., Ernst Kossek, E., Bodner, T., and Crain, T. (2013). Measurement development and validation of the family supportive supervisor behavior short-form (FSSB-SF). *J. Occup. Health Psychol.* 18, 285–296. doi: 10.1037/a0032612

Hammer, L. B., Kossek, E. E., Yragui, N. L., Bodner, T. E., and Hanson, G. C. (2009). Development and validation of a multidimensional measure of family supportive supervisor behaviors (FSSB). *J. Manag.* 35, 837–856. doi: 10.1177/0149206308328510

Hayes, A. F. (2012). *PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling [White paper].* Available online at: http://www.afhayes.com/public/process2012.pdf (accessed June 2022).

Hofstede, G. (1980). *Culture's consequences: International differences in work related values.* Beverly Hills, CA: Sage.

Hofstede, G. (2005). *Cultures and organizations: Software of the mind*. London: McGraw-Hill.

House, R. J., Javidan, M., Hanges, P. J., Dorfman, P. W., and Gupta, V. (2004). *Culture, leadership, and organizations: The globe study of 62 societies*. London: Sage Publications.

Huffman, A. H., and Olson, K. J. (2017). Gender differences in perceptions of resources and turnover intentions of work-linked couples in masculine occupations. *Stress Health* 33, 309–321. doi: 10.1002/smi.2709

Kossek, E. E. (2016). Managing work-life boundaries in the digital age. *Organ. Dynam.* 45, 258–270. doi: 10.1016/j.orgdyn.2016.07.010

Kossek, E. E., and Lautsch, B. A. (2012). Work–family boundary management styles in organizations: A cross-level model. *Organ. Psychol. Rev.* 2, 152–171. doi: 10.1177/2041386611436264

Kossek, E. E., Ruderman, M. N., Braddy, P. W., and Hannum, K. M. (2012). Work-nonwork boundary management profiles: A person-centered approach. *J. Vocat. Behav.* 81, 112–128. doi: 10.1016/j.jvb.2012.04.003

Lu, L., Kao, S. F., Cooper, C., Allen, T. D., Lapierre, L. M., O'Driscoll, M., et al. (2009). Work resources, work-to-family conflict, and its consequences: A Taiwanese– British cross-cultural comparison. *Int. J. Stress Manag.* 16, 25–44.

Masuda, A. D., Poelmans, S. A., Allen, T. D., Spector, P. E., Lapierre, L. M., Cooper, C. L., et al. (2012). Flexible work arrangements availability and their relationship with work-to-family conflict, job satisfaction, and turnover intentions: A comparison of three country clusters. *Appl. Psychol.* 61, 1–29. doi: 10.1111/j.1464-0597.2011.00453.x

Mellner, C., Aronsson, G., and Kecklund, G. (2014). Boundary management preferences, boundary control, and work-life balance among full-time employed professionals in knowledge-intensive, flexible work. *Nord. J. Work Life Stud.* 4, 7–23. doi: 10.19154/njwls.v4i4.4705

Mills, M. J., Matthews, R. A., Henning, J. B., and Woo, V. A. (2014). Family-supportive organizations and supervisors: How do they influence employee outcomes and for whom? *Inter. J. Hum. Res. Manag.* 25, 1763–1785. doi: 10.1080/09585192.2013.860387

Múthen, L. K., and Muthén, B. O. (1998–2015). *Mplus User's Guide. Seventh Edition*. Los Angeles, CA: Muthén & Muthén.

Nadeem, S., and de Luque, M. F. S. (2018). Developing an understanding of the human resource (HR) complexities in Pakistan with a GLOBE cultural lens. *J. Manag. Organ.* 26, 483–501. doi: 10.1017/jmo.2017.79

Naseem, K. (2018). Job stress, happiness and life satisfaction: The moderating role of emotional intelligence empirical study in telecommunication sector Pakistan. *J Soc. Hum. Stud.* 4, 7–14.

Neto, F., de Oliveira, J. B., and Barros, A. (1990). "Satisfação com a vida," in *A acção educativa: Análise psico-social*, eds L. S. Almeida, R. A. Santiago, P. Silva, L. Oliveira, O. Caetano, and J. P. Marques 91–100. Available online at: https://hdl.handle.net/10216/97793 (accessed June 2022).

Newman, A., Nielsen, I., Smyth, R., and Hooke, A. (2014). Examining the relationship between workplace support and life satisfaction: The mediating role of job satisfaction. *Soc. Ind. Res.* 120, 769–781. doi: 10.1007/s11205-014-0613-y

Park, Y., Fritz, C., and Jex, S. M. (2011). Relationships between work-home segmentation and psychological detachment from work: The role of communication technology use at home. *J Occup. Health Psychol.* 16, 457–467. doi: 10.1037/a0023594

Pavot, W., and Diener, E. (1993). Review of the satisfaction with life scale. *Psychol. Assess.* 5, 164–172. doi: 10.1037/1040-3590.5.2.164

Perrigino, M. B., and Raveendhran, R. (2020). *Managing remote workers during quarantine: Insights from organizational research on boundary management. Behav Scienc Pol.* Available online at: https://behavioralpolicy.org/journal_issue/covid-19/ (accessed June 2022).

Peters, P., and den Dulk, L. (2003). Cross cultural differences in managers'. support for home-based Telework. *Inter J. Cross. Cult. Manag.* 3, 329–346. doi: 10.1177/1470595803003003005

Piszczek, M. M. (2017). Boundary control and controlled boundaries: Organizational expectations for technology use at the work–family interface. *J. Organ. Behav.* 38, 592–611. doi: 10.1002/job.2153

Powell, G. N., Francesco, A. M., and Ling, Y. (2009). Toward culture-sensitive theories of the work–family interface. *J. Organ. Behav.* 30, 597–616. doi: 10.1002/job.568

Rathi, N., and Lee, K. (2017). Understanding the role of supervisor support in retaining employees and enhancing their satisfaction with life. *Pers. Rev.* 46, 1605–1619. doi: 10.1108/PR-11-2015-0287

Rudolph, C., Allan, B., Clark, M., Hertel, G., Hirschi, A., Kunze, F., et al. (2021). Pandemics: Implications for research and practice in industrial and organizational psychology. *Indust. Organ. Psychol.* 14, 1–35. doi: 10.31234/osf.io/k8us2

Sardeshmukh, S. R., Sharma, D., and Golden, T. D. (2012). Impact of telework on exhaustion and job engagement: A job demands and job resources model. *New Tech. Work Employ.* 27, 193–207. doi: 10.1111/j.1468-005X.2012.00284.x

Shi, Y., Xie, J., Zhou, Z. E., Tang, H., Ma, H., Zhang, H., et al. (2019). Family-supportive supervisor behaviors and employees' life satisfaction: The roles of work-self facilitation and generational differences. *Intl. J. Stress Manag.* 27, 262–272. doi: 10.1037/str0000152

Simões, A. (1992). Ulterior validação de uma escala de satisfação com a vida (SWLS). *Rev. Port. Pedag.* 26, 503–515.

Sinclair, R. R., Allen, T., Barber, L., Bergman, M., Britt, T., Butler, A., et al. (2020). Occupational Health Science in the Time of COVID-19: Now more than Ever. *Occup. Health Sci.* 4, 1–22. doi: 10.1007/s41542-020-00064-3

Straub, C. (2012). Antecedents and organizational consequences of family supportive supervisor behavior: A multilevel conceptual framework for research. *Hum. Res. Manag. Rev.* 22, 15–26. doi: 10.1016/j.hrmr.2011.08.001

Straub, C., Beham, B., and Islam, G. (2019). Crossing boundaries: Integrative effects of supervision, gender and boundary control on work engagement and work-to-family positive spillover. *Inter. J. Hum. Res. Manag.* 30, 2831–2854. doi: 10.1080/09585192.2017.1340324

Thomas, L. T., and Ganster, D. C. (1995). Impact of family-supportive work variables on work-family conflict and strain: A control perspective. *J. Appl. Psychol.* 80, 6–15. doi: 10.1037/0021-9010.80.1.6

Thompson, C. A., and Prottas, D. J. (2006). Relationships among organizational family support, job autonomy, perceived control, and employee well-being. *J. Occup. Health Psychol.* 11, 100–118. doi: 10.1037/1076-8998.10.4.100

Thompson, C. A., and Prottas, D. J. (2005). Relationships among organizational family support, job autonomy, perceived control, and employee well-being. *J. Occup. Health Psychol.* 10, 100–118.

van de Schoot, R., Lugtig, P., and Hox, J. (2012). A checklist for testing measurement invariance. *Eur. J. Dev. Psychol.* 9, 486–492. doi: 10.1080/17405629.2012.686740

Yucel, D., and Minnotte, K. L. (2017). Workplace support and life satisfaction: The mediating roles of work-to-family conflict and mental health. *Appl. Res. Qual. Life* 12, 549–575. doi: 10.1007/s11482-016-9476-5

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Perceived Covid-19-crisis intensity and family supportive organizational perceptions as antecedents of parental burnout: A study conducted in Italy in March/April 2021 and 2022

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The purpose of this study is to investigate to what extent perceived Covid-19-crisis intensity (PCCI) leads to the experience of parental burnout (PB), a syndrome characterized by exhaustion, emotional detachment from one's own children and a sense of inefficacy in the role as parent. Furthermore, the mediating role of work–family conflict (WFC) is examined. The buffering effect of family supportive organizational perceptions during the pandemic (FSOP-p) on the relationship between work–family conflict and parental burnout is also explored. Data were collected in March–April 2021 and March/April 2022. In spring 2021, 222 Italian working parents with at least one minor child living at home filled out the questionnaire. Data from 2021 showed that PCCI was positively related to the experience of parental burnout. Moreover, WFC mediated this relationship. No significant interaction effect was found for FSOP-p; however it was found that FSOP-p is negatively related to PCCI and WFC, and indirectly to parental burnout. In spring 2022, we examined whether there were changes in PCCI, WFC, and FSOP-p in a sample of 83 Italian parents. Moreover, for the second data collection we examine the tensions experienced by parents in their families about vaccination and infection precaution measures (e.g., Covid-19 vaccination passport). The results are different in 2022; the effect of PCCI on parental burnout is now completely mediated by the amount of WFC. It seems that now we go 'back to normal' and homeworking has become more optional for many, there is still an effect of PCCI on WFC, but no longer directly on parental burnout. Furthermore, the prevalence of PCCI in 2022 is lower than in 2021, while WFC and FSOP-p are not significantly different between the two timepoints. As family supportive organizational perceptions reduce the level of perceived Covid-19 intensity, organizations are urged to develop practices of support and to create a supportive environment.

KEYWORDS

work–family conflict, Covid-19 vaccination passport, perceived Covid-19 crisis intensity, parental burnout, family supportive organizational perceptions

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Introduction

Ever since its outbreak early Spring 2020, the Covid-19 pandemic has not only caused an increasing number of infections and fatalities, but also enormous changes to the world of work and daily life (Banerjee and Rai, 2020). Governments and companies were urged by the World Health Organization to take drastic measures to prevent or contain the spread of the disease. During the course of the pandemic, containment measures imposed by governments varied in intensity, often intensifying following new surges in infection rates due to new Covid-19 variants, and lessening when infection rates or hospital intakes were decreasing. Measures ranged from strict lockdowns, closing of schools and leisure centers and cancellation of social activities, to 'opening up society' with entry requirements (e.g., QR entry codes, Covid-19 vaccination passports, admission requirements for public spaces). The latter solutions allowed more freedom of movement for those that are vaccinated or recovered from a Covid-19 infection, but less for others, for instance for the unvaccinated or people with health issues. This has led to new tensions in society that sometimes trickled down into the family sphere (Swit and Breen, 2022).

Furthermore, a great amount of the workforce has seen a transformation in their work dispositions (Rudolph et al., 2020). Especially for knowledge workers, the Covid-19 pandemic has forced a quick shift to (mandatory) full-time remote work, limiting the possibility to seek alternative workspaces other than one's home (Carnevale and Hatak, 2020; Ghislieri et al., 2021). Such arrangements may have potential dramatic psychological impact on employees. First, due to the lack of familiarity with homeworking, employees may have experienced feelings of confusion and unclarity around how to organize and prioritize one's tasks, how to use certain technological tools, whom to ask for support, how to approach colleagues or how to deal with new tasks (Bick et al., 2020; International Labour Office, 2020; Ghislieri et al., 2021). According to role theory (Roy et al., 1965), being constantly exposed to incongruent or vague expectations leads to role conflict and role ambiguity, conditions that may easily result in stress and anxiety (House and Rizzo, 1972). Second, working remotely generally requires the sustained use of technological devices, internet, emails and instant messaging and it usually implies multitasking, frequent system upgrades, recurring technical problems, continual relearning and consequent insecurities around tools and programs. These elements have been shown to induce technostress, which entails negative psychological states such as anxiety, irritability, overload, inability to switch off and burnout (Kolakowski, 2020; Molino et al., 2020; Spagnoli et al., 2020; Galanti et al., 2021; Ghislieri et al., 2021). Other psychological effects of working in confinement may entail employee isolation - a psychological construct that refers to employees' perception of lacking opportunities for professional, social and emotional exchange with their co-workers (Brooks et al., 2020) – and a general sense of loneliness, also enhanced by regulations implying restriction of mobility, interruption of social and leisure activities, separation from loved ones, loss of freedom, lack of information and social support (Banerjee and Rai, 2020; Saladino et al., 2020). Long periods of isolation or quarantine have detrimental effects on mental wellbeing, including exhaustion, detachment from others, anxiety, irritability, insomnia, poor concentration and indecisiveness, deteriorating work performance, reluctance to work and consideration of resignation (Bai et al., 2004; Stickley and Koyanagi, 2016).

The purpose of this research is to examine how the transformations related to Covid-19, in terms of work pressure and social isolation, impacted a particularly vulnerable category: parents. The reasons for parents to be a population at risk during the pandemic regard their concerns about the physical and economic health of their family, about their ability to inform and reassure their children about Covid-19, about the outcomes of their children's isolation and homeschooling, and about the often-unsupported management of both family and work demands (Fontanesi et al., 2020; Yerkes et al., 2020). In fact, while the abrupt modification in work arrangements caused an increase in work stress, the closure of schools and care facilities often demanded parents to simultaneously handle homeschooling and extra childcare responsibilities (Carnevale and Hatak, 2020). The experience of incompatible pressure arising at the same time in the work and in the family domain, called work–family conflict (Greenhaus and Beutell, 1985), is a further challenge with which parents had to cope during the pandemic (Caligiuri et al., 2020). The struggle to achieve balance between the work and family sphere, which both exerted higher demands than usual, may have led to negative health-related outcomes. This study focuses on parental burnout, a psychological and physical condition affecting those parents who experience a collapse in the ability to cope with chronic, overwhelming stress related to parenting (Mikolajczak et al., 2018). This syndrome is distinct, although parallel, to the syndrome of job burnout, and it is characterized by exhaustion, emotional detachment from one's children and a deep sense of inefficacy in the role as parent (Roskam et al., 2017). Parental burnout has been found to associate with various outcomes such as depressive symptoms, sleep disorders, addictive behaviors, conflicts with the partner, escape ideation and child neglect or abuse (Kawamoto et al., 2018; Mikolajczak et al., 2018, 2020; Van Bakel et al., 2018; Brianda et al., 2020). Potential antecedents of parental burnout have been traced in socio-demographic factors, particularities of the child, parental traits and behaviors, and family functioning (Mikolajczak et al., 2018, 2020). However, little is known about the role played by disruptive events, such as a pandemic. In a longitudinal study of Portuguese parents before and during the pandemic Aguiar et al. (2021) found that the prevalence of parental burnout was indeed higher during the pandemic. In the current study, we examine Italian parents in two subsequent years, 2021 and 2022. Italy was one of the first countries that was severely hit by the Covid-19 pandemic in the spring of 2020, and to date counts over 20 million confirmed cases and about 170.000 confirmed casualties, which is one of the highest death rates in Europe (WHO, 2022). We collected data

during a new steep rise in cases in March and April 2021, and a plateauing level of cases in March and April 2022. Italy during these months was in a formal state of emergency in 2021 as well as 2022. Measures in the spring of 2021 were very strict (schools were closed, leaving one's house only allowed with authorization) and still strict in the spring of 2022, although at the end of March 2022 restriction measures were gradually loosened and more mobility was allowed for the vaccinated and when waring mouth-nose-masks (Mazzuca, 2022). Protests against compulsory vaccination and restriction measures in Italian society increased during this timeframe, resulting in a substantial polarization in Italian society (Bondielli et al., 2022; Spitale et al., 2022). This polarization has left no family untouched. Hence, examining the extent to which Italian parents over the course of two consecutive years experienced the Covid-19 pandemic and whether this affects their ability to perform in their role as parent will give a unique insight.

The extent to which the pandemic affects work–family conflict and subsequent parental burnout may depend on how organizations respond to their staff's needs for security, reassurance, stability and affiliation (Emmet et al., 2020). Perceived organizational support (POS; Rhoades and Eisenberger, 2002) constitutes a potential resource that has been found to attenuate job burnout risk (Walters and Raybould, 2007; Cheng and O-Yang, 2018), and to moderate the relationship between role conflict and job burnout (Wu et al., 2018), especially the dimension emotional exhaustion (Jawahar et al., 2007). As the present research focuses on parents, organizational support will be identified not only as positive organizational policies and attitudes aimed at valuing employees' work, goals and wellbeing but also as specific behaviors and philosophies focused on facilitating effective parenting during the pandemic. Examples of family supportive practices and philosophies could be: allowing time off to attend to family needs, accepting boundary blurriness and considering flexible time arrangements. Overall, this study aims to answer the following research questions:

RQ1: To what extent is parental burnout influenced by how intense the Covid-19 crisis was experienced and is this relationship mediated by work–family conflict in Italy in 2020 and 2021?

RQ2: To what extent do family supportive organizational perceptions buffer the relationship between work–family conflict and parental burnout in Italy in 2020 and 2021?

Altogether, the purpose of the present study is to contribute to the parental burnout literature, enhancing knowledge around its potential risk factors. In particular, it aims at providing insight into the extent to which parental burnout insurgence may be influenced by the perceived intensity of the Covid-19 situation, in terms of social isolation and work-related psychological risk factors. Furthermore, during the course of the pandemic, vaccinations and vaccination passports led to less strict restriction measures for vaccinated or recovered individuals, but less for the unvaccinated. Heated debates in society sometimes trickled down into families, creating tensions between parents, or parents and other relatives, increasing the burden on parents and thus there susceptibility to parental burnout. As this pandemic is likely to continue (Charumilind et al., 2020), and the incidence of future pandemics is not to be excluded (Gill, 2020), it is of interest to have a full understanding of the psychological impact of lockdowns, quarantines, restrictions and infection precaution measures. Specifically, parental burnout is a social issue that not only shows negative symptoms for parents, both in terms of health and productivity, but it also affects the relationship with their partner and the wellbeing and safety of their children (Mikolajczak et al., 2019). For this reason, knowing the risk factors that may facilitate its incidence may be of great societal relevance. Moreover, comprehending the mitigating effect of organizational support on parental burnout is significant for HR management, which can play a key role in guiding organizations in preventing this phenomenon from happening by applying policies and practices of support.

Theoretical framework

Parental burnout

In 2014, Bianchi and colleagues argued that burnout is not solely a work-related condition (Bianchi et al., 2014). They suggested burnout can be developed in any domain as long as frequent and intense stress is elicited. Although parenting is knowingly considered as a complex and demanding activity, subjected to various intense stressors, the concept of parental burnout is quite new in the literature. It was identified as a unique specific syndrome only in 2017 (Roskam et al., 2017), described as a state of intense exhaustion, decreased self-efficacy and diminished involvement in the relationship with one's children, originated by a strong imbalance between parental demands and the resources available to meet them (Hubert and Aujoulat, 2018; Roskam et al., 2018; Mikolajczak et al., 2020). Parental burnout has been found to associate with various behaviors such as depressive symptoms, sleep disorders, addictive behaviors, conflicts with the partner, escape ideation and child neglect or abuse (Kawamoto et al., 2018; Mikolajczak et al., 2018, 2020; Van Bakel et al., 2018).

Originally, the construct of parental burnout was derived from the tridimensional structure of classical job burnout, defined by exhaustion, depersonalization, and professional efficacy (Maslach et al., 2001). The first dimension, emotional exhaustion, implies feelings of weariness and depletion connected to the care of one's children. The second dimension refers to emotional distancing from one's children, which describes a situation where parents detach emotionally from their children, though still providing practical care. The third dimension, personal accomplishment, entails feelings of inefficacy and inadequacy in the parental role (Roskam et al., 2017). However, when Roskam and colleagues reconstructed the concept of parental burnout through an inductive approach, they found evidence of a fourth dimension: the contrast with previous self. In fact, the current

state of a person must markedly diverge from the previous state in order for the individual to experience burnout (Roskam et al., 2018). Mikolajczak et al. (2020) recently showed that parental burnout can be distinguished from job burnout both in its underlying dimensions that are specific for the sphere of life from which they originate, but also in terms of their consequences as "parental burnout has a unique impact on parenting (parental satisfaction, parental neglect and violence), and job burnout has a unique impact at work (job satisfaction, turnover intention)" (p. 685).

Perceived Covid-19-crisis intensity

One event that can exacerbate parental stress to the point where a burnout may manifest is the Covid-19 pandemic. Mason (1968) suggests that elements and events characterized by novelty, unpredictability, threat and lack of control trigger a stress response in the individual. The outbreak of Covid-19 represents a stressor that shows all these attributes: it brings an unprecedented situation, with unpredictable outcomes; it is perceived as threatening on social, financial and health-related aspects and its yet unclear mechanisms of diffusion challenge every sense of control (Pahayahay and Khalili-Mahani, 2020). The prolonged exposure to such stressors may lead to the state of burnout (Maslach and Leiter, 2016). The perception of Covid-19 intensity is here defined in terms of psychological stressors during work and feelings of loneliness caused by a state of protracted isolation.

The Covid-19 pandemic not only may have caused a sudden rise in psychological stressors, it also created an enormous change in the organization of work. Before the pandemic, only a small proportion of the workforce was working remotely, and working from home was often only for a part of the actual work time (International Labour Office, 2020). However, especially for knowledge workers, the Covid-19 pandemic has forced a quick shift to full-time working from home (Carnevale and Hatak, 2020). Research reports that working from home often leads to feelings of confusion and unclarity around how to organize and prioritize one's tasks, how to use technological tools, whom to ask for support, how to approach colleagues and how to deal with new tasks (Bick et al., 2020; International Labour Office, 2020). According to role theory (Roy et al., 1965), being constantly exposed to incongruent or vague expectations leads to role conflict and role ambiguity, conditions that may easily result in stress and anxiety (House and Rizzo, 1972). Indeed, relationships were found between role conflict and psychological strain, job burnout and single dimensions of job burnout (Jawahar et al., 2007). Furthermore, working remotely generally requires the sustained use of technological devices. These elements have been shown to induce technostress, which entails negative psychological states (Kolakowski, 2020; Molino et al., 2020; Spagnoli et al., 2020).

Other psychological effects of working in confinement are from the employee isolation literature. Employee isolation is a psychological construct that refers to employees' perception of lacking opportunities for professional, social and emotional exchange with their co-workers (Mulki and Jaramillo, 2011; Brooks et al., 2020). In virtual work environments, employees often fail to conform to the organizational culture, perceiving themselves as a single entity (Jaiswal and Arun, 2020). Employees may fear that their career opportunities will be limited and they miss the informal discussions and face-to-face interaction that facilitate not only information sharing, but also the emergence of positive feelings of trust and belonging (Cooper and Kurland, 2002; Gajendran and Harrison, 2007; Fosslien and West-Duffy, 2019).

In addition to work-related feelings of isolation, employees may experience a general sense of loneliness, connected to further governmental regulations put in place to limit the transmission of Covid-19, which implied restriction of mobility, interruption of social and leisure activities, separation from loved ones, loss of freedom, lack of information and social support (Banerjee and Rai, 2020; Saladino et al., 2020). Loneliness, generally a consequence of social isolation, is considered to be one of the major risk factors for various disorders, such as anxiety, depression, chronic stress, insomnia and even late-life dementia (Wilson et al., 2007; Brooks et al., 2020).

Stickley and Koyanagi (2016) argued that long periods of isolation in custodial care or quarantine have detrimental effects on mental wellbeing. Literature concerning the epidemic of SARS (severe acute respiratory syndrome) reported that quarantined subjects, compared to non-quarantined, were more likely to develop symptoms of exhaustion, detachment from others, anxiety, irritability, insomnia, poor concentration and indecisiveness, deteriorating work performance, reluctance to work and consideration of resignation (Bai et al., 2004). Other psychological symptoms showed by isolated subjects were emotional disturbance, depression, stress, low mood, irritability, insomnia and post-traumatic stress symptoms (DiGiovanni et al., 2004; Hawryluck et al., 2004; Tam et al., 2004; Lee et al., 2005; Liu et al., 2012; Brooks et al., 2020).

Findings show that parents represent a particularly vulnerable category in times of crisis. Taylor et al. (2008) report prevalence of very high psychological distress for respondents with one child during the outbreak of equine influenza in Australia. Data collected among parents who had experienced quarantine during the pandemic of H1N1 or SARS, showed that the subjects presented high levels of Post-Traumatic Stress Disorders (Sprang and Silman, 2013). Research conducted during the diffusion of Covid-19 confirms these discoveries. A study assessing the psychological impact of the Covid-19 pandemic on Italian parents reported that 17% of the respondents experienced significant parenting-related exhaustion (Marchetti et al., 2020). Lockdown measures were found to predict the peak in parents' levels of depression and anxiety (Johnson et al., 2020). The comparison between subjects with and without children showed that the Covid-19 crisis led to a greater decrease in the wellbeing of individuals with children, especially younger ones (Huebener et al., 2021).

As far as parental burnout is concerned, only few studies exist. Prikhidko and Long (2020) demonstrated that a moderate relationship exists between the concern related to Covid-19 and parental burnout. Furthermore, Aguiar et al. (2021) found that the prevalence of parental burnout was higher during the pandemic. In a study among Italian parents, Cusinato et al. (2020) found that lockdown measures and changes in daily routine negatively affected parents' psychological dimensions. To conclude, the foregoing leads to the following hypotheses:

> *H1*: Perceived Covid-19-Crisis Intensity is positively related to parental burnout

Furthermore, we expect that societal debates and the polarization in Italian society (Bondielli et al., 2022; Spitale et al., 2022) may trickle down and create tensions in families. We argue that diverging attitudes concerning Covid-19 vaccination and vaccination passports may create additional psychological stressors for parents. To our knowledge there is no study to date examining whether tensions related to vaccination and infection precaution measures affect parents in such a way that it increases parental burnout. From research among couples we can infer that this may be the case. Schokkenbroek et al. (2021) found that couples in Belgium became more aware of diverging attitudes during the Covid-19 pandemic, resulting in feeling less connected and more stressed. Hence, we argue that:

> *H1a*: Family tensions related to diverging attitudes on vaccination and infection precaution measures (VIPM) positively relate to parental burnout.

The mediating role of work–family conflict

Perceived Covid-19-Crisis Intensity (PCCI) and Family tensions related to diverging attitudes concerning infection and precaution measures (VIPM) may not only directly elicit parental burnout through anxiety and psychological distress as a response to the novelty, unpredictability, threat and lack of control the pandemic brings along, but also indirectly, as both PCCI and VIPM may evoke increased role conflict between parents work and family demands. For most knowledge workers, the Covid-19 pandemic meant an abrupt change to (mandatory) full-time remote work, (Carnevale and Hatak, 2020; Ghislieri et al., 2021), for those workers whose work could not be transformed to remote working it often meant substantial -and stressful - health precaution measures at work. In many instances they quickly needed to adapt to new circumstances at work, while at the same time, they had to devote more time and energy to their children, due to the closure of schools and centers for childcare (Carnevale and Hatak, 2020). Parents thus often had to manage increased demands in the work and family domain simultaneously. From role theory it can be argued that participating in multiple roles may lead to inter-role conflict, as it becomes harder to fulfil multiple roles successfully due to competing demands or discordant behaviors among roles (Roy et al., 1965). Work–family conflict is a particular type of inter-role conflict that originates from simultaneous incompatible demands stemming from both the family and the work domain, leading to compromised effectiveness in either one or both roles (Greenhaus and Beutell, 1985). Specifically, conflict might occur when the amount of time and energy devoted to one role is limited due to the high demands associated with the other role (time-based and energy-based conflict), when stress arising in one role is transferred to the other role, this causes strain symptoms (strain-based), and/or when behaviors that are effective in one role are inappropriately enacted in the other role (behavior-based; Greenhaus and Beutell, 1985; Greenhaus et al., 2006). Particularly when boundaries between domains are blurred, work–family conflict is more likely to occur (Hunter et al., 2019). The Covid-19 pandemic made the boundaries of the domains of work and family blur in many ways, hence making work–family conflict more likely.

Subsequently, work–family conflict can be seen as a source of stress that induces burnout. The Conservation of Resource (COR) Theory offers a framework for explaining work–family conflict as a source of stress (Grandey and Cropanzano, 1999). This stress model is based on the assumption that people strive to maintain, protect, and create resources. The threat of losing these resources, their actual loss, or the null gain of resources after a positive investment are factors that lead to stress (Hobfoll, 1988). According to the COR model, inter-role conflict causes experiences of stress because resources are lost in the process of finding a balance between work and family (Grandey and Cropanzano, 1999). Assuming that one's time and energy are limited resources, individuals who engage in multiple roles will invest resources in one role, thus unavoidably experiencing a resource drain in the other role (Edwards and Rothbard, 2000). Hence, employees who are confronted with higher work-related demands will experience a greater loss in the family domain and vice versa (Bakker and Geurts, 2004; Butler et al., 2005). These losses are the root of negative feelings or states such as dissatisfaction, depression, anxiety, physiological tension and burnout (Hobfoll and Shirom, 1993).

Considerable evidence exists in the literature for a positive relationship between work–family conflict and negative health-related outcomes. In fact, work-family-conflict was consistently found to correlate with depression, anxiety and psychological strain (Grandey and Cropanzano, 1999; Frone et al., 2020). It also appears to correlate with physical conditions reflecting the sympathetic nervous system's reactions to stress (e.g., blood pressure, cholesterol levels, hypertension) and with self-reported negative health symptoms and unhealthy behaviors (Thomas and Ganster, 1995; Spector et al., 2004).

Furthermore, conflicts between the work and family domains have been found to mediate the relationship between demanding work characteristics and indicators of psychological wellbeing and

job burnout (Geurts et al., 1999; Janssen et al., 2004; Rupert et al., 2009) as well as mediating the relationship between demanding family characteristics and indicators of psychological wellbeing (Asiedu et al., 2018) particularly during the pandemic (Swit and Breen, 2022). As the Covid-19 pandemic has characteristics of both demands, we expect that:

> *H2*: Work-family conflict mediates the relationship between PCCI and parental burnout

Furthermore, tensions related to diverging attitudes in families concerning vaccination and precaution measures are likely to affect the support parents may experience from their spouse in juggling work and family demands negatively. As spousal support is one of the most important resources for parents, such diminished spousal support is likely to exacerbate work–family conflict and consequently may lead to a higher likelihood of parental burnout. From meta-analytic research examining the antecedents of work–family conflict spousal support is indeed seen as an important resource to prevent work–family conflict (Michel et al., 2011). To clarify the matter further, research among Dutch parents during the Covid-19 pandemic shows that if parents had more disagreements about any of five issues (working from home, working on location, care for the children, free time, household tasks) they perceived more stress (André and van der Zwan, 2021). This suggests that if parents have disagreements about working from home or on location, or about whether to take precaution measures (such as vaccination) within their own nuclear family (with their spouse) or with their extended family (parents, in-laws) this has a great potential to create tensions and thus impact work–family conflict from the family side of the balance.

Hence, we expect that:

> *H2a*: Work-family conflict mediates the relationship between family tensions towards VIPM and parental burnout

The moderating role of family supportive organizational practices during the pandemic

As this unprecedented crisis has brought alterations and instability in various aspects of work and everyday life, support from the organization is essential to help staff go through this transition process and adjust to the "new normal" (Gigauri, 2020). Organizational support is shown to be extremely protective of employees' mental health during the outbreak of infectious diseases (Brooks et al., 2018). Some of the recommended initiatives to favor employees' wellbeing and stability in times of crisis consists of the adoption of flexible schedules, less strict policies concerning performance management, training and support to virtual working skills, together with consistent, transparent and empathetic communication (Adams, 2020; Fallon, 2020; Howlett, 2020). Further solutions could include stress-mitigating offerings such as webinars on resilience, tutorials on mindfulness (De Cieri et al., 2019), employee assistance programs, and virtual counseling services (Caligiuri et al., 2020).

The Organizational Support Theory proposes that, over time, based on the multiple interactions with supervisors and employers and on the quality of working conditions and HR offerings, employees tend to form a generalized and stable perception of organizational support (Rhoades and Eisenberger, 2002; Kurtessis et al., 2015). Perceived organizational support is thus defined as the pattern of employee's beliefs concerning the extent to which the organization values their contributions and cares about their wellbeing (Eisenberger et al., 1986). When employees feel they are being favored, well-treated and valued by their organization, their socio-emotional needs of belongingness and esteem are fulfilled (Poldma, 2016), and they experience a greater wellbeing (Kurtessis et al., 2015). Perceived organizational support constitutes a potential resource that has been found to attenuate job burnout risk (Walters and Raybould, 2007; Cheng and O-Yang, 2018; Zeng et al., 2020) and to moderate the relationship between inter-role conflict and job burnout (Wu et al., 2018), especially the dimension of emotional exhaustion (Jawahar et al., 2007).

As the present research focuses on parents, organizational support will be identified as positive organizational policies and attitudes aimed at valuing employees' work, goals and wellbeing with a focus on facilitating effective parenting. Allen (2001) suggests that family-friendly benefits may not have the intended impact if they are not accompanied by family-friendly organizational values. Therefore, together with organizational policies, family supportive organizational perceptions will be taken into consideration. This dimension is defined by Thompson et al. (1999) as the "the shared assumptions, beliefs, and values regarding the extent to which an organization supports and values the integration of employees' work and family lives" (p. 392). Examples of family supportive perceptions could be: allowing time off to attend to family needs, accepting boundary blurriness, considering flexible time arrangements as a strategic solution. In addition, the extent to which parents perceive the organization to offers support and guidance during the Covid-19 pandemic might be particularly important (e.g., Carnevale and Hatak, 2020; Fontanesi et al., 2020). This study will examine the extent to which parents family supportive organizational perceptions during the pandemic will buffer the risk of parental burnout that stems from work–family conflict:

> *H3*: Family supportive organizational practices during the pandemic (FSOP-p) have a moderating effect on the relationship between work-family conflict and parental burnout

The relationships between Perceived Covid-19-Crisis Intensity, parental burnout, work–family conflict and family supportive organizational perceptions as described above are shown in the conceptual model below (Figure 1).

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Materials and methods

Research design

A quantitative research was conducted to investigate the aforementioned hypotheses by data collection *via* online questionnaires, which were considered as the fastest and cheapest way to reach as many respondents as possible, especially during times of Covid-19 restriction measures. The data collection took place during March/April 2021 and March/April 2022. In March/April 2021 and 2022 Italy was in a formal state of emergency. In 2021 there was a strict lockdown, with schools closed, mandatory home-working, and the population was not allowed to leave the house without formal authorization (see https://www.governo.it/it/coronavirus-misure-del-governo). In 2022 there were still restrictions, such as compulsory mouth-nose masks and vaccination passports in public spaces, public transport and so forth. From April 1st 2022 onwards there was a gradual loosening of restriction measures (week by week, depending on the color code of the region; Mazzuca, 2022). Although our aim was to conduct a longitudinal study, of the 286 respondents participating in March/April 2021 only 35 respondents filled out the questionnaire during March/April 2022, hence we proceeded with a stacked cross-sectional design using two data waves one year apart.

Procedure

Ethical approval was received before starting recruiting participants. The questionnaire was distributed during March/April 2021 through a link to a web-based questionnaire in Italian, which was sent *via* email and other social media to people in the researchers' networks. In March/April 2022 we reached out to the same pool of respondents, through email and social media with a small flyer visualizing the 2021 main findings and a link to the follow-up questionnaire. The aim of the study was explained before the questionnaire started both in the participation invitation and, more extensively, on the front page of the web-based questionnaire. On this page, anonymity and confidentiality were guaranteed. In addition, a verification and informed consent form was included and filled in by respondents in order to verify themselves as existing persons.

Participants

Of the 286 respondents that started the survey in 2021, 222 filled in the complete questionnaire and met the inclusion criteria (working parent with a child living at home that was 18 years or younger). As it was assumed that pandemic-related modifications in the working conditions would not have a sufficient impact on subjects working less than 12 h per week, also participants who worked less than 12 contract or actual hours per week were excluded. Hence, the analyses for Time 1 were carried out on a sample of 222 subjects. The Time 1 sample consists of 50 men (21%), 186 women (78.5%) and one with non-specified gender (0.4%). Their average age was 43.9, ranging from 30 to 60 years old (SD = 6.24). 219 (92.4%) of the respondents were married or cohabiting, 16 (6.8%) of the respondents were single, divorced or widowed and one (0.4%) was in a relationship but not cohabiting. The number of children living at home ranged from 1 to 4 (M = 1.81, SD = 0.73), the average age of the youngest child was 7.66 years old (SD = 5.00), ranging between 0 and 18. 84 (37.3%) stated that in the past year they have dedicated less or the same amount of time to their children's care as the years before, while the rest (62.7%) spent more or much more time taking care of their children. Furthermore, the number of working hours per week was on average 36.17 (SD = 9.66). 142 respondents (60.7%) worked from home at least one or two days per week.

In the second data collection, 127 participants started the survey; however, only 83 filled in all scales and met the

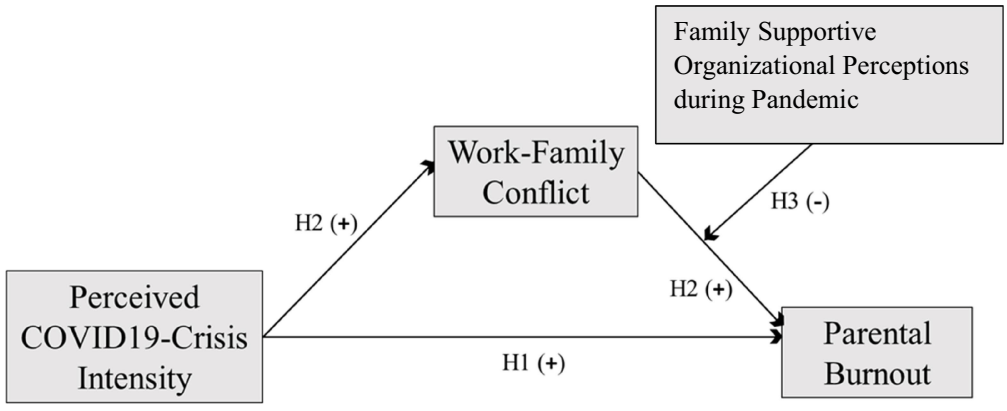

FIGURE 1
Hypothesized Relationships among Variables.

inclusion criteria. The Time 2 sample consisted of 15 men (18.1%), 68 women (81.9%). Their average age was 43.9, ranging from 26 to 60 years old (SD = 8.15). 75 (90.4%) of the respondents were married or cohabiting, 6 (7.2%) of the respondents were single, divorced or widowed and 2 (2.4%) were in a relationship but not cohabiting. The number of children living at home ranged from 1 to 4 (M = 1.70, SD = 0.73), the average age of the youngest child was 7.84 years old (SD = 5.71), ranging between 0 and 18. 67 respondents (80.7%) stated that in the past year they had dedicated less or the same amount of time to their children's care as the years before, while 16 (19.3%) spent more or much more time taking care of their children. Furthermore, the number of working hours per week was on average 35.14 (SD = 11.94). 12 respondents (15%) worked from home at least 1 day a week. In general our samples seem to be quite consistent over time, although our response is lower at the second timepoint. The largest changes are that most people returned to office at our second timepoint, and, compared to the first covid-year, parents in the second covid-year did not spent much more time on their children.

Measures

Perceived Covid-19-Crisis Intensity (PCCI) at Time 1 was measured with a scale composed of 18 items derived from two scales that were adapted for the current Covid-19-Crisis. The first part consisted of a shortened and adapted version (15 items) of the Short Inventory to Monitor Psychological Hazards (SIMPH; Notelaers et al., 2007). Items were modified in order to specifically address the comparison between pre- and post-Covid-19 outbreak. Example items were "Compared to the period preceding Covid-19, I now have to work harder to complete any work task" or "Compared to the period preceding Covid-19, it's now easier to ask my colleagues for help" (reversed). Respondents were asked to answer with regard to the year following the initial outburst of the pandemic. All items were rated on a 5-point Likert scale, where 1 = strongly disagree and 5 = strongly agree. In order to test the validity of the scale and to examine its underlying structure, an exploratory factor analysis was conducted. Three components were found and were named: (1) *Struggle and Confusion*, (2) *Lack of Social Support*, and (3) *Lack of Autonomy*. Reliability of the overall scale was tested through Cronbach's Alpha, which was 0.81, indicating good internal consistency (George and Mallery, 2018). For the subscales, Cronbach's Alpha was, respectively, 0.83 (Struggle and Confusion); 0.83 (Lack of Social Support); and 0.74 (Lack of Autonomy).

Perceived Covid-19-Crisis Intensity (PCCI) at Time 2. The same items were used at Time 2, but the instructions were adapted to the current situation. An example item is "Compared to last year, I now have to work harder to complete any work task" or "Compared to last year, it's now easier to ask my colleagues for help." The overall Cronbach's Alpha at Time 2 was 0.80, and for the subscales they were, respectively 0.87 (Struggle and Confusion); 0.79 (Lack of Social Support); and 0.74 (Lack of Autonomy).

Parental burnout (PB), was evaluated using a scale constructed through the combination of Parental Burnout Inventory (PBI; Roskam et al., 2017) and Parental Burnout Assessment (PBA; Roskam et al., 2018). PBI contains three dimensions (*emotional exhaustion*, *emotional distancing*, and *inefficacy*), while PBA also entails an additional dimension (*contrast with previous self*). Hence, the scale consisted of 12 items, nine of which pertained to PBI (for instance: "I accomplish many valuable things as a parent"), while three were drawn from PBA (for example: "I tell myself that I'm no longer the parent I used to be"). Respondents were asked to respond on a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. Cronbach's alpha was 0.92 at Time 1 and 0.90 at Time 2, which means the scale has good internal consistency.

To measure *Work–family conflict (WFC)*, six items were adopted out of the 18-item-scale developed by Carlson et al. (2000). The items assessed to what extent private life and family activities affect the work domain and vice versa. One example item is: "The time I spend with my family often causes me not to spend time on activities at work that could be helpful to my career." As most parents had to work from home during the months of April/March 2021 and 2022, we slightly modified the wording of the items that suggested work and family domains were at different locations. For instance: "I am often so emotionally drained *when I get home* from work that it prevents me from contributing to my family" was changed into: "I am often so emotionally drained *when I finish working* that it prevents me from contributing to my family." Respondents were asked to answer on a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. Cronbach's alpha was 0.83 at Time 1 and 0.78 at Time 2, indicating the scale to be reliable.

Family Supportive Organizational Perceptions during the pandemic was assessed through an adaptation of the 7-item scale derived from Allen's (2001) Family-Supportive Organizational Perceptions (FSOP) scale. Example items are: "My organization assumes that the most productive employees are those who put their work before their family life" (reversed) and "My organization believes that employees should be given ample opportunity to perform both their job and their personal responsibilities as well." Two more items were added in order to focus on the pandemic-related behaviors: "During the pandemic, my organization has provided specific instructions on how to act and behave" and "During the pandemic, my organization offered to help me more than usual." For all items, respondents were asked to assess on a Likert five-point scale ranging from 1 = strongly disagree to 5 = strongly agree. At Time 1 Cronbach's alpha was 0.88 and at Time 2 0.83.

Finally, control variables were included to see whether there are spurious relations affecting the relationships in the proposed conceptual model. The control variables were gender, age, number of children living at home, youngest child's age, change in time spent with children, work hours and telework.

Statistical analysis

We performed linear regression analysis to test hypothesis 1 and tested the mediation (hypothesis 2) and moderation (hypothesis 3) models using Hayes' PROCESS (Hayes, 2017). We used model 4 for mediation and model 14 for moderation.

Results

Table 1 shows the means (*M*), standard deviations (*SD*) and significant correlations for each main variable and control variables for Time-1 (below the diagonal) and Time-2 (above the diagonal). PCCI is highly and significantly correlated with parental burnout and work–family conflict at Time-1 as well as Time-2. Furthermore, Perceived Organizational Support was negatively related to PCCI, parental burnout and work–family conflict. Tensions related to vaccination and infection precautions (VIPM) were, contrary to our expectations, not correlated with any of the other measures.

We test the first hypothesis with linear regression analysis (see Table 2). Model 1 shows that the direct effect of PCCI on Parental Burnout in 2021 is 0.610 ($p < 0.001$), which means that a higher perceived covid crisis intensity is related with a higher score on the parental burnout scale. Model 2 shows that in 2022 the direct effect of PCCI on Parental Burnout is still positive and significant in a linear regression analysis (0.415, $p < 0.01$), controlled for gender, age, number of children, age youngest child, work hours, telework hours and time for children compared to last year. Although the size of the effect is smaller, since we are working with two different samples we should be careful in interpreting the size of the effect. These results confirm our first hypothesis that Perceived Covid-19 Crisis Intensity (PCCI) is positively related to parental burnout.

Models 3 and 4 show that Work–Family Conflict (WFC) has a positive direct effect on Parental Burnout at Time-1 ($b = 0.356$, $p < 0.001$) and Time-2 ($b = 0.417$, $p < 0.001$). We will test the mediation effect with Hayes in the next paragraph. Model 5 is only present for Time-2, where we investigate if tensions in the family about getting vaccinated or infection precaution measures affects parental burnout. We find the effect is borderline significant ($p = 0.056$). This gives a first indication that we might not have to reject our hypothesis 1a that family tensions related to attitudes toward vaccination and infection precaution matters are positively related to parental burnout.

Hypothesis 2 in which we predict that work–family conflict mediates the relationship between PCCI and parental burnout has been tested with Hayes Process model 4. The results for 2021 are presented in Figure 2 and for 2022 in Figure 3. In 2021, we find a significant direct and indirect relationship between PCCI and parental burnout. Which means that the relationship is only partly mediated by Work–Family Conflict. The direct effect was 0.610 and is now 0.392. In 2022 this relationship is fully mediated by the level of work–family conflict of the respondent as can be seen in Figure 3 below. The relationship between PCCI and work–family conflict is 0.59 and the relationship between work–family conflict and parental burnout is 0.40. See for all coefficients Table 3. This allows confirmation of hypothesis 2.

We also tested the three subscales of PCCI in this mediation model: struggle and confusion, lack of autonomy and lack of social support in Tables 4a,b. The subscale struggle and confusion had the largest explanatory power and seems to drive the relationship between PCCI and parental burnout. This is the same in 2021 and 2022. The other two subscales did not have a significant relationship with parental burnout. We also tested the curvilinear effect of the 'lack of autonomy' scale, we did not find a curvilinear effect on either timepoint.

Hayes Process Model 14 was applied to test the third hypothesis. Hypothesis 3 stated that perceived support from the organization buffers the impact of work–family conflict on parental burnout such that the positive relationship is weaker for those with a perception of positive organizational support than for those perceiving a negative supporting attitude from the organization. Results, as presented in Figures 4, 5, do not show any significant moderating effect on either time point.

Our last hypothesis, 2a, expected that work–family conflict could also mediate the relationship between family tensions toward vaccination and infection prevention (VIPM) and parental burnout. As shown in model 4 of Tables 4, although family tensions and work–family conflict both contribute to parental burnout, there is no mediation effect, because there is no relationship between family tensions and work–family conflict. Furthermore, the relationship between VIPM and parental burnout was only borderline significant.

Discussion

The first aim of this study was to examine whether and to what extent the perceived intensity of the Covid-19 crisis influences the emergence of parental burnout through work–family conflict. As Mikolajczak and Roskam (2018) suggested that parental burnout may be a consequence of a chronic imbalance of risks over resources, it was hypothesized that protracted exposure to stressors, such as the continuous unpredictable changes in work conditions due to the pandemic, and the decrease in resources, such as one's usual social support, could lead parents to a state of burnout (cf. Maslach and Leiter, 2016). Accordingly, the present study showed that those who have stronger perceptions of the pandemic intensity indeed experience stronger symptoms of parental burnout both in 2021 and in 2022. Furthermore, higher levels of pandemic perceived intensity were found to be associated with greater levels of work–family conflict, which is in turn related to parental burnout, in both subsequent years of the pandemic. These findings further substantiate and expand Greenhaus and Beutell (1985) theorization of work–family conflict, which suggests that an increase in demands creates or enhances a role conflict between the two spheres. In previous research such

TABLE 1 Correlation matrix. Below the diagonal the correlations for Time-1 (N =222), above the diagonal the correlations for Time-2 (N =83).

	Variable	M /% (T1)	SD (T1)	M/% (T2)	SD (T2)	Diff	1	2	3	4	5	6	7	8	9	10	11	12	13
1	PCCI	3.10	0.61	2.93	0.64	*	1	0.39 ***	0.50 ***	−0.65 ***	0.18	0.04	−0.233 *	−0.07	0.03	−0.11	0.10	−0.10	−0.03
2	PB	2.17	0.81	2.20	0.75	n.s.	0.47 ***	1	0.53 ***	−0.385 ***	0.21 *	0.04	−0.010	−0.01	0.04	−0.09	−0.01	−0.08	0.17
3	WFC	2.70	0.88	2.72	0.87	n.s.	0.37 ***	0.52 ***	1	−0.459 ***	0.14	−0.00	−0.16	−0.25 *	−0.05	−0.01	0.02	−0.09	−0.04
4	FSOP-p	3.19	0.88	3.09	1.09	n.s.	−0.34 ***	−0.27 ***	−0.278 ***	1	−0.23 *	−0.04	0.25 *	0.19	−0.12	0.14	−0.15	0.23 *	0.14
5	Gender (female)	78%		81%		n/a	0.19 **	0.20 **	0.094	−0.125	1	−0.13	−0.08	0.07	−0.01	−0.08	−0.16	−0.21	0.06
6	Age	43.61	6.15	43.30	8.16	n.s.	0.09	0.04	−0.177 **	0.045	−0.02	1	0.02	0.26 *	0.84 ***	−0.21	0.20	0.01	−0.12
7	Education	4.43	1.03	4.43	0.99	n.s.	−0.07	0.02	0.183 **	0.015	−0.10	−0.08	1	0.07	−0.11	0.08	0.29 **	0.29 **	−0.03
8	Number of children	1.82	0.71	1.70	0.73	n.s.	0.14 *	0.14 *	−0.054	0.093	0.09	0.14 *	−0.18 **	1	0.15	−0.16	−0.08	−0.13	−0.02
9	Age youngest child	7.50	5.00	7.84	5.71	n.s.	0.06	−0.00	−0.229 ***	0.019	0.08	0.744 ***	−0.19 **	0.10	1	−0.32 **	0.16	−0.14	−0.08
10	Time spent on Number of children	3.80	0.86	2.98	0.92	***	0.01	0.11	0.167 *	−0.025	0.15 *	−0.15 *	0.10	0.14 *	−0.22 ***	1	−0.23 *	0.20	0.10
11	Work hours	36.09	9.72	35.14	11.94	n.s.	−0.21 ***	0.01	0.156 *	−0.009	−0.29 ***	−0.13	0.13 *	−0.11	−0.16 *	−0.03	1	0.20	−0.12
12	Telework (almost always)	49%		15%			−0.11	0.05	0.132 *	0.145 *	−0.02	0.12	0.31 ***	−0.00	−0.05	0.17*	0.12	1	0.11
13	VIPM (only at T2)																		1

All scales measured on 5-point Likert scale. For Time-1 telework hours was calculated based on the number of days a week that is spend on telework, at Time-2 the number of hours was directly used. Gender (0 = men, 1 = women), Age and Education were measured in intervals with increasing age and education.

***p <0.001; **p < 0.001; *p < 0.05.

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TABLE 2 Regression analysis on parental burnout (Y).

	Model 1 (Time-1)	Model 2 (Time-2)	Model 3 (Time-1)	Model 4 (Time-2)	Model 5 (Time-2)
	B(SD)	B(SD)	B(SD)	B(SD)	B(SD)
Constant	−1.163 (0.562)*	0.739 (0.855)	−1.249 (0.521)*	0.613 (0.776)	0.287 (0.780)
PCCI	0.610 (0.080)***	0.415 (0.128)**	0.389 (0.083)***	0.160 (0.132)	0.157 (0.129)
Gender	0.334 (0.125)*	0.294 (0.221)	0.252 (0.117)*	0.207 (0.201)	0.188 (0.198)
Age	0.007 (0.012)	0.006 (0.020)	0.011 (0.011)	−0.008 (0.019)	−0.004 (0.018)
Number of children	0.066 (0.068)	−0.015 (0.119)	0.108 (0.064)	0.121 (0.113)	0.116 (0.111)
Age youngest child	−0.009 (0.005)	−0.004 (0.029)	0.000 (0.014)	0.016 (0.026)	0.011 (0.026)
Work hours	0.014 (0.005)	−0.003 (0.007)	0.007 (0.004)	−0.002 (0.007)	−0.001 (0.007)
Telework hours	0.030 (0.031)	0.000 (0.007)	0.005 (0.029)	0.003 (0.007)	0.001 (0.007)
Time for children compared to last year	0.061 (0.059)	−0.040 (0.097)	0.025 (0.055)	−0.037 (0.088)	−0.046 (0.086)
Work–Family Conflict (WFC)			0.356 (0.059)***	0.417 (0.101)***	0.421 (0.099)***
Vaccination and Infection Precaution Measures (VIPM)					0.127 (0.065)^
N	*222*	*83*	*222*	*83*	*83*
R2	*0.293*	*0.177*	*0.396*	*0.332*	*0.366*

***$p < 0.001$; **$p < 0.001$; *$p < 0.05$; ^$p < 0.10$.

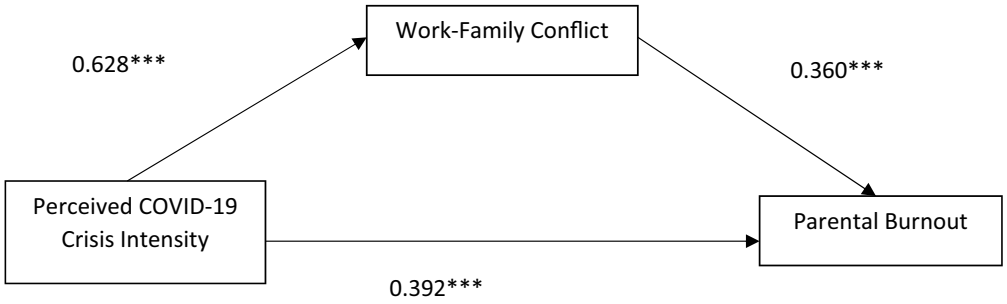

FIGURE 2
Mediation model (T1, 2021).

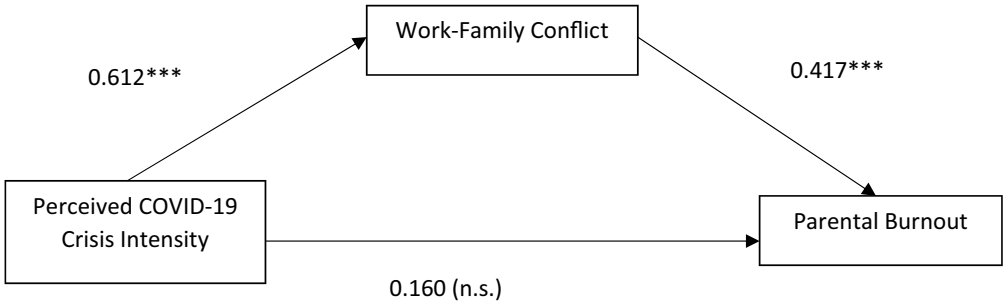

FIGURE 3
Mediation model (T2, 2022).

demands may stem from the work or the family domain, in our current study demands in both the work and the family domain increased as a result from the pandemic, causing a stronger interference. The relationship between perceived intensity of the Covid-19 crisis and parental burnout was fully mediated by work–family conflict in 2022, yet partially mediated by work–family

TABLE 3 Hayes mediation analysis on parental burnout (Y) with Work–Family Conflict (M) and PCCI (X; models 1 and 2).

	Time-1 (2021)		Time-2 (2022)	
	Work–Family Conflict	Parental Burnout	Work–Family Conflict	Parental Burnout
	B (SD)	B(SD)	B (SD)	B(SD)
Constant	−0.348 (0.604)	−1.172 (0.519)*	0.096 (0.099)	0.405 (0.863)
PCCI	0.628 (0.087)***	0.392 (0.083)***	0.612 (0.134)***	0.160 (0.132)
Gender	0.190 (0.135)	0.240 (0.116)*	0.208 (0.230)	0.207 (0.201)
Age	−0.001 (0.013)	0.011 (0.011)	0.035 (0.021)	−0.008 (0.019)
Number of children	−0.116 (0.07)	0.111 (0.064)	−0.326 (0.124)*	0.122 (0.113)
Age youngest child	−0.028 (0.016)	0.000 (0.014)	−0.047 (0.030)	0.016 (0.026)
Work hours	0.146 (0.036)***	0.046 (0.032)	−0.002 (0.008)	−0.002 (0.007)
Telework hours	0.106 (0.107)	0.025 (0.092)	−0.007 (0.008)	0.003 (0.007)
Time for children compared to last year	0.120 (0.063)	0.025 (0.054)	−0.008 (0.100)	−0.037 (0.088)
Work–Family Conflict (WFC)		0.360 (0.058)***		0.417 (0.101)***
VIPM				
N	*222*	*222*	*83*	*83*
R2	*0.298*	*0.394*	*0.332*	*0.332*

***$p < 0.001$; **$p < 0.001$; *$p < 0.05$; ^$p < 0.10$.

conflict in 2021. We believe that it was partially mediated in 2021 as apart from the perceived intensity of the Covid-19 crisis to be an antecedent of work–family conflict and subsequently parental burnout, the novelty, unpredictability, threat and lack of control characteristic of the pandemic in 2021 may have led to parental burnout through anxiety and psychological distress. In 2022, much more was known about the virus, the different variants and about treatment of patients. Moreover, a larger share of the population in 2022 was vaccinated or had build-up some immunity.

Interestingly, women were found to experience more parental burnout than men. This is consistent with Roskam et al. (2018) and Roskam and Mikolajczak (2020) outcomes of parental burnout identification: according to their findings the percentage of women in burnout or at high risk was higher than the percentage of fathers in the same conditions. Gender discrepancies were also found in the levels of perceived crisis intensity and in work–family conflict. Consistent with these findings, both Zamarro and Prados (2021) and Shockley et al. (2021) reported that the Covid-19 pandemic disproportionately affected working mothers in terms of childcare load. A study conducted in Italy during the lockdown also reported a gender imbalance in vulnerability to stress, with mothers presenting higher levels of psychological distress than fathers (Marchetti et al., 2020). The authors argued that reasons for this can be traced within the Italian culture, which still holds women, even when involved in professional work, as the ones most responsible for caregiving and for taking care of the household. During the pandemic, children were often obliged to homeschool, and extra-curricular activities were limited or cancelled. Therefore, women may have suffered higher levels of stress and work–family conflict due to the additional pressure exerted by the need of managing children's care, leisure and homeschooling for days in a row. Additionally, visits and social gatherings were often restrained, and elderly people, identified as the most vulnerable to the Covid-19 disease, were strongly advised to avoid social contacts. This often resulted in a decrease in support coming from grandparents or other members of the social group in the care of children and the household (Cantillon et al., 2021). Consistently, the results of this study found that the time dedicated to childcare after the beginning of the pandemic has increased especially for women, and, in turn, this increase corresponded to higher levels of work–family conflict and parental burnout in 2021. The difference between men and women in time spent on children was no longer significant in 2022, likely related to the opening of schools in 2022. The literature offers wide evidence of how the Covid-19 pandemic enlarged the gender gap in terms of stress (Kowal et al., 2020), income, employment (Kristal and Yaish, 2020) and job satisfaction (Feng and Savani, 2020), the present study further contributes to the research on gender inequality.

The present study also investigated which aspects of pandemic-related changes were more strongly related to parental burnout and work–family conflict. The analyses showed that the elements that were most associated with parental burnout were those pertaining to the PCCI dimension "Struggle and confusion," which consisted of the fatigue due to higher workload, new work tasks, disfavored methods, contradictory instructions, confusing expectations and unfamiliar tools (tech stress, see also Ghislieri et al., 2021) to perform one's job. These findings show that strain experienced in one domain (i.e., work) is not only related to the risk of burnout in that same domain (job burnout), as suggested by Bianchi et al. (2014), but it may also impact other domains (i.e.,

TABLE 4a Hayes mediation analysis on parental burnout (Y) with Work–Family Conflict (M) and PCCI (X; including all controls from the past Table, results not shown) at Time-1 (2021).

	Time-1 (2021)					
	Work–Family Conflict	Parental Burnout	Work–Family Conflict	Parental Burnout	Work–Family Conflict	Parental Burnout
	B(SD)	B(SD)	B(SD)	B(SD)	B(SD)	B(SD)
PCCI (Struggle)	0.477 (0.059)***	0.245 (0.060)***				
PCCI (Lack of Autonomy)			0.095 (0.065)	0.124 (0.052)*		
PCCI (Lack of Social Support)					0.105 (0.065)	0.087 (0.053)
Work–Family Conflict (WFC)		0.363 (0.061)***		0.471 (0.055)***		0.474 (0.055)***
N	*222*	*222*	*222*	*222*	*222*	*222*
R2	*0.330*	*0.379*	*0.134*	*0.348*	*0.134*	*0.339*

***$p < 0.001$; **$p < 0.001$; *$p < 0.05$; ^$p < 0.10$.

TABLE 4b Hayes mediation analysis on parental burnout (Y) with Work–Family Conflict (M) and PCCI (X; including all controls, results not shown) at Time-2 (2022).

	Time-2 (2022)							
	Work–Family Conflict	Parental Burnout	Work–Family Conflict	Parental Burnout	Work–Family Conflict	Parental Burnout	Work–Family Conflict	Parental Burnout
	Model 1		Model 2		Model 3		Model 4	
	B (SD)	B(SD)	B (SD)	B(SD)	B (SD)	B(SD)	B (SD)	B(SD)
PCCI (Struggle)	0.369 (0.091)***	0.128 (0.085)						
PCCI (Lack of Autonomy)			0.193 (0.102)	−0.016 (0.083)				
PCCI (Lack of Social Support)					0.082 (0.109)	−0.012 (0.085)		
Work–Family Conflict (WFC)		0.412 (0.098)***		0.478 (0.092)***		0.476 (0.091)***		0.477 (0.088)***
VIPM							−0.011 (0.084)	0.127 (0.065)^
N	*83*	*83*	*83*	*83*	*83*	*83*		
R2	*0.298*	*0.340*	*0.182*	*0.319*	*0.149*	*0.319*		

***$p < 0.001$; **$p < 0.001$; *$p < 0.05$; ^$p < 0.10$.

family). This is widely conveyed in the literature concerning spillover from work to family and, vice versa, from family to work. Almost 10 years ago, Berkowsky (2013) advocated that the increasing use of Information Technologies and of working-from-home arrangements leads to an escalating blurriness in work-family boundaries, which in turn enhances the risk for negative spillover from one to the other domain. With the outbreak of the Covid-19 pandemic, telework and the use of IT escalated dramatically, thus probably intensifying negative spillover. In accordance with this, the present study's results also showed that the first dimension of PCCI, entailing struggle and confusion, was related to work–family conflict.

We did not find an effect of the subscales 'lack of autonomy' or 'lack of social support' with either parental burnout or work–family conflict. Warr's (1994) vitamin model offers an interesting explanation. The author argues that autonomy has a curvilinear relationship with wellbeing. While a mild amount of autonomy is a job resource that positively influences performance, health and motivation (Bakker and Demerouti, 2007), too much autonomy can be detrimental for wellbeing, as complex decision making and constant taking of responsibility can lead to an overload of strain. Bredehoeft et al. (2015) consider autonomy as a job demand, as it can entail great psychological costs and emotional exhaustion (Dettmers and Bredehöft, 2020). Connecting this to the present findings, it is conceivable that for some subjects the higher levels of autonomy (often implied by telework) may have been a resource, while for some others they may have been a source of strain. At the same time, the lack of autonomy, perhaps connected with new strict regulations on the workplace, might have been demanding and stressful for some, but reassuring and beneficial for others. In the data of the present study, no curvilinear relationship in 2021 nor 2022 was found between the lack of

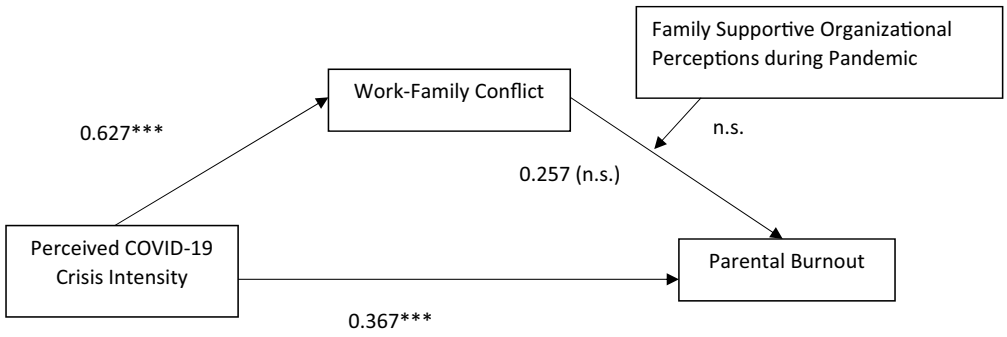

FIGURE 4
Moderation model (Time-1, 2021).

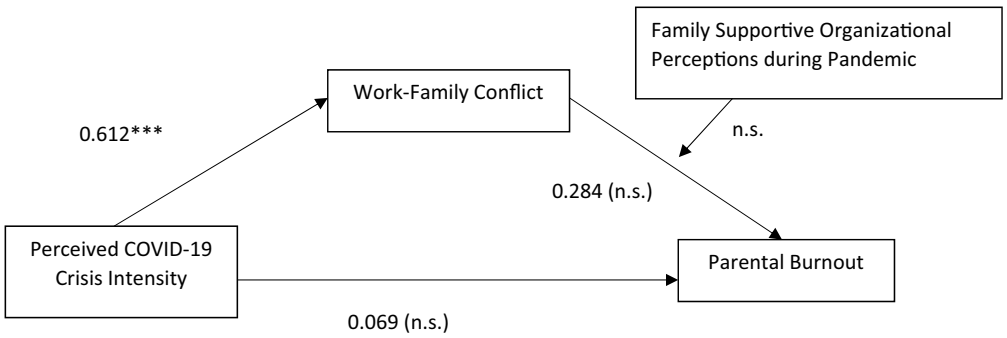

FIGURE 5
Moderation model (Time-2, 2022).

autonomy and parental burnout. This could be due to the fact that parental burnout is not necessarily similar to the reversed construct of wellbeing (which is the construct for which the curvilinear relationship was hypothesized by Warr, 1994), or, alternatively, to the fact that autonomy may have positive or negative effects depending on individual dispositions and circumstances. Further research could thus investigate the possible reasons behind the unclarity around the role played by autonomy, and whether its benefits are correlated with individual preference, specific beliefs or certain personality styles. A few studies examined the relationship between autonomy and types of personality, such as Conscientiousness or Extraversion (Barrick and Mount, 1993; Gellatly and Irving, 2001); however, more elaboration is needed on the topic. Since working from home is becoming a more and more common arrangement (Eurofound, 2020), and since it generally implies an increase in autonomy (Gajendran and Harrison, 2007; Weinert et al., 2015), it would be of great advantage for organizations to understand for whom and to what extent freedom and autonomy are to be considered beneficial for wellbeing and productivity. As a final contribution to understanding the impact of the Covid-19 pandemic, we examined tensions related to vaccination and infection precaution measures in relation to parental burnout. Consistent with Cusinato et al. (2020) study among Italian parents that lockdown measures and changes in daily routines negatively affected parents' psychological wellbeing, our study found an indication that tensions related to vaccination and infection precaution measures were related to parental burnout (borderline significant for this sample).

The present research also explored the role of family supportive organizational perceptions during the pandemic. This concept entailed the existence of organizational practices and values that support employees' general wellbeing and work-family balance. While it was expected that family supportive organizational perceptions would reduce the effect of work-family conflict on parental burnout, this was not demonstrated by our results. However, logically and understandably, it was discovered that family supportive organizational perceptions itself negatively related to the perceived intensity of the pandemic-related changes. *De facto*, supportive organizational practices and values such as caring for employees' wellbeing, allowing for flexible arrangements, recognizing efforts, considering personal goals and values, accepting and valorizing employees' private needs may themselves be the reasons why employees may have experienced the pandemic impact as less intense. Similar conclusions were drawn by Fiksenbaum et al. (2006), who demonstrated that higher levels of organizational support predicted lower perceived SARS threat, emotional exhaustion, and state anger in Canadian nurses.

It would be interesting to investigate whether organizational support is perceived differently based on gender, and subsequently, if it has a different impact on the perception of the crisis intensity.

Practically speaking, as family supportive organizational perceptions was shown to be associated with lower levels of perceived pandemic intensity, lower levels of work–family conflict and, consequently, fewer symptoms of parental burnout, organizations should redouble their efforts in ensuring support to their employees. Attempts in this direction will serve in soothing the negative long-term changes brought by Covid-19 or by other new stressors and complex job demands that may arise for other reasons, such as economic crises or other disruptive changes. Family-supportive policies and flexible arrangements could prove to be effective resources that can buffer the risk of experiencing high levels of work–family conflict and parental burnout. Gigauri (2020) adds that creating a culture that supports the employees' physical and psychological wellbeing represents a strategic organizational solution to face the pandemic crisis. More generally, the positive impact of organizational supportive policies and practices as well as a family supportive climate in the organization on employees' wellbeing can ensure a more sustainable and effective workforce in the long-term (Kossek et al., 2014).

Furthermore, as mothers seem to be suffering more than fathers from the pandemic probably due to the imbalanced division of care and household responsibilities, efforts should be made both on the organizational level and the societal level to incentivize men to share these responsibilities with their partner. Work-life balance programs addressing men, such as paternity and parental leave with income substitution for fathers, seem indeed to be a crucial step toward gender equality, because only when men are given equal opportunities to be caregivers, only when they are accounted for caregiving, will the burden of caregiving responsibilities may not automatically fall onto women (Sweet, 2012; Levs, 2019; Ankiilu, 2021).

Limitations and future research

This research was conducted 1 and 2 year after the outbreak of the Covid-19 pandemic in Italy. Data were gathered in March/April 2021 and 2022, when the Coronavirus Disease infection rates were growing toward a third peak and plateauing in cases after the fourth infection peak, (WHO, 2022). In Italy, in March and April 2021, movement and encounters were restricted, most commercial activities were interrupted and all schools only used distance learning (Mezza Italia, 2021; Mazzuca, 2022). In March and April 2022 most schools were open, although with strict safety precautions, workplaces, public transport and sports facilities were open when in the possession of valid vaccination passports and with infection precaution measures instilled. This means that data were obtained in particular fractions of the entire pandemic, in 2021 when the harshest conditions were in place and in 2022 at a time when society was gradually opening, yet accompanied with societal polarization on vaccination and infection precaution measures. On the one hand this could be seen as a strong point of the study, as it considered stress levels at their peak in 2021 and lessening in 2022. On the other hand, it could be seen as a limitation, as results cannot be compared to a pre-pandemic moment in time, nor to the situation where Covid-19 has become more or less endemic. Arguably, in other periods of the pandemic year, for example when children were allowed to physically go to school, parents may have carried less burdens concerning childcare and homeschooling, and thus may have experienced less work–family conflict and lower levels of stress. To what extent a situation in which Covid-19 is endemic, where work places and schools may go to and from restriction measures, causing long lasting uncertainty and subsequent parental burnout remains to be seen.

Other critical aspects of this research regard the way of sampling and the study design. Convenience and snowballing sampling were used to enlist respondents for this study. Questionnaires were distributed to friends, family members and acquaintances, who themselves shared the link to the survey with colleagues, or parents having children in the same school. This guaranteed some variety in the sample; however, most of the responses came from northern Italy. Especially in the first part of 2020, northern Italy was the area that was most hit by Covid-19. In most southern regions the virus spread later and restrictions were less intense (Monitoraggio Coronavirus, n.d.). Therefore, it is advisable to be careful in making generalizations to the entire population (Pruchno et al., 2008). Furthermore, sample sizes were relatively small with 222 and 83 respondents at the two time-points. This cautions us to be careful with drawing conclusions. However, since we do find effects it can be very interesting to research the longitudinal effects on parents in existing panels.

A further limitation may be social desirability bias. Lately, fathers and particularly mothers have felt more and more pressure on adhering to the image of the perfect parent: calm, balanced, sensitive, supportive, warm, always available (Daly, 2007). Western social norms prescribe parents, especially mothers, to be fully devoted to childcare and to always put their children's needs first (Van Engen et al., 2012; Meeussen and Van Laar, 2018). The desire to comply with this ideal may have a twofold outcome. On the one hand, it has been shown that trying to be a perfect parent may increase the susceptibility to parental stress and burnout (Kawamoto et al., 2018; Mikolajczak et al., 2020). On the other hand, however, it could cause biased self-reports, as it might be hard for parents to admit they do not meet this standard (Morsbach and Prinz, 2006; Bornstein et al., 2014). Accordingly, it is plausible that parental burnout was underestimated, especially among women.

A further issue may concern the validity of PCCI: since data preceding the pandemic were non-existent, most of its items implied that respondents compared their present feelings and impressions of their working conditions with their feelings and impressions experienced before the pandemic. It is probable that accuracy in making inferences is limited when thinking retrospectively (Hardt and Rutter, 2004).

Other possible limitations refer to the use of the concept of work–family conflict. While this variable entails negative interference of work with family and family with work, only antecedents regarding the work-domain (and some regarding general isolation) were considered. Further research is advised to utilize an additional variable that specifically considers the pandemic-related changes that occurred within the family, the children's care and homeschooling. This may offer a wider frame to understand work–family conflict and parental burnout, as it would allow a deeper investigation on their generating factors and their possible combination. Furthermore, we would have liked to be able to control for more demographic variables, such as region, income and other resources at home such as hired helps for household and caregiving. It would have been interesting to see how these would affect the relationships under study.

Additionally, due to the cross-sectional nature of this study, no definitive conclusions about causality can be drawn. For example, while, as theorized, experiencing work–family conflict could lead to a higher degree of parental burnout, it is equally plausible that the experience of high levels of stress and symptoms of burnout causes higher levels of role conflict. Similarly, parents experiencing high levels of work–family conflict may also perceive the intensity of the Covid-19 pandemic more intense. Although we approached all parents of the first data collection in 2022 again, a too small proportion participated in 2022 ($n = 35$) to statistically examine their development in PCCI, work–family conflict and parental burnout. A longitudinal diary study should have been designed in order to get more insight in the causality of the relationships. Such a follow-up study could not only help individuate some degree of causality among variables, but may also provide some further understanding of the long-term effects of the pandemic.

Conclusion

The objective of the present study was to investigate the relationship between the perceived intensity of the Covid-19 pandemic, characterized by the struggle and confusion, social isolation and impairment of autonomy it induced, and parental burnout, a recently developed construct defined by parental emotional exhaustion, detachment from one's own children, feelings of low self-efficacy and the acknowledgment of a discrepancy with the previous self in two consecutive years after the first onset of the Covid-19 pandemic. The role of family supportive organizational perceptions was also investigated. Results showed that perceiving a high level of crisis intensity may lead to the emergence of symptoms of parental burnout, and may increase the levels of work–family conflict, which is itself a cause of parental burnout. Unexpectedly, family supportive organizational perceptions did not show any buffering effect in this relationship. However, organizational behaviors and attitudes that support employees' wellbeing and allow flexible management of work and personal needs were found to directly impact and reduce the perceptions of crisis intensity. This means that organizations, through the implementation of supportive policies and practices and the establishment of a supportive environment, might have the power, and the responsibility, to act upon crisis perceptions and, consequently, upon work–family conflict and parental burnout. Why waste such an opportunity?

Data availability statement

The datasets presented in this article are not readily available because we did not ask the participants if we could share the data outside our project. Requests to access the datasets should be directed to marloes.vanengen@ru.nl.

Ethics statement

The studies involving human participants were reviewed and approved by the Ethic Review Board, Tilburg School of Social and Behavioral Sciences, Tilburg University. The patients/participants provided their written informed consent to participate in this study.

Author contributions

MR wrote first draft of the manuscript, designed questionnaire, collected data at wave 1 and wave 2, cleaned data at wave-1 did analysis for wave 1. ME wrote first draft of the manuscript, revised the manuscript, co-designed questionnaire, and collected data at T1 and T2. SA wrote methods and results section of the manuscript, revised the manuscript, co-designed and programmed wave 2 of the questionnaire, collected data at wave 2, cleaned data, performed analysis for wave 1 and 2. All authors contributed to the article and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

References

Adams, D. (2020). 7 Best practices for supporting employees during Covid-19. Available at: https://hrexecutive.com/7-best-practices-for-supporting-employees-during-Covid-19/ (Accessed August 22, 2022).

André, S., and van der Zwan, R. (2021). The influence of the COVID-19 pandemic on changes in perceived work pressure for Dutch mothers and fathers. Spain: Presented at ESA 2021, Barcelona.

Aguiar, J., Matias, M., Braz, A. C., César, F., Coimbra, S., Gaspar, M. F., et al. (2021). Parental burnout and the COVID-19 pandemic: how Portuguese parents experienced lockdown measures. *Fam. Relat.* 70, 927–938. doi: 10.1111/fare.12558

Allen, T. D. (2001). Family-supportive work environments: the role of organizational perceptions. *J. Vocat. Behav.* 58, 414–435. doi: 10.1006/jvbe.2000.1774

Ankiilu, M. (2021). A fresh look at paternity leave: why the benefits extend beyond the personal. African Eye Report. Available at: https://africaneyereport.com/a-fresh-look-at-paternity-leave-why-the-benefits-extend-beyond-the-personal/ (Accessed August 22, 2022).

Asiedu, E. E. A., Annor, F., Amponsah-Tawiah, K., and Dartey-Baah, K. (2018). Juggling family and professional caring: role demands, work–family conflict and burnout among registered nurses in Ghana. *Nurs. Open* 5, 611–620. doi: 10.1002/nop2.178

Bai, Y., Lin, C. C., Lin, C. Y., Chen, J. Y., Chue, C. M., and Chou, P. (2004). Survey of stress reactions among health care workers involved with the SARS outbreak. *Psychiatr. Serv.* 55, 1055–1057. doi: 10.1176/appi.ps.55.9.1055

Bakker, A. B., and Demerouti, E. (2007). The job demands-resources model: state of the art. *J. Manag. Psychol.* 22, 309–328. doi: 10.1108/02683940710733115

Bakker, A. B., and Geurts, S. A. E. (2004). Toward a dual-process model of work-home interference. *Work. Occup.* 31, 345–366. doi: 10.1177/0730888404266349

Banerjee, D., and Rai, M. (2020). Social isolation in Covid-19: the impact of loneliness. *Int. J. Soc. Psychiatry* 66, 525–527. doi: 10.1177/0020764020922269

Barrick, M. R., and Mount, M. K. (1993). Autonomy as a moderator of the relationships between the big five personality dimensions and job performance. *J. Appl. Psychol.* 78, 111–118. doi: 10.1037/0021-9010.78.1.111

Berkowsky, R. W. (2013). When you just cannot get away. *Inf. Commun. Soc.* 16, 519–541. doi: 10.1080/1369118x.2013.772650

Bianchi, R., Truchot, D., Laurent, E., Brisson, R., and Schonfeld, I. S. (2014). Is burnout solely job-related? A critical comment. *Scand. J. Psychol.* 55, 357–361. doi: 10.1111/sjop.12119

Bick, A., Blandin, A., and Mertens, K. (2020). Work from home after the Covid-19 outbreak. Federal Reserve Bank of Dallas, Working Papers, 2020.

Bondielli, A., Tortora, G. C., Ducange, P., Macri, A., Marcelloni, F., and Renda, A. (2022). "Online monitoring of stance from tweets: The case of green pass in Italy." in *2022 IEEE International Conference on Evolving and Adaptive Intelligent Systems (EAIS)*. IEEE. pp. 1–8. Available at: https://ieeexplore.ieee.org/abstract/document/9787753

Bornstein, M. H., Putnick, D. L., Lansford, J. E., Pastorelli, C., Skinner, A. T., Sorbring, E., et al. (2014). Mother and father socially desirable responding in nine countries: two kinds of agreement and relations to parenting self-reports. *Int. J. Psychol.* 50, 174–185. doi: 10.1002/ijop.12084

Bredehoeft, F., Dettmers, J., Hoppe, A., and Janneck, M. (2015). Individual work design as a job demand: the double-edged sword of autonomy. *J. Psychol. des Alltag./Psychol. Everyday Act.* 8, 12–24. doi: 10.15203/1998-9970-8-2-02

Brianda, M. E., Roskam, I., Gross, J. J., Franssen, A., Kapala, F., Gérard, F., et al. (2020). Treating parental burnout: impact of two treatment modalities on burnout symptoms, emotions, hair cortisol, and parental neglect and violence. *Psychother. Psychosom.* 89, 330–332. doi: 10.1159/000506354

Brooks, S. K., Dunn, R., Amlôt, R., Rubin, G. J., and Greenberg, N. (2018). A systematic, thematic review of social and occupational factors associated with psychological outcomes in healthcare employees during an infectious disease outbreak. *J. Occup. Environ. Med.* 60, 248–257. doi: 10.1097/jom.0000000000001235

Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., et al. (2020). The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet* 395, 912–920. doi: 10.1016/s0140-6736(20)30460-8

Butler, A. B., Grzywacz, J. G., Bass, B. L., and Linney, K. D. (2005). Extending the demands-control model: a daily diary study of job characteristics, work-family conflict and work-family facilitation. *J. Occup. Organ. Psychol.* 78, 155–169. doi: 10.1348/096317905X40097

Caligiuri, P., De Cieri, H., Minbaeva, D., Verbeke, A., and Zimmermann, A. (2020). International HRM insights for navigating the Covid-19 pandemic: implications for future research and practice. *J. Int. Bus. Stud.* 51, 697–713. doi: 10.1057/s41267-020-00335-9

Cantillon, S., Moore, E., and Teasdale, N. (2021). COVID-19 and the pivotal role of grandparents: childcare and income support in the UK and South Africa. *Fem. Econ.* 27, 188–202. doi: 10.1080/13545701.2020.1860246

Carlson, D. S., Kacmar, K. M., and Williams, L. J. (2000). Construction and initial validation of a multidimensional measure of work–family conflict. *J. Vocat. Behav.* 56, 249–276. doi: 10.1006/jvbe.1999.1713

Carnevale, J. B., and Hatak, I. (2020). Employee adjustment and well-being in the era of Covid-19: implications for human resource management. *J. Bus. Res.* 116, 183–187. doi: 10.1016/j.jbusres.2020.05.037

Charumilind, S., Craven, M., Lamb, J., Sabow, A., and Wilson, M. (2020). When will the Covid-19 pandemic end? Available at: https://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/when-will-the-Covid-19-pandemic-end (Accessed August 22, 2022).

Cheng, J. C., and O-Yang, Y., (2018). Hotel employee job crafting, burnout, and satisfaction: the moderating role of perceived organizational support. *Int. J. Hosp. Manag.* 72, 78–85. doi: 10.1016/j.ijhm.2018.01.005

Cooper, C. D., and Kurland, N. B. (2002). Telecommuting, professional isolation, and employee development in public and private organizations. *J. Organ. Behav.* 23, 511–532. doi: 10.1002/job.145

Cusinato, M., Iannattone, S., Spoto, A., Poli, M., Moretti, C., Gatta, M., et al. (2020). Stress, resilience, and well-being in Italian children and their parents during the COVID-19 pandemic. *Int. J. Environ. Res. Public Health* 17:8297.

Daly, M. (2007). Parenting in contemporary Europe. A positive approach. Strasbourg: Council of Europe Publishing. Available at: https://books.google.nl/books?hl=en&lr=&id=JROG3RcY8fkC&oi=fnd&pg=PA7&dq=Parenting+in+Contemporary+Europe&ots=p58UoaWoHP&sig=34MUJBwNs_NYssIy21nkpGcJm8#v=onepage&q=Parenting%20in%20Contemporary%20Europe&f=false (Accessed August 22, 2022).

De Cieri, H., Shea, T., Cooper, B., and Oldenburg, B. (2019). Effects of work-related stressors and mindfulness on mental and physical health among Australian nurses and healthcare workers. *J. Nurs. Scholarsh.* 51, 580–589. doi: 10.1111/jnu.12502

Dettmers, J., and Bredehöft, F. (2020). The ambivalence of job autonomy and the role of job design demands. *Scand. J. Work Organ. Psychol.* 5:8. doi: 10.16993/sjwop.81

DiGiovanni, C., Conley, J., Chiu, D., and Zaborski, J. (2004). Factors influencing compliance with quarantine in Toronto during the 2003 SARS outbreak. *Biosec. Bioter.: Biodefense Stra. Practice Sci.* 2, 265–272. doi: 10.1089/bsp.2004.2.265

Edwards, J. R., and Rothbard, N. P. (2000). Mechanisms linking work and family: clarifying the relationship between work and family constructs. *Acad. Manag. Rev.* 25:178. doi: 10.2307/259269

Eisenberger, R., Huntington, R., Hutchison, S., and Sowa, D. (1986). Perceived organizational support. *J. Appl. Psychol.* 71, 500–507. doi: 10.1037/0021-9010.71.3.500

Emmet, E., Schrah, G., Schrimper, M., and Wood, A. (2020). Covid-19 and the employee experience: how leaders can seize the moment. Available at: https://www.mckinsey.com/businessfunctions/organization/our-insights/Covid-19-and-the-employee-experience-how-leaders-can-seize-the-moment (Accessed August 22, 2022).

Eurofound (2020). *Telework and ICT-based mobile work: Flexible working in the digital age, new forms of employment series*. Publications Office of the European Union:Luxembourg.

Fallon, N. (2020). Expert advice on how to support your employees during a crisis. Available at: https://www.uschamber.com/co/run/human-resources/how-to-support-your-employees-in-a-crisis (Accessed August 22, 2022).

Feng, Z., and Savani, K. (2020). Covid-19 created a gender gap in perceived work productivity and job satisfaction: implications for dual-career parents working from home. *Gender Manage.* 35, 719–736. doi: 10.1108/GM-07-2020-0202

Fiksenbaum, L., Marjanovic, Z., Greenglass, E. R., and Coffey, S. (2006). Emotional exhaustion and state anger in nurses who worked during the Sars outbreak: the role of perceived threat and organizational support. *Can. J. Commun. Ment. Health* 25, 89–103. doi: 10.7870/cjcmh-2006-0015

Fontanesi, L., Marchetti, D., Mazza, C., Di Giandomenico, S., Roma, P., and Verrocchio, M. C. (2020). The effect of the Covid-19 lockdown on parents: a call to adopt urgent measures. *Psychol. Trauma Theory Res. Pract. Policy* 12, S79–S81. doi: 10.1037/tra0000672

Fosslien, L., and West-Duffy, M. (2019). How to create belonging for remote workers. Available at: https://sloanreview.mit.edu/article/how-to-create-belonging-for-remote-workers/ (Accessed August 22, 2022).

Frone, M. R., Russell, M., and Cooper, M. L. (2020). "Relationship of work and family stressors to psychological distress: the independent moderating influence of social support, mastery, active coping, and self-focused attention," in *Occupational stress*. (CRC Press), 129–150.

Gajendran, R. S., and Harrison, D. A. (2007). The good, the bad, and the unknown about telecommuting: meta-analysis of psychological mediators and individual consequences. *J. Appl. Psychol.* 92, 1524–1541. doi: 10.1037/0021-9010.92.6.1524

Galanti, T., Guidetti, G., Mazzei, E., Zappalà, S., and Toscano, F. (2021). Work from home during the COVID-19 outbreak: the impact on employees' remote work

productivity, engagement, and stress. *J. Occup. Environ. Med.* 63:e426, –e432. doi: 10.1097/JOM.0000000000002236

Gellatly, I. R., and Irving, P. G. (2001). Personality, autonomy, and contextual performance of managers. *Hum. Perform.* 14, 231–245. doi: 10.1207/S15327043HUP1403_2

George, D., and Mallery, P. (2018). *IBM SPSS statistics 25 step by step*. New York: Routledge.

Geurts, S., Rutte, C. R., and Peeters, M. (1999). Antecedents and consequences of work–home interference among medical residents. *Soc. Sci. Med.* 48, 1135–1148. doi: 10.1016/S0277-9536(98)00425-0

Ghislieri, C., Molino, M., Dolce, V., Sanseverino, D., and Presutti, M. (2021). Work-family conflict during the Covid-19 pandemic: teleworking of administrative and technical staff in healthcare. An Italian study. *Med. Lav.* 112, 229–240. doi: 10.23749/mdl.v112i3.11227

Gigauri, I. (2020). Organizational support to HRM in times of the COVID-19 pandemic crisis. *Eur. J. Mark.* 5, 2803–2818. doi: 10.46609/ijsser.2020.v05i10.005

Gill, V. (2020). Coronavirus: this is not the last pandemic. Available at: https://www.bbc.com/news/science-environment-52775386 (Accessed August 22, 2022).

Grandey, A. A., and Cropanzano, R. (1999). The conservation of resources model applied to work–family conflict and strain. *J. Vocat. Behav.* 54, 350–370. doi: 10.1006/jvbe.1998.1666

Greenhaus, J. H., Allen, T. D., and Spector, P. E. (2006). Health consequences of work–family conflict: the dark side of the work–family interface. *Res. Occup. Stress Well-Being* 5, 61–89. doi: 10.1016/s1479-3555(05)05002-x

Greenhaus, J. H., and Beutell, N. J. (1985). Sources of conflict between work and family roles. *Acad. Manag. Rev.* 10, 76–88. doi: 10.5465/amr.1985.4277352

Hardt, J., and Rutter, M. (2004). Validity of adult retrospective reports of adverse childhood experiences: review of the evidence. *J. Child Psychol. Psychiatry* 45, 260–273. doi: 10.1111/j.1469-7610.2004.00218.x

Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach. 2nd Edn.* New York: Guilford publications.

Hawryluck, L., Gold, W. L., Robinson, S., Pogorski, S., Galea, S., and Styra, R. (2004). SARS control and psychological effects of quarantine, Toronto, Canada. *Emerg. Infect. Dis.* 10, 1206–1212. doi: 10.3201/eid1007.030703

Hobfoll, S. E. (1988). *The ecology of stress*. Washington DC: Hemisphere Publishing.

Hobfoll, S. E., and Shirom, A. (1993). "Stress and burnout in the workplace: conservation of resources" in *Handbook of organization behavior*. ed. T. Golombiewski (New York: Marcel Dekker), 41–61.

House, R. J., and Rizzo, J. R. (1972). Role conflict and ambiguity as critical variables in a model of organizational behavior. *Organ. Behav. Hum. Perform.* 7, 467–505. doi: 10.1016/0030-5073(72)90030-x

Howlett, E. (2020). How should HR support managers on staff wellbeing as the Covid crisis continues? People management. Available at: https://www.peoplemanagement.co.uk/news/articles/how-should-hr-support-managers-on-staff-wellbeing-as-the-Covid-crisis-continues (Accessed August 22, 2022).

Hubert, S., and Aujoulat, I. (2018). Parental burnout: when exhausted mothers open up. *Front. Psychol.* 9:1021. doi: 10.3389/fpsyg.2018.01021

Huebener, M., Waights, S., Spiess, C. K., Siegel, N. A., and Wagner, G. G. (2021). Parental well-being in times of Covid-19 in Germany. *Rev. Econ. Househ.* 19, 91–122. doi: 10.1007/s11150-020-09529-4

Hunter, E. M., Clark, M. A., and Carlson, D. S. (2019). Violating work-family boundaries: reactions to interruptions at work and home. *J. Manag.* 45, 1284–1308. doi: 10.1177/0149206317702221

International Labour Office (2020). Teleworking during the Covid-19 pandemic and beyond. A practical guide.

Jaiswal, A., and Arun, C. J. (2020). Unlocking the Covid-19 lockdown: work from home and its impact on employees.

Janssen, P. P. M., Peeters, M. C. W., de Jonge, J., Houkes, I., and Tummers, G. E. R. (2004). Specific relationships between job demands, job resources and psychological outcomes and the mediating role of negative work–home interference. *J. Vocat. Behav.* 65, 411–429. doi: 10.1016/j.jvb.2003.09.004

Jawahar, I. M., Stone, T. H., and Kisamore, J. L. (2007). Role conflict and burnout: the direct and moderating effects of political skill and perceived organizational support on burnout dimensions. *Int. J. Stress. Manag.* 14, 142–159. doi: 10.1037/1072-525.14.2.142

Johnson, M. S., Skjerdingstad, N., Ebrahimi, O. V., Hoffart, A., and Johnson, S. U. (2020). Mechanisms of parental stress during and after the Covid-19 lockdown: a two-wave longitudinal study.

Kawamoto, T., Furutani, K., and Alimardani, M. (2018). Preliminary validation of Japanese version of the parental burnout inventory and its relationship with perfectionism. *Front. Psychol.* 9:970. doi: 10.3389/fpsyg.2018.00970

Kolakowski, N. (2020). Covid-19 burnout growing among remote workers. Available at: https://insights.dice.com/2020/05/05/Covid-19-burnout-growing-remoteworkers/ (Accessed August 22, 2022).

Kossek, E. E., Valcour, M., and Lirio, P. (2014). "The sustainable workforce," in *Wellbeing*, 295–319.

Kowal, M., Coll-Martín, T., Ikize, G., Rasmussen, J., Eichel, K., Studzińska, A., et al. (2020). Who is the most stressed during the Covid-19 pandemic? Data from 26 countries and areas. *Appl. Psychol. Health Well Being* 12, 946–966. doi: 10.1111/aphw.12234

Kristal, T., and Yaish, M. (2020). Does the coronavirus pandemic level gender inequality curve? (it doesn't). *Res. Soc. Stratif. Mobil.* 68:100520. doi: 10.1016/j.rssm.2020.100520

Kurtessis, J. N., Eisenberger, R., Ford, M. T., Buffardi, L. C., Stewart, K. A., and Adis, C. S. (2015). Perceived organizational support: a meta-analytic evaluation of organizational support theory. *J. Manag.* 43, 1854–1884. doi: 10.1177/0149206315575554

Lee, S., Chan, L. Y. Y., Chau, A. M. Y., Kwok, K. P. S., and Kleinman, A. (2005). The experience of SARS-related stigma at Amoy gardens. *Soc. Sci. Med.* 61, 2038–2046. doi: 10.1016/j.socscimed.2005.04.010

Levs, J. (2019). Why paternity leave is needed to promote gender equality. Available at: https://www.strategy-business.com/article/Why-paternity-leave-is-needed-to-promote-gender-equality. (Accessed August 22, 2022).

Liu, X., Kakade, M., Fuller, C. J., Fan, B., Fang, Y., Kong, J., et al. (2012). Depression after exposure to stressful events: lessons learned from the severe acute respiratory syndrome epidemic. *Compr. Psychiatry* 53, 15–23. doi: 10.1016/j.comppsych.2011.02.003

Marchetti, D., Fontanesi, L., Mazza, C., Di Giandomenico, S., Roma, P., and Verrocchio, M. C. (2020). Parenting-related exhaustion during the Italian Covid-19 lockdown. *J. Pediatr. Psychol.* 45, 1114–1123. doi: 10.1093/jpepsy/jsaa09

Maslach, C., and Leiter, M. P. (2016). Understanding the burnout experience: recent research and its implications for psychiatry. *World Psychiatry* 15, 103–111. doi: 10.1002/wps.20311

Maslach, C., Schaufeli, W. B., and Leiter, M. P. (2001). Job burnout. *Annu. Rev. Psychol.* 52, 397–422. doi: 10.1146/annurev.psych.52.1.397

Mason, J. W. (1968). A review of psychoendocrine research on the pituitary-thyroid system. *Psychosom. Med.* 30, 666–681. doi: 10.1097/00006842-196809000-00024

Mazzuca (2022). L'Informazione per la Sicureza. Available at: https://www.insic.it/sicurezza-sul-lavoro/covid-19/fine-dello-stato-di-emergenza-cosa-cambia-dal-1-aprile-2022-novita-per-green-pass-smart-working-e-misure-restrittive/ (Accessed August 22, 2022).

Meeussen, L., and Van Laar, C. (2018). Feeling pressure to be a perfect mother relates to parental burnout and career ambitions. *Front. Psychol.* 9:2113. doi: 10.3389/fpsyg.2018.02113

Mezza Italia (2021). Mezza Italia in lockdown dal 15 marzo fino a Pasqua. La nuova mappa: Che cosa cambia su spostamenti, scuola e seconde case. Available at: https://www.open.online/2021/03/13/Covid-19-decreto-pasqua-nuova-mappa-colori-regioni-cosa-cambia-15-marzo/ (Accessed August 22, 2022).

Michel, J. S., Kotrba, L. M., Mitchelson, J. K., Clark, M. A., and Baltes, B. B. (2011). Antecedents of work–family conflict: a meta-analytic review. *J. Organ. Behav.* 32, 689–725. doi: 10.1002/job.695

Mikolajczak, M., and Roskam, I. (2018). A theoretical and clinical framework for parental burnout: the balance between risks and resources (BR2). *Front. Psychol.* 9:886. doi: 10.3389/fpsyg.2018.00886

Mikolajczak, M., Brianda, M. E., Avalosse, H., and Roskam, I. (2018). Consequences of parental burnout: its specific effect on child neglect and violence. *Child Abuse Negl.* 80, 134–145. doi: 10.1016/j.chiabu.2018.03.025

Mikolajczak, M., Gross, J. J., Stinglhamber, F., Lindhal-Norberg, A., and Roskam, I. (2020). Is parental burnout different from job burnout and depressive symptomatology? *Clin. Psychol. Sci.* 8, 673–689. doi: 10.1177/2167702620917447

Mikolajczak, M., Gross, J. J., and Roskam, I. (2019). Parental burnout: what is it, and why does it matter? *Clin. Psychol. Sci.* 7, 1319–1329. doi: 10.1177/2167702619858430

Molino, M., Ingusci, E., Signore, F., Manuti, A., Giancaspro, M. L., Russo, V., et al. (2020). Wellbeing costs of technology use during Covid-19 remote working: an investigation using the Italian translation of the technostress creators scale. *Sustainability* 12:5911. doi: 10.3390/su12155911

Monitoraggio Coronavirus (n.d.). Medie mobili. FrancoMostacci.it. Availble at: http://www.francomostacci.it/?page_id=3424 (Accessed 15 June, 2021).

Morsbach, S. K., and Prinz, R. J. (2006). Understanding and improving the validity of self-report of parenting. *Clin. Child. Fam. Psychol. Rev.* 9, 1–21. doi: 10.1007/s10567-006-0001-5

Mulki, J. P., and Jaramillo, F. (2011). Workplace isolation: Salespeople and supervisors in USA. *Int. J. Hum. Resour. Man.* 22, 902–923.

Notelaers, G., De Witte, H., Van Veldhoven, M. J. P. M., and Vermunt, J. K. (2007). Construction and validation of the short inventory to monitor psychosocial hazards. *Méd. du Travail et Ergo.* 44, 11–17.

Pahayahay, A., and Khalili-Mahani, N. (2020). What media helps, what media hurts: a mixed methods survey study of coping with Covid-19 using the media repertoire framework and the appraisal theory of stress. *J. Med. Internet Res.* 22:e20186. doi: 10.2196/20186

Poldma, T. (2016). Hierarchy of needs (Maslow). The Bloomsbury Encyclopedia of Design.

Prikhidko, A, and Long, H, & Wheaton M. G. (2020) The effect of concerns about COVID-19 on anxiety, stress, parental burnout, and emotion regulation: the role of susceptibility to digital emotion contagion. *Front. Public Health*, 8:567250. doi: 10.3389/fpubh.2020.567250

Pruchno, R. A., Brill, J. E., Shands, Y., Gordon, J. R., Genderson, M. W., Rose, M., et al. (2008). Convenience samples and caregiving research: how generalizable are the findings? *The Gerontologist* 48, 820–827. doi: 10.1093/geront/48.6.820

Rhoades, L., and Eisenberger, R. (2002). Perceived organizational support: a review of the literature. *J. Appl. Psychol.* 87, 698–714. doi: 10.1037/0021-9010.87.4.698

Roskam, I., Brianda, M. E., and Mikolajczak, M. (2018). A step forward in the conceptualization and measurement of parental burnout: the parental burnout assessment (PBA). *Front. Psychol.* 9:758. doi: 10.3389/fpsyg.2018.00758

Roskam, I., and Mikolajczak, M. (2020). Gender differences in the nature, antecedents and consequences of parental burnout. *Sex Roles J. Res.* 83, 485–498. doi: 10.1007/s11199-020-01121-5

Roskam, I., Raes, M.-E., and Mikolajczak, M. (2017). Exhausted parents: development and preliminary validation of the parental burnout inventory. *Front. Psychol.* 8:163. doi: 10.3389/fpsyg.2017.00163

Roy, D. F., Kahn, R. L., Wolfe, D. M., Quinn, R. P., Snoek, J. D., and Rosenthal, R. A. (1965). Organizational stress: studies in role conflict and ambiguity. *Am. Sociol. Rev.* 30:620. doi: 10.2307/2091375

Rudolph, C., Allan, B., Clark, M., Hertel, G., Hirschi, A., Kunze, F., et al. (2020). Pandemics: implications for research and practice in industrial and organizational psychology. Industrial and Organizational Psychology: Perspectives on Science and Practice.

Rupert, P. A., Stevanovic, P., and Hunley, H. A. (2009). Work–family conflict and burnout among practicing psychologists. *Prof. Psychol. Res. Pract.* 40, 54–61. doi: 10.1037/a0012538

Saladino, V., Algeri, D., and Auriemma, V. (2020). The psychological and social impact of Covid-19: new perspectives of well-being. *Front. Psychol.* 11:577684. doi: 10.3389/fpsyg.2020.577684

Schokkenbroek, J. M., Hardyns, W., Anrijs, S., and Ponnet, K. (2021). Partners in lockdown: relationship stress in men and women during the COVID-19 pandemic. *Couple Fam. Psychol.: Res. Pract.* 10, 149–157. doi: 10.1037/cfp0000172

Shockley, K. M., Clark, M. A., Dodd, H., and King, E. B. (2021). Work-family strategies during COVID-19: examining gender dynamics among dual-earner couples with young children. *J. Appl. Psychol.* 106, 15–28. doi: 10.1037/apl0000857

Spagnoli, P., Molino, M., Molinaro, D., Giancaspro, M. L., Manuti, A., and Ghislieri, C. (2020). Workaholism and technostress during the Covid-19 emergency: the crucial role of the leaders on remote working. *Front. Psychol.* 11:620310. doi: 10.3389/fpsyg.2020.620310

Spector, P. E., Cooper, C. L., Poelmans, S., Allen, T. D., O'Driscoll, M., Sanchez, J. I., et al. (2004). A cross-national comparative study of work-family stressors, working hours, and well-being: China and Latin America versus the Anglo world. *Pers. Psychol.* 57, 119–142. doi: 10.1111/j.1744-6570.2004.tb02486.x

Spitale, G., Biller-Andorno, N., and Germani, F. (2022). Concerns around opposition to the green pass in Italy: social listening analysis by using a mixed methods approach. *J. Med. Internet Res.* 24:e34385. doi: 10.2196/34385

Sprang, G., and Silman, M. (2013). Posttraumatic stress disorder in parents and youth after health-related disasters. *Disaster Med. Public Health Prep.* 7, 105–110. doi: 10.1017/dmp.2013.22

Stickley, A., and Koyanagi, A. (2016). Loneliness, common mental disorders and suicidal behavior: findings from a general population survey. *J. Affect. Disord.* 197, 81–87. doi: 10.1016/j.jad.2016.02.054

Sweet, S. (2012). *Work and family policy: International comparative perspectives. 1st* Edn. New York: Routledge.

Swit, C. S., and Breen, R. (2022). Parenting during a pandemic: predictors of parental burnout. *J. Fam. Issues*:0192513X2110648. doi: 10.1177/0192513X211064858

Tam, C. W. C., Pang, E. P. F., Lam, L. C. W., and Chiu, H. F. K. (2004). Severe acute respiratory syndrome (SARS) in Hong Kong in 2003: stress and psychological impact among frontline healthcare workers. *Psychol. Med.* 34, 1197–1204. doi: 10.1017/s0033291704002247

Taylor, M. R., Agho, K. E., Stevens, G. J., and Raphael, B. (2008). Factors influencing psychological distress during a disease epidemic: data from Australia's first outbreak of equine influenza. *BMC Public Health* 8, 1–13. doi: 10.1186/1471-2458-8-347

Thomas, L. T., and Ganster, D. C. (1995). Impact of family-supportive work variables on work-family conflict and strain: a control perspective. *J. Appl. Psychol.* 80, 6–15. doi: 10.1037/0021-9010.80.1.6

Thompson, C. A., Beauvais, L. L., and Lyness, K. S. (1999). When work–family benefits are not enough: the influence of work–family culture on benefit utilization, organizational attachment, and work–family conflict. *J. Vocat. Behav.* 54, 392–415. doi: 10.1006/jvbe.1998.1681

Van Bakel, H. J. A., Van Engen, M. L., and Peters, P. (2018). Validity of the parental burnout inventory among dutch employees. *Front. Psychol.* 9:697. doi: 10.3389/fpsyg.2018.00697

Van Engen, M. L., Vinkenburg, C. J., and Dikkers, J. D. (2012). Sustainability in combining career and care: challenging normative beliefs about parenting. *J. Soc. Issues* 68, 645–664. doi: 10.1111/j.1540-4560.2012.01769.x

Walters, G., and Raybould, M. (2007). Burnout and perceived organisational support among front-line hospitality employees. *J. Hosp. Tour. Manag.* 14, 144–156. doi: 10.1375/jhtm.14.2.144

Warr, P. B. (1994). A conceptual framework for the study of work and mental health. *Work Stress* 8, 84–97. doi: 10.1080/02678379408259982

Weinert, C., Maier, C., and Laumer, S. (2015). Why are teleworkers stressed? An empirical analysis of the causes of telework-enabled stress. Wirtschaftsinformatik, 1407–1421. Available at: https://fis.uni-bamberg.de/handle/uniba/39796

WHO (2022). Available at: https://covid19.who.int/region/euro/country/it (Accessed July 19, 2022).

Wilson, R. S., Krueger, K. R., Arnold, S. E., Schneider, J. A., Kelly, J. F., Barnes, L. L., et al. (2007). Loneliness and risk of Alzheimer disease. *Arch. Gen. Psychiatry* 64:234. doi: 10.1001/archpsyc.64.2.234

Wu, G., Wu, Y., Li, H., and Dan, C. (2018). Job burnout, work-family conflict and project performance for construction professionals: the moderating role of organizational support. *Int. J. Environ. Res. Public Health* 15:2869. doi: 10.3390/ijerph15122869

Yerkes, M. A., André, S. C. H., Besamusca, J. W., Kruyen, P. M., Remery, C. L. H. S., Van der Zwan, R., et al. (2020). Intelligent' lockdown, intelligent effects? Results from a survey on gender (in)equality in paid work, the division of childcare and household work, and quality of life among parents in the Netherlands during the Covid-19 lockdown. *PLoS One* 15:e0242249. doi: 10.1371/journal.pone.0242249

Zamarro, G., and Prados, M. J. (2021). Gender differences in couples' division of childcare, work and mental health during Covid-19. *Rev. Econ. Househ.* 19, 11–40. doi: 10.1007/s11150-020-09534-7

Zeng, X., Zhang, X., Chen, M., Liu, J., and Wu, C. (2020). The influence of perceived organizational support on police job burnout: a moderated mediation model. *Front. Psychol.* 11:948. doi: 10.3389/fpsyg.2020.00948

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Psychological fortitude model for digitally mindset working adults

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Introduction: The inception of Industry 4.0 (which includes smart digital technologies and intelligence), as well as the rapidly enforced adoption of the technological revolution due to the lockdown regulations during the COVID-19 pandemic, brought new situational demands, challenges and opportunities for both employees and organizations across the globe. Individuals are required to develop personal enablers (both intrapersonal and intradigital attributes) to optimize their psychological fortitude. Research on the intrapersonal resources needed by employees to have the fortitude to adapt to remote working conditions as a result of the digital era, is currently lacking. The igital era brought about the question of how individuals' career adaptability and career wellbeing (as a set of agile adaptable attributes) relate to their perceptions of the value-oriented psychological contract, and whether these intrapersonal resources can contribute to a psychological fortitude model for remote working employees.

Method: This study utilized a survey method to investigate the correlations between agile adaptable attributes and the valueoriented psychological contract of global digital-mindset human resource and financial service organizations. Based on further canonical correlations, structural equation modeling was conducted to develop and recommend a psychological fortitude model for remote working adults in the digital age.

Results: Close theoretical and empirical associations were found between career adaptability and career wellbeing (as agile adaptable variables) and the perceived value-orientated psychological contract.

Discussion: This study proposed a psychological fortitude model (consisting of intrapersonal resources) that organizations and career practitioners can use as a basis to enhance employees' psychological fortitude in the digital age, as well as for further career research.

KEYWORDS

agile adaptable attributes, career adaptability, career wellbeing, digital age, psychological fortitude, remote working, value-orientated psychological contract

Introduction

With the inception of the Fourth Industrial Revolution, increased emphasis was placed on the inquiry into positive human functioning in the fast-changing, digital workspace (Brown et al., 2017). Industry 4.0, together with the rapid changes brought about by the COVID-19 pandemic, steadily created the new normal working context,

characterized by technology, remote working and social distancing (Potgieter, 2022).

Research studies by Brown et al. (2017) pointed out that a positive psychological state is dependent on the situational context (such as the career space context as emanating from the digital era and remote working conditions). Individuals' perceptions, interpretations and cognitive appraisal of their situational demands and the resources and support available to positively cope and adapt to the challenges, changes and stressors of the work context and conditions, as well as their ability to self-manage and adapt, are significant enablers of positive human functioning (Coetzee, 2019). According to Pretorius and Padmanabhanunni (2021), sufficient adaptive cognitive appraisals about oneself, one's family, social support systems, organizational support and the immediate external environment results in fortitude. Fortitude is the psychological strength to cope amidst adversity and to maintain wellbeing (Pretorius and Padmanabhanunni, 2021). Pretorius and Padmanabhanunni (2021) also describe fortitude as a protector of personal and psychological wellbeing. Fletcher and Sakar (2016) pointed out that fortitude is different than resilience, as fortitude relate to the psychological strength to find courage during challenging times whereas resilience relate to the psychological ability to recover from misfortune or difficult times.

Psychological fortitude relates to the intrapersonal strength of an individual to face difficult situations and uncertainty, such as the challenges and obstacles posed by the digital era and the new demands and challenges of remote working. Psychological fortitude is therefore the cognitive endurance of employees to survive, thrive and cope in the digital era. An overarching premise is that psychological fortitude is a psychological state of personal development and success in uncertain, unstable and stressful organizational contexts. According to Coetzee (2019), employees who showcase positive psychological states experience higher levels of wellbeing, greater job satisfaction and engagement, and a perceived high level of job performance.

The inception of Industry 4.0 (which includes artificial intelligence and smart digital technologies), as well as the rapidly enforced adoption of the technological revolution due to the recent worldwide lockdown regulations during the COVID-19 pandemic, brought new challenges, requirements, demands and opportunities for both employees and organizations. Individuals should develop personal enablers (both intrapersonal and intradigital attributes) to optimize their psychological fortitude. Research on the intrapersonal resources needed by employees to have the fortitude to not only succeed, but to thrive in the digital era, is currently lacking.

The digital era, characterized by turbulent working conditions, the gig economy, remote working, fast changing technological innovation and globalization, contributed to the birth of the value-oriented psychological contract of the career-agile employee (Scheel and Mohr, 2013; Ghislieri et al., 2018; Coetzee, 2021; Veldsman, 2021). According to Coetzee (2021), value-oriented content refers to the expectation of an employee that the obligated organizational contributions agreed upon will meet their own personal career values and needs, will contribute to a higher and valuable organizational objective, and that the employer will provide the agreed upon value-oriented organizational support. Aderibigbe (2021) noted that the unwritten agreement between employer and employee relates to the individual's need for career meaningfulness, which will provide them with the ability to progress and evolve in their career identity and to make significant contributions or meet the expectations/requirements of the customers they serve, the larger community, as well as the environment. Singh et al. (2020) suggested that the rapid changes in the digital era required a new way of understanding the employment relationship. In addition, the workspace now also includes a younger generation (the digital natives) that has its own set of perceptions, cognitive appraisals and expectations regarding the employment relationship (Deas, 2021). Karani et al. (2021) emphasized the need for research on the nature of the psychological contract and the contributors to the employment relationship as the foundation of the psychological contract. Coetzee (2021) also reiterated that the digital era (characterized by digital relationships and communication channels) required a new understanding and innovative methods of managing the psychological contract (Table 1).

Agile adaptable employees have the ability to adapt and effectively carry out tasks amidst change, technology and uncertainty. Potgieter (2021) found career adaptability to be an essential agile adaptable dimension within the digital career space. Coetzee (2021) in turn found that career wellbeing should be considered as an essential agile adaptable dimension required for effective coping in the new normal digital world of work. The digital era raised the question of how individuals' career adaptability and career wellbeing (as a set of agile adaptable attributes) relate to their perceptions of the value-oriented psychological contract and if these intrapersonal resources can contribute to a psychological fortitude model for employees in the digital era. The general aim of this study was thus to propose a psychological fortitude model (consisting of intrapersonal resources) that organizations and career practitioners can use as a basis to enhance employees' psychological fortitude in the digital age.

Literature review

Psychological contract

The value-oriented psychological contract is based on the principles of the equity theory of Adams (1963). Deas (2021) summarized these principles as the motivation of employees by their intra-motivation to maintain a balance between, on the one side, their own agreed upon attitudinal and performance-orientated inputs and efforts that they contribute within their jobs and tasks, and on the other hand, in exchange for their input and effort, the agreed upon outcomes from the organization. This perceived input-outcome balance incorporates the assessment of the equity and fairness ratio between the psychological career value requirements (that is, the agreed upon inputs delivered) and

TABLE 1 Value-oriented psychological contract dimensions.

Employee's primary and secondary obligated inputs	The *employee's primary obligated inputs* encompass the responsibility or obligation of the employee to achieve job requirements, to provide inputs, ideas and efforts in the execution of job roles, to act ethically and honestly and to positively participate and implement creative thinking in the execution of expected tasks. The *employee's secondary obligated inputs* refer to the responsibility to work hard, be committed to task completion as well as the organization and its brand, to accomplish the organization's objectives, values, vision and mission and to consciously contribute positively to the organization's performance, objectives, culture and success.	Aderibigbe (2021); Deas (2021); Deas and Coetzee (2021)
Organization's obligated outcomes	The *organization's obligated outcomes* encompass the employee's expectations regarding what they should receive in exchange for their inputs (for example, career development support, fair and respectful treatment, work-life balance, fair remuneration and benefit packages, and challenging and meaningful work).	Rousseau (2001, 2008); De Vos et al. (2003); Isaksson et al. (2003); Coyle-Shapiro and Conway (2005); Freese et al. (2008); Schwieger and Ladwig (2018); Deas and Coetzee (2021).
Employee's obligated inputs delivered	The employee's obligated inputs delivered include an equity check point that contributes towards the perceived fit between the person and the environment (or misfit). A perceived misfit may result in either a renegotiation of the employment relationship or a resignation to search for a better fit elsewhere.	Darrow and Behrend (2017); Jiang (2017); Deas and Coetzee (2021); Ferreira et al. (2022); Guan et al. (2021).
Employer's obligated psychological contract fulfilment	The employer's obligated psychological contract fulfilment also entails an equity checkpoint towards the fulfilment of the expected or obligated employment relationship. A perceived misfit may result in renegotiation of the person-environment fit, or in searching for a better fit elsewhere.	Luthans (2011); Darrow and Behrend (2017); Jiang (2017); Deas and Coetzee (2021); Ferreira et al. (2022); Guan et al. (2021).

the expected agreed upon organizational outcomes (Deas and Coetzee, 2021; Guan et al., 2021). Bal and Vink (2011) found that if the perception is present that a fair input-outcome is being achieved, and if employees believe that there is a balance between their personal goals, motives and values (Payne et al., 2008), a positive psychological contract appraisal, high job satisfaction and affective organizational commitment will be reached. Coetzee (2021) found that a positive perception regarding the value-oriented psychological contract results in creative thinking, enhanced organizational performance, enhanced employee performance, positive attitudes, positive participation in group tasks and teamwork, enhanced organizational commitment and loyalty towards the brand and mission of the organization. Veldsman (2021) confirmed that the contemporary psychological contract relies on a brief, short-term, equitable and transactional exchange of obligated or agreed upon employee-employer value matching. Deas (2021) developed four psychological-contract-orientated dimensions, which include (1) *"employee primary and secondary obligated inputs,"* (2) *"organisational obligated outcomes,"* (3) *"employee obligated inputs delivered,"* and (4) *"employer obligated psychological contract fulfilment."*

No research has been found to date on the contributors to the value-oriented psychological contract, specifically in the digital new-normal career space (which entails, to a large degree, employees working remotely).

Numerous studies were found explaining the correlation between the psychological contract and organizational commitment (McDonald and Makin, 2000; Lub et al., 2012), as well as between career adaptability and organizational commitment (Ferreira and Coetzee, 2013; Coetzee et al., 2017; Jabaar, 2017; Ferreira, 2019). However, to date, no research has been found on the influence of career adaptability on the value-oriented psychological contract.

Career adaptability

The new world of work and fast changing digital era is characterized by frequent change and transitions between jobs, organizations and careers, which necessitate more agile and flexible adaptation on the part of employees (Rudolph et al., 2017). The ability to adapt and demonstrate that one can adjust is essential to effectively deal with the digital era's extraordinary social, economic and technological changes that are reshaping the world of work (Johnston, 2018; Lent, 2018). Martin et al. (2019, p. 566) define career adaptability as "the skill to constructively regulate psycho-behavioral functions in response to new, changing, and/or uncertain circumstances, conditions and situations." Career adaptability is defined as intrapersonal psychological capacities, functions and resources during the career management process. According to Hirschi (2018), these psychological capacities facilitate proactive adaption and successful alignment with the fast-changing digital world of work (Table 2).

Individuals with high levels of career adaptability experience more positive emotional dispositions (Johnston, 2018), can adapt to technological innovation and positively participate in agile learning and career navigation (Potgieter et al., 2021). Career adaptability connects the individual's willingness and ability to adapt to changing career situations, such as the

TABLE 2 Dimensions of career adaptability.

Career concern	Career-related cognitive anticipation and preparation to respond to the demands, challenges and changes of the future job requirement and work environment.	Savickas and Porfeli (2012); Savickas (2013); Rudolph et al. (2017); Ginevra et al. (2018); Kirdok and Bolukbaşi (2018)
Career control	The degree of accountability that an individual accepts for their career future. Career control also includes the adoption of self-regulation strategies to adjust to the requirements of various settings.	Savickas and Porfeli (2012); Savickas (2013); Oncel (2014); Coetzee and Stoltz (2015); Rudolph et al. (2017); Ginevra et al. (2018)
Career curiosity	Curiosity is the intrinsic motivation to explore possible future selves and associated career possibilities and options.	Savickas and Porfeli (2012); Savickas (2013); Rudolph et al. (2017); Ginevra et al. (2018)
Career confidence	Alludes to the belief and having confidence in one's own capability to achieve career goals amidst uncertain and unstable career conditions.	Savickas and Porfeli (2012); Savickas (2013); Rudolph et al. (2017); Ginevra et al. (2018)

fast-changing digital requirements in the world of work (Hirschi et al., 2015).

From the literature, it is assumed that career adaptability will theoretically contribute to the value-orientated psychological contract.

Numerous studies were found on the correlation between wellbeing and the psychological contract (Bester, 2019; Duran et al., 2019; Collins and Beauregard, 2020), as well as wellbeing and employability (Coetzee and Engelbrecht, 2019), job satisfaction (Engelbrecht, 2019), organizational commitment (McInerney et al., 2015; Ferreira, 2019) and adaptability (Ferreira, 2019). However, to date, no research has been found on the influence of career wellbeing on the value-oriented psychological contract in the digital era.

Career wellbeing

The digital era also significantly influenced the career wellbeing of employees (Loveder, 2017; Potgieter, 2019). Career wellbeing is an intrapersonal positive psychological capacity that reflects an employee's long-term satisfaction with the outcomes, achievements, success and changes of their career within the challenges, rapid changes and complexities of the working context (Bester et al., 2019).

According to Coetzee et al. (2021), career wellbeing is a multidimensional construct which includes the facets of positive career affect, career networking/social support and career meaningfulness. Table 3 defines the facets of career wellbeing.

From the literature, it is assumed that wellbeing will theoretically contribute to the value-orientated psychological contract.

Materials and methods

Participants

The sample in this study ($N = 293$) consisted of national and international digital-oriented financial service and human resource management organizations. These organizations were predominantly located in South Africa (70%), while the rest of the sample organizations were based in Zimbabwe (15%) and in Europe (15%). The sample was almost equally represented by gender (men 54% and woman 46%). The majority of the sample belonged to the Black race groups (African/Indian/Asian/Colored: 63%), while 37% of the participants belonged to the white race groups.

Instruments

The career adaptability scale (Savickas and Porfeli, 2012), a 23-item scale, was used to measure the dimensions of career adaptability, which includes *career concern* (6 items, e.g., "Realizing that today's choices shape my future"); *career control* (6 items, e.g., "Making decisions by myself"); *career curiosity* (6 items, e.g., "Exploring my surroundings"), and *career confidence* (5 items, e.g., "Solving problems"). The respondents had to rate each item on a seven-point Likert-type scale, where 1 represented "strongly disagree" and 7 represented "strongly agree." Several previous studies have confirmed the construct validity of this instrument (Savickas and Porfeli, 2012). Ndlovu and Ferreira (2019) reported internal consistency reliabilities ranging from 0.57 (concern) to 0.87 (overall adaptability).

The *career well-being scale* (Coetzee et al., 2021), a 14-item scale, was used to measure the three facets of career well-being. The scale measures three states of career well-being: the *affective career state* (6 items, e.g., "I feel supported in achieving my career goals"); the *career networking/social support state* (4 items, e.g., "I have a feedback community that helps me stay in touch with my personal strengths and areas for enrichment"); and the *state of career meaningfulness* (4 items, e.g., "My career is interesting and makes me excited"). The items were rated on a seven-point Likert-type scale, where 1 represented "strongly disagree" and 7 represented "strongly agree." Initial research reported construct validity, as well as acceptable internal consistency reliability of the career well-being scale (Coetzee et al., 2021). The Cronbach alphas obtained for the subscales were 0.86 (affective career state), 0.85 (career networking/social support state) and 0.87 (career meaningfulness).

The *psychological contract inputs-outcomes inventory* (PCIOI; Deas and Coetzee, 2021), a multi-level 46-item scale, measures 4 dimensions of employees' value-oriented psychological contract

TABLE 3 Facets of career wellbeing.

Positive career affect	Relates to positive emotions consequent to psychological states. Individuals with positive career affect mostly feel satisfied with the given conditions to achieve their career goals.	Tugade et al. (2004); Engelbrecht (2019); Potgieter et al. (2021)
Career networking / social support	Refers to the perceptions of an individual that they have a network of people who support their career goals and that this support network can easily be approached to assist in achieving their career goals. Individuals with a sound career network / social support believe that feedback from the social support network may enhance their strengths.	Reich et al. (2010); Potgieter (2019); Ferreira (2021); Potgieter (2021); Potgieter et al. (2021).
Career meaningfulness	Alludes to the belief that one's career has meaning and that being involved in this career is a matter of personal choice. Individuals who experience career meaningfulness, see their career as worthwhile and valuable and believe that their careers contribute to the bigger picture and enhance lives. Believing that one's career has meaning creates optimism about the future and provides motivation to cope with stressful working conditions.	Allan et al. (2020); Coetzee et al. (2021), Potgieter et al. (2021)

perceptions. The dimension of *employee inputs* measures perceptions about primary job performance responsibilities and secondary attitudinal responsibilities (12 items, e.g., "I feel obligated to meet performance requirements" and "I feel obligated to fulfil the organization's vision, mission and its brand"). The dimension of *organizational outcomes* (29 items) measures the expectation employees have of their organization. This expectation includes facets of culture (e.g., "I expect clear goals and job role expectations"), career development opportunities (e.g., "I expect to receive learning/coaching/mentoring on the job"), rewards (e.g., "I expect a fair compensation structure"), relationships (e.g., "I expect mutual respect between colleagues"), work-life balance (e.g., "I expect the flexibility in terms of where and when I do my job"), and job characteristics (e.g., "I expect innovative work challenges").

The third dimension of the PCIOI measures the perception that the employee has regarding the fulfilment of the psychological contract, in delivering on expectations. This dimension is measured in 5 items (e.g., "I feel as a whole the organization has fulfilled my expectations"). The final dimension is a self-reflective checkpoint for employees, where they reflect on whether they feel that they have *delivered on their primary and input obligations* toward the organization (2 items, e.g., "I feel I delivered on the secondary employee inputs"). The items were rated on a 5-point Likert-type scale (1 = not at all; 5 = to a great extent). Construct validity and the internal consistency reliability of the scale were confirmed by Deas and Coetzee (2021).

Procedure

The professional social media platform LinkedIn was used to gather the data. The message functionality of LinkedIn was used to send out a hyperlink which contained the survey to the researcher's professional network on LinkedIn. Participants were invited to voluntarily participate and anonymously complete an online survey *via* the electronic link. A total of $N = 293$ respondents provided informed consent and participated in the study. No missing values were found in the data set and the data were analyzed using the SPSS (Version 27) statistical program.

Ethical considerations

Ethical clearance to conduct the research was obtained from the University of South Africa (ERC Ref#: 2020_CEMS/IOP_014).

Data analysis

Bivariate correlation analysis was performed to determine the existence of associations between the career adaptability, career wellbeing and value-oriented psychological contract dimensions. Canonical correlation analysis was performed to determine the strength of the overall variance shared between agile adaptable canonical variate (career wellbeing and career adaptability) as the independent variable and value-orientated psychological contract dimension (dependent variable). The structural model fit between the agile adaptable canonical variate and the value-orientated psychological contract dimensions was measured using SEM (structural equation modeling) with the maximum-likelihood (ML) estimation method. The root mean square error of approximation (RMSEA), chi-square test and the standardized mean square residual (SRMR) were used to assess the goodness-of-fit statistics.

The comparative fit index (CFI) and Tucker–Lewis index (TLI) as goodness-of-fit indices were also used to evaluate the model fit. When the CFI and TLI values are equal to or higher than 0.9, the RMSEA is equal to or lower than 0.08 and the SRMR is equal to or lower than 0.05, the model can usually be accepted as a good fit (Garson, 2008).

Results

Descriptive statistics and correlations

Table 4 reports the descriptive statistics obtained (means, standard deviations, internal consistency, reliabilities), as well as the correlations between the study variables. The career wellbeing variables had a positive and significant relationship with the career adaptability variables ($r \geq 0.24 \leq 0.70$; small to large

TABLE 4 Descriptive statistics and bi-variate correlations.

	Variable	α	CR	Mean (SD)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Positive affect	0.91	0.93	5.12 (1.24)	–																
2	Network/social support	0.82	0.88	5.07 (1.21)	0.66***	–															
3	Meaningfulness	0.89	0.91	5.84 (1.07)	0.70***	0.55***	–														
4	Concern	0.86	0.87	3.95 (0.74)	0.36***	0.36***	0.32***	–													
5	Control	0.79	0.81	3.92 (0.70)	0.30***	0.28***	0.32***	0.52***	–												
6	Curiosity	0.85	0.87	3.95 (0.69)	0.26***	0.32***	0.34***	0.59***	0.51***	–											
7	Confidence	0.89	0.90	4.16 (0.66)	0.27***	0.24***	0.35***	0.49***	0.57***	0.60***	–										
8	Employee's primary inputs	0.84	0.87	4.45 (0.63)	0.25***	0.20	0.25***	0.35***	0.27***	0.35***	0.41***	–									
9	Employee's secondary inputs	0.89	0.93	4.20 (0.79)	0.32***	0.23***	0.39***	0.24***	0.26***	0.30***	0.30***	0.62***	–								
10	Organizational outcome: Career development opportunities	0.88	0.88	4.14 (0.89)	0.15**	0.11	0.11	0.25***	0.14*	0.20***	0.15**	0.21***	0.23***	–							
11	Organizational outcome: Organizational culture	0.71	0.77	4.08 (0.85)	0.33 ***	0.29***	0.30***	0.34***	0.27***	0.40***	0.25***	0.30***	0.44***	0.39***	–						
12	Organizational outcome: Relationships	0.85	0.86	4.45 (0.63)	0.12 *	0.09*	0.16**	0.20***	0.19**	0.16**	0.16**	0.21***	0.22***	0.43***	0.49***	–					
13	Organizational outcome: Job characteristics	0.80	0.82	4.43 (0.60)	0.17 **	0.19***	0.29***	0.23***	0.27***	0.35***	0.33***	0.30***	0.30***	0.35***	0.57***	0.56***	–				
14	Organizational outcome: Rewards	0.83	0.84	4.23 (0.81)	0.09	0.06	0.04	0.21***	0.16*	0.20***	0.14*	0.17**	0.11	0.50***	0.37***	0.37***	0.29***	–			
15	Organizational outcome: Work-life balance	0.87	0.88	4.08 (0.82)	0.18**	0.22***	0.13*	0.09	0.09	0.15**	0.10	0.17**	0.07	0.16**	0.29***	0.30***	0.39***	0.17**	–		
16	Psychological contract fulfilment	0.92	0.93	3.45 (1.00)	0.68***	0.54***	0.48***	0.20***	0.23***	0.18**	0.16**	0.23***	0.34***	0.04	0.26***	0.04	0.13 *	0.06	0.18**	–	
17	Employee inputs delivered	0.87	0.89	4.17 (0.77)	0.27***	0.28***	0.36***	0.22***	0.27***	0.28***	0.34***	0.48***	0.45***	0.18**	0.44***	0.33***	0.38***	0.07	0.18***	0.27***	–

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

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practical effect; $p \leq 0.001$). Except for the organizational outcomes of career development and rewards, the career wellbeing variables significantly and positively correlated with most of the value-oriented psychological contract dimensions ($r \geq 0.12 \leq 0.68$; small to medium practical effect; $p \leq 0.05$). Except for the organizational outcome of work-life balance, career adaptability correlated positively and significantly with all the value-orientated psychological contract dimensions ($r \geq 0.14 \leq 0.41$; small to medium practical effect; $p \leq 0.05$). The zero-order correlations were all found to be below the level of concern for multicollinearity ($r \geq 0.80$). The correlation results prompted an interest to conduct further canonical correlation analyses to assess the ability of agile adaptable attributes (career adaptability and career wellbeing) to predict the value-orientated psychological contract.

Canonical correlations

From the canonical correlation analysis, seven canonical functions for the model were derived. Wilk's lambda was used to assess the null hypothesis that the canonical correlation coefficients for all functions would be zero. For this model, three (out of the seven) canonical functions were found to be significant ($p < 0.01$). A Wilk's lambda (λ) of 0.283, $F(63, 1{,}549{,}29) = 6{,}174$, and $p < 0.001$ were obtained, indicating that the full canonical model was statistically significant across the seven functions. These results indicate that there is a significant and positive association between agile adaptable canonical variates and the psychological contract. The magnitude of the relationship (yielded by $1 - \lambda$: 1–0.28) was 0.72 (large practical effect; Fp < 0.001), which indicates that the full model explained a considerable percentage (72%) of the variance shared between the two sets of variables. Refer to Table 5.

The canonical correlation for the first function was 0.73, and this function contributed 53.1% (Rc^2; large practical effect) of the explained variance relative to the seven functions. The second and third canonical function (Rc = 0.49 and Rc = 0.37, respectively) explained only a further 24.2% and 13.5% of the variance shared between the two canonical variate sets. The first function was therefore considered practically appropriate for understanding the links between the two sets of variables. From Table 5, it is evident that career wellbeing variates (positive affect, career meaningfulness, and networking/social support) had the most significant predictive ability with regard to the psychological contract variable ($Rc^2 \leq 0.28 \geq 0.49$).

Structural equation model

Using the canonical correlation results and to further test the overall structural model fit, structural equation modeling was performed. The fit statistics showed that the tested model fits the data satisfactorily and that the model can be accepted: Chi (19) = 3.06, RMSEA = 0.070, SRMR = 0.21, CFI = 0.81, TLI = 0.80. The goodness-of-fit statistics confirmed the agile adaptable attribute as a significant predictor of the value-oriented psychological contract construct (0.63; $p = 0.000$).

Based on the goodness-of-fit model, Figure 1 illustrates the psychological fortitude model recommended for digitally orientated working adults in the digital age.

Discussion

For organizations to perform optimally, thrive, maintain and increase competitive advantages and adapt to the continuously changing digital world of work, they need employees with considerable psychological fortitude. Organizations should determine what elements contribute toward the psychological fortitude of employees. The central hypothesis of this study was that the agile adaptable construct variables (career wellbeing and career adaptability) would have a direct relationship with the perceived value-orientated psychological contract. Based on the empirical results of this study, a psychological fortitude model for digitally orientated working adults in the digital age is recommended.

The findings of this study seem to reveal close theoretical and empirical associations between career adaptability and career wellbeing (as agile adaptable variables) and the perceived value-orientated psychological contract. The aim of this study was to provide a psychological fortitude model that organizations and career practitioners can use as a basis to enhance employees' psychological fortitude, and for further career research and career practices.

When individuals are satisfied with the primary (such as task requirements) and secondary (such as working attitude) inputs they deliver to the organization, they will show greater career adaptability (concern, control, curiosity and confidence) and career wellbeing (positive affect, social support/networking, and career meaningfulness). This confirms the theoretical assumption made that individuals with high subjective career satisfaction related to the perception of the value of their contribution to the organization and objectives of the organization experience greater wellbeing (Bester and Bester, 2021) and display greater adaptability (Potgieter, 2021).

Individuals who experience greater career wellbeing are typically satisfied with what they receive back from the organization in return for the services they deliver (although the results showed that career wellbeing did not significantly correlate with the organizational outcome of rewards). This finding contradicts the finding of Chinyamurindi (2019), who found that remuneration influences the wellbeing of employees. Othman et al. (2019) also found that rewards such as salary and promotion have a significant influence on the career satisfaction of employees. Refining the research is therefore necessary in order to differentiate between the types of rewards (intrinsic or extrinsic) that may influence the wellbeing of individuals.

TABLE 5 Standardized canonical correlation analysis.

Variate	Variables	Standardized canonical coefficients (canonical weights)	Structure coefficient (canonical loading, Rc)	Canonical cross-loading (Rc)	Squared multiple correlations (Rc^2)
Agile adaptable attributes (canonical variate)	Concern	0.08	−0.42	−0.30	0.09
	Control	−0.09	−0.41	−0.30	0.09
	Curiosity	−0.14	−0.42	−0.30	0.09
	Confidence	−0.01	−0.36	−0.26	0.07
	Positive affect	−0.77	−0.97	−0.70	0.49
	Meaningfulness	−0.01	−0.73	−0.53	0.28
	Networking/social support	−0.25	−0.79	−0.57	0.33
Psychological contract (canonical variate)	Employee's primary inputs	−0.08	−0.39	−0.28	0.08
	Employee's secondary inputs	0.01	−0.48	−0.35	0.12
	Employee's inputs delivered	−0.09	−0.45	-0.32	0.10
	Organizational outcome: Relationships	0.04	−0.19	−0.14	0.02
	Organizational outcome: Career development opportunities	−0.10	−0.22	−0.16	0.03
	Organizational outcome: Rewards	0.05	−0.15	−0.11	0.01
	Organizational outcome: Work-life balance	−0.06	−0.30	−0.22	0.05
	Organizational outcome: Job characteristics	0.00	−0.32	−0.23	0.05
	Organizational outcome: Organizational culture	−0.24	−0.52	−0.38	0.14
	Organizational outcome: Psychological contract fulfilment	−0.83	−0.94	−0.68	0.47
Overall model fit measure (function 1):					
Chi-square (70) = 5.692; $p < 0.001$; $r = 0.726$					

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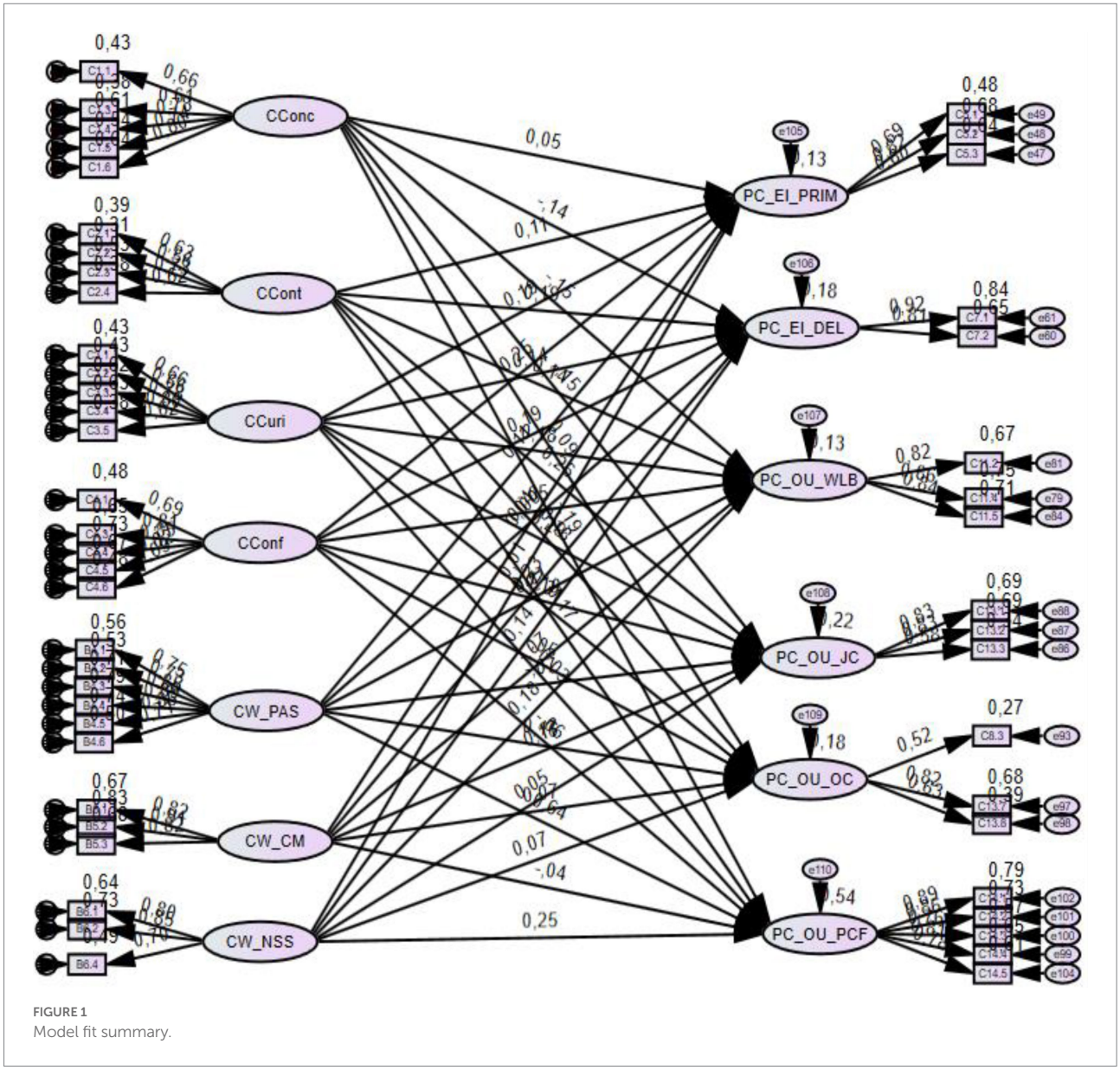

FIGURE 1
Model fit summary.

It was found that highly adaptable employees are satisfied with the organizational outcomes received from the organization in return for their services (although no correlation was found between career adaptability and work-life balance). It is thus evident from the empirical results that the agile adaptable construct variables significantly and positively influence the perceived value-orientated psychological construct variable.

Figure 2 provides an overview of the empirically manifested psychological fortitude model. This profile may be implemented when developing career management practices and interventions for enhancing the psychological fortitude of working adults in the digital era. Enhanced psychological fortitude contribute to success on both an individual and organizational level.

Individuals who do not experience positive relationships at work (positive perceptions about their psychological contract), may break their psychological contract in the career space and search for more meaningful and satisfying, value-orientated work somewhere else. For employees to have a sound psychological contract and thus great psychological fortitude, organizations and career practitioners should implement interventions to enhance the personal enablers of agile adaptable variables. Interventions should include strategies for enhancing career wellbeing and career adaptability. Such interventions may include creating a conducive environment and positive culture to enhance positive career affect, creating platforms to engage in supportive relationships with colleagues, as well as providing meaningful work and job tasks to employees. Interventions should further include strategies to enhance employees' perception of their career control and their confidence in their career prospects and future, and to awaken career curiosity and career concern. Should employees thus acquire agile adaptable attributes (that is great career adaptability and career wellbeing), they will have positive

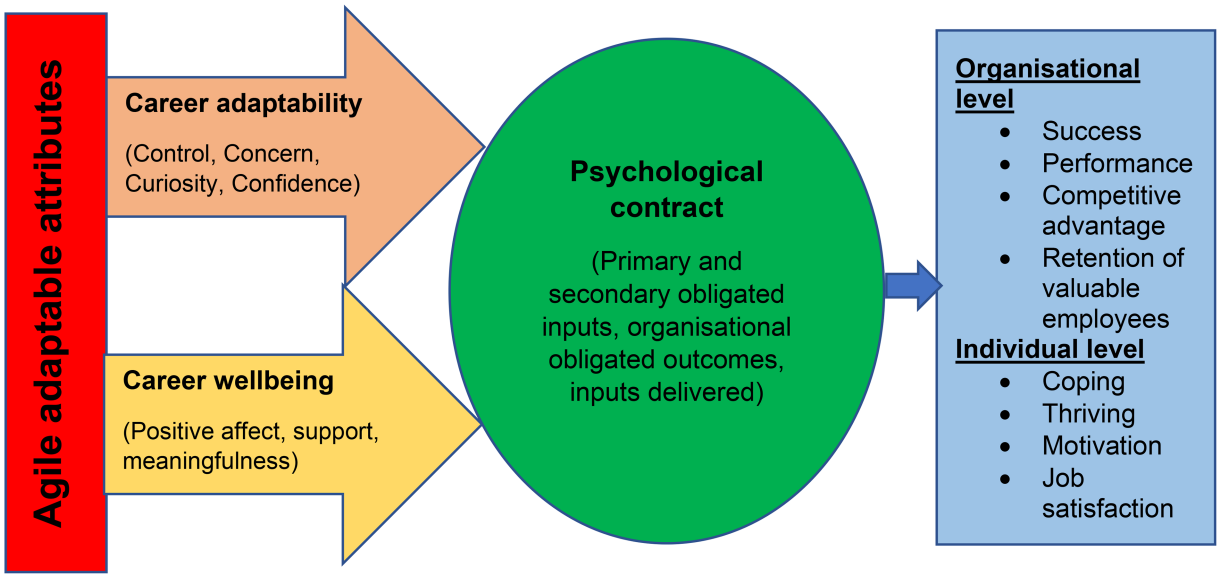

FIGURE 2
Psychological fortitude model for digitally mindset working adults.

perceptions about their value-orientated psychological contract with their employer. Good appraisals about the value-orientated psychological contract will create and enhance employees' psychological fortitude to survive and thrive within the digital career space.

Conclusion

The results of this study provide empirical evidence that career adaptability and career wellbeing are important attributes in understanding and enhancing the value-oriented psychological contract. The study emphasizes the need to understand the effect of the intrapersonal agile adaptable capabilities/value-oriented psychological contract link. Such understanding may result in and contribute to the psychological fortitude of digitally-oriented working adults. Our anticipation is that the study will inspire future research, especially on the influence of psychological attributes on the value-oriented psychological contract in the digital workspace and new-normal working context.

Limitations

The study used a cross-sectional research design in collecting the data. Future studies could adopt a longitudinal research design to investigate agile adaptable attributes in relation to the value-oriented psychological contract. In addition, this study was limited to the financial services and human resource management industry. Replication studies should be conducted across a wider industry range and larger samples should be used.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by University of South Africa (ERC Ref#: 2020_CEMS/IOP_014). The patients/participants provided their written informed consent to participate in this study.

Author contributions

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

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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References

Adams, J. S. (1963). Toward an understanding of inequity. *J. Abnorm. Soc. Psychol.* 67, 422–436. doi: 10.1037/h0040968

Aderibigbe, J. K. (2021). "Psychological capital: the antidote for the consequences of organisational citizenship behaviour in industry 4.0 workplace," in *Agile Coping in the Digital Workplace: Emerging Issues for Research and Practice*. eds. N. Ferreira, I. L. Potgieter and M. Coetzee (Switzerland: Springer). isbn:978-3-030-70227-4

Allan, B. A., Rolniak, J. R., and Bouchard, L. (2020). Underemployment and wellbeing: exploring the dark side of meaningful work. *J. Career Dev.* 47, 111–125. https://10.1177/0894845318819861. doi: 10.1177/0894845318819861

Bal, P. M., and Vink, R. (2011). Ideological currency in psychological contracts: the role of team relationships in a reciprocity perspective. *Int. J. Hum. Resour. Manag.* 22, 2794–2817. doi: 10.1080/09585192.2011.560869

Bester, M. (2019). "Organisational conditions for flourishing in virtual teams," in *Thriving in Digital Workspaces: Emerging issues for research and practice*. ed. M. Coetzee (Switzerland: Springer). isbn:978-3-030-24462-0

Bester, M. S., and Bester, L. M. (2021). "Coping strategies for a collarless workforce: an employee experience guide," in *Agile Coping: Emerging Issues for Research and Practice*. eds. N. Ferreira and M. Coetzee (Switzerland: Springer). isbn:978-3-030-70227-4

Bester, M., Coetzee, M., Ferreira, N., and Potgieter, I. L. (2019). "Conceptualisation of future-fit career Wellbeing," *Pretoria, South Africa*. eds. N. Ferreira and M. Coetzee (Potgieter, IL: University of South Africa).

Brown, D. J., Arnold, R., Fletcher, D., and Standage, M. (2017). Human thriving: a conceptual debate and literature review. *Eur. Psychol.* 22, 167–179. doi: 10.1027/1016-9040/a000294

Chinyamurindi, W. T. (2019). "Framing career wellbeing amongst expatriate workers: a narrative analysis," in *Theory, Research and Dynamics of Career Wellbeing*. eds. I. Potgieter, N. Ferreira and M. Coetzee (Cham, Switzerland: Springer)

Coetzee, M. (ed.) (2019). "Organisational climate conditions of psychological safety as thriving mechanisms in digital workspaces," in *Thriving in Digital Workspaces: Emerging Issues for Research and Practice*. ed. M. Coetzee (Springer Nature: Cham, Switzerland)

Coetzee, M. (2021). "When protean career values intertwine with employee-employer obligations: exploring the implications of digital era work mindsets for modern psychological contract practices," in *Redefining the Psychological Contract in the Digital Era: Issues for Research and Practice*. eds. M. Coetzee and A. Deas (Cham, Switzerland: Springer Nature)

Coetzee, M., and Engelbrecht, L. (2019). How employability attributes mediate the link between knowledge workers' career adaptation concerns and their self-perceived employability. *Psychol. Rep.* 123, 1005–1026. doi: 10.1177%2F0033294119844981

Coetzee, M., Ferreira, N., and Potgieter, I. L. (2021). Exploring the construct validity of the career wellbeing scale for its application as a career development tool in the COVID-19 pandemic career space. *Afr. J. Career Dev.* 3:a39. doi: 10.4102/ajcd.V3i1.39

Coetzee, M., Ferreira, N., and Shunmugum, C. (2017). Psychological career resources, career adaptability and work engagement of generational cohorts in the media industry. *S. Afr. J. Hum. Resour. Manag.* 1:a868. doi: 10.4102/sajhrm.v15i0.868

Coetzee, M., and Stoltz, E. (2015). Employees' satisfaction with retention factors: exploring the role of career adaptability. *J. Vocat. Behav.* 89, 83–91. doi: 10.1016/j.jvb.2015.04.012

Collins, A., and Beauregard, A. (2020). The effect of breaches of the psychological contract on the job satisfaction and wellbeing of doctors in Ireland: a quantitative study. *Hum. Resour. Health* 18:art 89. doi: 10.1186/s12960-020-00534-3

Coyle-Shapiro, J. A. M., and Conway, N. (2005). *Psychological Contract Measure* [database record]. APA PsycTests.

Darrow, J. B., and Behrend, T. S. (2017). Person-environment fit is a formative construct. *J. Vocat. Behav.* 103, 117–131. doi: 10.1016/j.jvb.2017.08.007

De Vos, A., Bruyens, D., and Schalk, R. (2003). Psychological contract development during organisational socialisation: adaptation to reality and the role of reciprocity. *J. Organ. Behav.* 24, 537–559. doi: 10.1002/job.205

Deas, A. (2021). "Psychological contract of digital natives: are we measuring what they expect?" in *Redefining the Psychological Contract in the Digital Era: Issues for Research and Practice*. eds. M. Coetzee and A. Deas (Cham, Switzerland: Springer Nature), 297–313.

Deas, A., and Coetzee, M. (2021). A psychological contract for the digital mindset: factor analysis of the psychological contract inputs-outcomes inventory (PCIOI). *J. Psychol. Afr.* 32, 379–388. doi: 10.1080/14330237.2022.2066359

Duran, F., Woodhams, J., and Bishopp, D. (2019). An interview study of the experiences of police officers in regard to psychological contract and wellbeing. *J. Police Crim. Psychol.* 34, 184–198. doi: 10.1007/s11896-018-9275-z

Engelbrecht, L. (2019). "Facilitating career wellbeing: exploring a career satisfaction and employability profile of knowledge workers," in *Theory, Research and Dynamics of Career Wellbeing*. eds. I. Potgieter, N. Ferreira and M. Coetzee (Cham, Switzerland: Springer). isbn:978-3-030-28180-9

Ferreira, N. (2019). "Enhancing career wellbeing: the role of workplace friendship, career adaptability and organisational commitment," in *Theory, Research and Dynamics of Career Wellbeing*. eds. I. Potgieter, N. Ferreira and M. Coetzee (Cham, Switzerland: Springer)

Ferreira, N. (2021). "Positive coping skills, thriving and social connectedness: are there generational differences in the digital workplace," in *Agile Coping Dynamics: Emerging Issues for Research and Practice* (Springer). isbn:978-3-030-70227-4

Ferreira, N., and Coetzee, M. (2013). Exploring black employees' job embeddedness and organisational commitment. *South. Afr. Bus. Rev.* 17, 239–255.

Ferreira, N., Coetzee, M., and Potgieter, I. L. (2022). Validity of the career embeddedness scale as predictor of affective commitment. *S. Afr. J. Indus. Psychol.* 48. doi: 10.4102/sajip.v48i0.1956. [Epub ahead of print]

Fletcher, D., and Sakar, M. (2016). Mental fortitude training: an evidence-based approach to developing psychological resilience for sustained success. *J. Sport Psychol.* 7, 135–157. doi: 10.1080/21520704.2016.1255496

Freese, C., Schalk, R., and Croon, M. (2008). The Tilburg psychological contract questionnaire. *Gedrag en Organisatie* 21, 278–294. doi: 10.5117/2008.021.003.004

Garson, G. (2008). Structural equation modeling: Statnotes, PA765. Available at: http://faculty.chass.ncsu.edu/garson/PA765/17ounselli.html (Accessed February 8, 2012).

Ghislieri, C., Molino, M., and Cortese, C. G. (2018). Work and organisational psychology looks at the fourth industrial revolution: how to support workers and organisations? *Front. Psychol.* 9. doi: 10.3389/fpsyg.2018.02365 [Epub ahead of print]

Ginevra, M. C., Annovazzi, C., Santilli, S., Maggio, I. D., and Camussi, E. (2018). Breadth of vocational interests: the role of career adaptability and future counselling. *Career Dev. Q.* 66, 233–245. doi: 10.1002/cdq.12145

Guan, Y., Deng, H., Fan, L., and Zhou, X. (2021). Theorizing person-environment fit in a changing career world: interdisciplinary integration and future directions. *J. Vocat. Behav.* 126:art 103557. doi: 10.1016/j/jvb.2021.103557

Hirschi, A. (2018). The fourth industrial revolution: issues and implications for career research and practice. *Career Dev. Q.* 66, 192–204. doi: 10.1002/cdq.12142

Hirschi, A., Herrmann, A., and Keller, A. C. (2015). Career adaptivity, adaptability, and adapting: a conceptual and empirical investigation. *J. Vocat. Behav.* 87, 1–10. doi: 10.1016/j.jvb.2014.11.008 0001-8791

Isaksson, K., Bernhard, C., Peiró, J. M, Caballer, A., Gracia, F., and Ramos, J. (2003). Psychological contracts across employment situations (PSYCONES). Results from the pilot study (Research report No 2.2). Switzerland: OUP Oxford. Available at: www.uv.es/~psycon.

Jabaar, R. (2017). The relationship between organizational commitment, career adaptability and retention factors within the retail sector in the Western cape. Unpublished Master's dissertation. Pretoria, South Africa: University of South Africa.

Jiang, Z. (2017). Social support and career psychological states: an integrative model of person-environment fit. *J. Career Assess.* 25, 219–237. doi: 10.1177/1069072715621019

Johnston, C. S. (2018). A systematic review of the career adaptability literature and future outlook. *J. Career Assess.* 26, 3–30. doi: 10.1177/1069072716679921

Karani, A., Trivedi, P., and Thanki, H. (2021). Psychological contract and work outcomes during Covid-19 pandemic. *J. Organ. Effectiveness People Performance* 9, 149–168. doi: 10.1108/JOEPP-09-2020-0186

Kirdok, O., and Bolukbaşi, A. (2018). The role of senior university students' career adaptability in predicting their subjective well-being. *J. Educ. Train. Stud.* 6, 47–54. doi: 10.11114/jets.v6i5.3010

Lent, R. W. (2018). Future of work in the digital world: preparing for instability and opportunity. *Career Dev. Q.* 66, 205–219. doi: 10.1002/cdq.12143

Loveder, P. (2017). *Australian Apprenticeships: Trends, Challenges and Future Opportunities for Dealing with Industry 4.0*. Leabrook, Australia: National Centre for Vocational Education Research (NCVER).

Lub, X., Bijvank, M. N., Bal, P. M., Blomme, R., and Schalk, R. (2012). Different or alike? Exploring the psychological contract and commitment of different generations of hospitality workers. *Int. J. Contemp. Hosp. Manag.* 24, 553–573. doi: 10.1108/09596111211226824

Luthans, F. (2011). *Organizational Behaviour: An Evidence-Based Approach*. New York, NY: McGraw-Hill.

Martin, A. J., Strnadova, I., Nemec, Z., Hajkova, V., and Kvetonova, L. (2019). Teacher assistants working with students with disability: the role of adaptability in enchanging their workplace wellbeing. *Int. J. Incl. Educ.* 25, 565–587. doi: 10.1080/13603116.2018.1563646

McDonald, D. J., and Makin, P. J. (2000). The psychological contract, organisational commitment and job satisfaction of temporary staff. *Leadersh. Organ. Dev. J.* 21, 84–91. doi: 10.1108/01437730010318174

McInerney, D. M., Ganotice, F. A., King, R. B., Morin, A. J. S., and Marsh, H. W. (2015). Teachers' commitment and psychological well-being: implications of self-beliefs for teaching in Hong Kong. *Educ. Psychol.* 35, 926–945. doi: 10.1080/01443410.2014.895801

Ndlovu, F., and Ferreira, N. (2019). Students' psychological hardiness in relation to career adaptability. *J. Psychol. Afr.* 29, 598–604. doi: 10.1080/14330237.2019.1689468

Oncel, L. (2014). Career adapt-abilities scale: convergent validity of subscale scores. *J. Vocat. Behav.* 85, 13–17. doi: 10.1016/j.jvb.2014.03.006

Othman, A. K., Mustafa, H. N., Hamzah, M. I., and Abdullah, M. Z. (2019). The influence of flexible work arrangement and remuneration on employees' job satisfaction in private higher education institutions. *Adv. Bus. Res. Int. J.* 5, 71–82. doi: 10.24191/abrij.v5i1.9984

Payne, S. C., Culbertson, S. S., Boswell, W. R., and Barger, E. J. (2008). Newcomer psychological contracts and employee socialisation activities: does perceived balance in obligations matter? *J. Vocat. Behav.* 73, 465–472. doi: 10.1016/j.vb.2008.09.003

Potgieter, I. L. (2019). "Workplace friendship and career wellbeing: the influencing role of mood, health and biographical variables," in *Theory, Research and Dynamics of Career Wellbeing*. eds. I. Potgieter, N. Ferreira and M. Coetzee (Cham, Switzerland: Springer) doi: 10.1007/978-3-030-28180-9_12. isbn:978-3-030-28180-9

Potgieter, I. L. (2021). "Surviving the digital era: the link between positive coping, workplace friendship and career adaptability," in *Agile Coping in the Digital Workplace: Emerging Issues for Research and Practice*. ed. N. Ferreira (IL Potgieter & M Coetzee: Springer) doi: 10.1007/978-3-030-70228-1. isbn:978-3-030-70227-4

Potgieter, I. L. (2022). Digitally connected, yet psychologically disconnected. Unpublished inaugural lecture. Pretoria, South Africa: University of South Africa.

Potgieter, I. L., Coetzee, M., and Ferreira, N. (2021). Psychological attachment in the new normal working context: influence of career navigation and career well-being attributes. *Afr. J. Career Dev.* 3:a48. doi: 10.4102/ajcd.v3i1.48

Pretorius, T. B., and Padmanabhanunni, A. (2021). The dynamics of appraisal: a review of 20 years of research using the fortitude questionnaire. *S. Afr. J. Psychol.* 5, 158–174. doi: 10.1177/0091246320957489

Reich, J. W, Zautra, A. J, and Hall, J. S. (2010). *Handbook of Adult Resilience*. eds. J. W. Reich, A. J. Zautra and J. S. Hall (London, United Kingdom: The Guilford Press).

Rousseau, D. M. (2001). Schema, promises and mutuality: the building blocks of the psychological contract. *J. Occup. Organ. Psychol.* 74, 511–541. doi: 10.1348/096317901167505

Rousseau, D. M. (2008). *Psychological contract inventory* (no 2002–02). Technical report.

Rudolph, C. W., Lavigne, K. N., and Zacher, H. (2017). Career adaptability: a meta-analysis of relationships with measures of adaptivity, adapting responses, and adaptation results. *J. Vocat. Behav.* 98, 17–34. doi: 10.1016/j.jvb.2016.09.002

Savickas, M. L. (2013). "Career construction theory and practice," in *Career Development and Counseling: Putting Theory and Research to Work*. eds. S. D. Brown and R. W. Lent. *2nd* ed (Hoboken, NJ: Wiley), 147–183.

Savickas, M. L., and Porfeli, E. J. (2012). Career adapt-abilities scale: construction, reliability and measurement equivalence across 13 countries. *J. Vocat. Behav.* 80, 661–673. doi: 10.1016/j.jvb.2012.01.011

Scheel, T., and Mohr, G. (2013). The third dimension: value-oriented contents in psychological contracts. *Eur. J. Work Organ. Psy.* 22, 390–407. doi: 10.1080/1359432X.2012.665229

Schwieger, D., and Ladwig, C. (2018). Reaching and retaining the next generation: adapting to the expectations of gen Z in the classroom. *Inform. Syst. Educ. J.* 16, 45–54.

Singh, N., Tyagi, H., and Bamel, U. (2020). Impact of transactional, relational and balanced contract on affective commitment: meaningful work as mediator. *Int. J. Product. Perform. Manag.* 70, 131–149. doi: 10.1108/IJPPM-12-2018-0432

Tugade, M. M., Fredrickson, B. L., and Barrett, L. F. (2004). Psychological resilience and positive emotional granularity: examining the benefits of positive emotions on coping and health. *J. Pers.* 72, 1161–1190. doi: 10.1111/j.1467-6494.2004.00294.x

Veldsman, T. H. (2021). *Industrial-Organisational Psychologists Engaging with the New World of Work*. Switzerland: KR Publishing.

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Captain or deckhand? The impact of self-leadership on employees' work role performance under remote work

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Relying on self-determination theory, this study investigates the mediating role of psychological empowerment in the relationship between self-leadership and work role performance (task proficiency, task adaptivity, and task proactivity) in remote work settings. It also explores whether and how supervisor close monitoring moderates the indirect impact of self-leadership on work role performance. Hypotheses were tested using a two-study design including white-collar employees from a broad range of jobs and companies (Study 1) and employee-supervisor dyads working in small and medium-sized firms (Study 2) in Turkey. In Study 1, results showed that self-leadership had a positive indirect effect on employees' work role performance through psychological empowerment. In Study 2, the cross-lagged two-wave design provided support for this indirect effect while demonstrating partial support for the moderating role of supervisor close monitoring. The current study contributes to research on self-leadership and work role performance by providing a detailed understanding of the motivational process through which self-leadership leads to increased work role performance. It also offers practical insights for enhancing self-leaders' work role performance, particularly within the remote work context.

KEYWORDS

self-leadership, psychological empowerment, work role performance, supervisor close monitoring, remote work

> *"Self-leadership… is about influencing ourselves, creating the self-motivation and self-direction we need to accomplish what we want to accomplish." [Charles C. Manz]*

Introduction

The unexpected outbreak of the COVID-19 pandemic in 2020 and its rapid spread around the world have brought radical changes to work life, dramatically impacting the workplaces across the globe (Kniffin et al., 2021; Wang et al., 2021). Of these numerous changes, perhaps the most remarkable was the widespread, almost overnight switch to mandatory and full-time remote work, a transition which has created thoroughgoing challenges for employees as well as organizations (Chong et al., 2020; Costantini and Weintraub, 2022). In this new and unfamiliar context, employees have found themselves

applying different behavioral and cognitive self-management strategies to cope with the challenges associated with remote work. Historically preceding these COVID-specific effects, developments in communication technology has also transformed the workplace providing employees with increased autonomy and discretion to monitor and control their own behavior (Gephart, 2002). Organizations and managers, on the other hand, adopt different techniques to monitor employees' work while working in distant places (Wang et al., 2021). Taken together, these changes accentuate the importance of employees' ability to lead themselves in the new work context by employing a particular set of self-leadership strategies.

Self-leadership refers to "a comprehensive self-influence perspective that concerns leading oneself toward performance of naturally motivating tasks as well as managing oneself to do work that must be done but is not naturally motivating" (Manz, 1986, p. 589). The concept first arose in 1980s (e.g., Manz, 1986) as an extension of self-management (e.g., Manz and Sims, 1980) and has attracted significant attention since then, as documented in several empirical and practitioner-oriented articles (e.g., Manz, 1992; Neck and Houghton, 2006; Marques-Quinteiro and Curral, 2012). Regarding its performance-related outcomes, empirical evidence has shown that self-leadership affects employees' work performance positively (Griffin et al., 2007), enhancing their task proficiency, adaptability, and proactivity (Hauschildt and Konradt, 2012; Marques-Quinteiro and Curral, 2012; Bailey et al., 2018; Marques-Quinteiro et al., 2019). On the other hand, the literature is limited in terms of the theory-driven, empirical studies (e.g., Panagopoulos and Ogilvie, 2015; Inam et al., 2021) that explore the mechanisms through which self-leadership nurtures different aspects of work role performance. Indeed, although previous research has focused on a diverse group of variables (i.e., self-efficacy, work engagement, job satisfaction) that link self-leadership to performance, the motivational, self-empowerment process starting with self-leadership and leading to increased work role performance is under-researched and warrants empirical examination (Goldsby et al., 2021), particularly in remote work settings.

Moreover, despite the burgeoning research interest in the impact of self-leadership on different performance outcomes, and with a few notable exceptions, there is a dearth of knowledge about the boundary conditions that may affect the self-leadership—work role performance relationship. Panagopoulos and Ogilvie (2015) considered organization-based self-esteem as a boundary condition that positively moderated the indirect relationship between self-leadership and salesperson performance. In a more recent study, Kalra et al. (2021) positioned technical knowledge as a moderating factor that alleviated the linkages between behavioral self-leadership and adaptive selling behaviors as well as sales performance. While these studies drew attention to the importance of boundary conditions in self-leadership research, they focused primarily on personal factors (e.g., employee characteristics or competencies) in shaping the linkages between self-leadership and performance outcomes. In doing so, they overlooked the moderating role of external factors, particularly those associated with supervisor control, on the employee initiated self-empowerment process. Indeed, some recent studies have investigated the direct effects of external factors, such as leader's motivating language, on different self-leadership behaviors (Mayfield et al., 2021; Mayfield and Mayfield, 2021). However, less is known about whether and how external contingencies such as supervisor control might shape the motivational process started with self-leadership and leading to enhanced work role performance.

A major gap in the self-leadership research arises from the work environments in which prior studies have been conducted, primarily traditional physical working conditions which involve face-to-face communication and human interaction (e.g., Konradt et al., 2009; Hauschildt and Konradt, 2012; Marques-Quinteiro and Curral, 2012). The growth of physically distant working conditions (e.g., telework or hybrid work), which has resulted in greater flexibility and autonomy in daily working routines (Müller and Niessen, 2019), necessitates further investigation of the effects of self-leadership in such work contexts. Surprisingly, few attempts (Castellano et al., 2021; Costantini and Weintraub, 2022) have been made to evaluate the outcomes of self-leadership in remote or hybrid working contexts, which might in fact serve as ideal settings to study the effects of "leading oneself" toward task accomplishment (Manz, 1986). Although previous research has demonstrated a link between self-leadership and employee performance in remote work settings (Castellano et al., 2021; Costantini and Weintraub, 2022), these studies focused on a single aspect of work role performance, i.e., task performance or proactivity, among remote workers. Further, only a limited research effort has been directed toward understanding the boundary conditions that may affect the performance outcomes of self-leaders who are working remotely. A more comprehensive approach is thus needed to empirically scrutinize the impacts of self-leadership on different performance outcomes in specific contexts such as remote working, and under different external contingencies.

Against this background, we seek to make the following contributions to the self-leadership and work role performance literatures. First, drawing on self-determination theory (SDT; Deci et al., 2017) and Zimmerman (1995, 2000) empowerment theory, we develop and test an integrative model that demonstrates the motivational process through which self-leadership leads to increased work role performance (Figure 1). Specifically, we suggest that psychological empowerment might act as a dynamic, autonomous motivational state that links self-leadership to positive performance outcomes, including increased task proficiency, adaptivity, and proactivity. Second, we position supervisor close monitoring as an external control factor which shapes the motivational and performance outcomes of self-leadership. Finally, we test our integrative model in a relatively under-researched work setting, remote work, which is a practice that has taken widespread root among many organizations during and after the COVID-19 pandemic. Exploration of the proposed

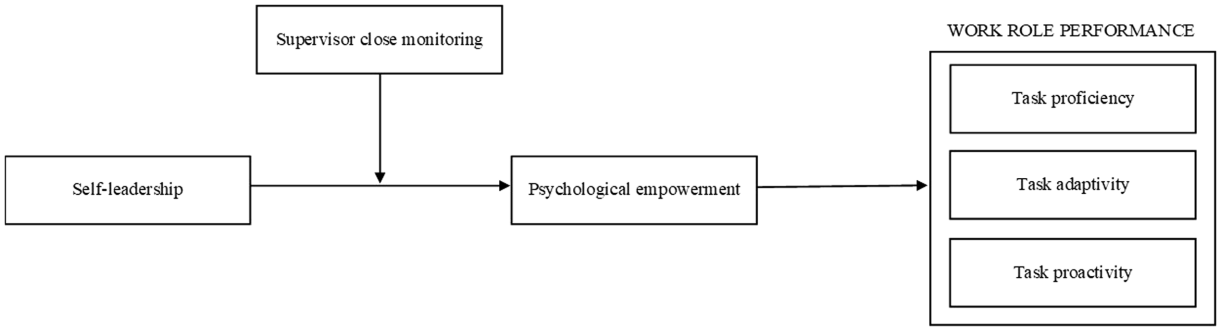

FIGURE 1
Conceptual model.

set of relationships under remote work conditions is noteworthy as it advances our understanding of the possible interactive effects of self-regulation/control (i.e., self-leadership) and external regulation/control (i.e., supervisor close monitoring) in a unique setting that may genuinely pave the way for both (virtual) self-leadership and supervisors' close monitoring. It also provides valuable practical insights into how employees with self-leadership capabilities need to be approached and managed for better performance outcomes under remote work settings.

Background and hypotheses development

Self-leadership and work role performance

Self-leadership refers to a set of cognitive and behavioral actions through which individuals attain self-motivation and self-direction that enhance their overall performance (e.g., Manz, 1986; Neck and Houghton, 2006). These strategies can be grouped under three major categories: (1) *Behavior-focused strategies* (e.g., self-observation and self-goal setting), (2) *Constructive thought pattern strategies* (e.g., evaluating beliefs and assumptions and visualizing successful performance), (3) *Natural reward strategies* (e.g., focusing on natural rewards; Houghton and Neck, 2002).

According to previous research, one of the primary outcomes associated with self-leadership is enhanced work role performance (e.g., Hauschildt and Konradt, 2012; Marques-Quinteiro and Curral, 2012; Bailey et al., 2018). Work role performance is a multifaceted concept that involves individual-, team-, and organization-level work role behaviors. For the scope of our research, we focus only on individual task role behaviors, namely task proficiency, task adaptivity, and task proactivity. *Task proficiency* describes the extent to which an employee fulfills the predefined requirements of his or her work role (Griffin et al., 2007). *Task adaptivity* characterizes the degree to which individuals contend with and adapt to changes that influence their roles in dynamic work settings (Griffin et al., 2007). Finally, *task proactivity* describes the extent to which individuals perform self-initiated, change-oriented behaviors to shape their work roles and change themselves in uncertain work environments (Griffin et al., 2007).

Empirical research has shown that self-leadership is positively associated with different aspects of work-role performance (Marques-Quinteiro and Curral, 2012; Bailey et al., 2018; Marques-Quinteiro et al., 2019). On the other hand, the literature is limited in terms of theory-driven, empirical studies that examine the interlinking mechanisms between self-leadership and work-role performance. The extant research focused on self-efficacy (Chaijukul, 2010; Panagopoulos and Ogilvie, 2015), job satisfaction (Chaijukul, 2010), and work engagement (Inam et al., 2021) as three mediating mechanisms that link self-leadership into work-role performance. Relying on SDT (Deci et al., 2017) and Zimmerman (1995, 2000) empowerment theory, we suggest that psychological empowerment might also serve as an overarching motivational mechanism through which self-leadership behaviors are translated into better work role performance. We explain this process in greater detail below.

Mediating role of psychological empowerment

Psychological empowerment refers to "a motivational construct manifested in four cognitions: meaning, competence, self-determination, and impact" (Spreitzer, 1995, 1,443). Based on these four cognitions, psychologically empowered individuals feel a kind of autonomous motivation at work as they seek and give meaning to their job, feel capable of performing the job, find ways to be autonomous, and recognize the impact of their job on the overall performance of the department or organization. In his seminal work on empowerment theory, Zimmerman (1995, 2000) has suggested that psychological empowerment involves "beliefs that goals can be achieved, awareness about resources and factors that hinder or enhance one's efforts to achieve those goals, and efforts to fulfill the goals" (p. 582).

Studies exploring the link between self-leadership and empowerment assert that self-leadership strategies such as self-goal setting, self-reward, and visualizing successful performance enhance employees' psychological empowerment at work by fostering feelings of self-determination, competence, meaning/purpose, and impact (Manz, 1992; Houghton and Yoho, 2005; Chaijukul, 2010; Amundsen and Martinsen, 2015). This argument has also found support in psychological empowerment theory (Zimmerman, 1995, 2000), which implies that self-leadership skills empower employees by helping them become autonomous, enabling them to control the events in their lives (including their work lives), and guiding them to become their own best supporters toward the achievement of goals. As such, these skills or strategies are likely to enhance employees' autonomous motivation which is one of the two major types of motivation according to Deci et al (2017) basic self-determination theory (SDT) model for the workplace.

According to Deci et al. (2017), there are two major types of motivations that predict various workplace outcomes including employee performance. The first is labeled as *autonomous motivation* that describes "the process of being motivated by one's interest in an activity (i.e., intrinsic motivation) and/or the value and regulation of the activity internalized within the self (i.e., integrated extrinsic motivation)" (Sun et al., 2012, 57). In contrast, *controlled motivation*, as the second motivation type, refers to a form of external regulation, in which individuals' behavior is shaped by the external conditions in the work setting such as rewards, punishments, or power dynamics (Deci et al., 2017). SDT also postulates three primary needs (autonomy, competence, and relatedness), the satisfaction of which promotes the experience of autonomous motivation. These needs are conceptually in line with the four cognitions underlying psychological empowerment (i.e., meaning, self-determination, competence, and impact; Morin et al., 2016), representing an ideal form of autonomous motivation in the work setting.

In this study, we suggest that psychological empowerment is likely to act as a dynamic, motivational mechanism that links self-leadership to the three distinct aspects of work role performance (Cerasoli et al., 2014). Specifically, we propose that the self-leadership strategies or behaviors are likely to initiate an employee-driven, self-empowerment process through which employees develop a sense of autonomous motivation in their job that eventually enhances their work role performance. That is, employees pursuing self-leadership strategies develop a sense of perceived control, competence, and mastery of their work domain (i.e., psychological empowerment; Zimmerman, 1995), which might improve their task proficiency, adaptability, and proactivity. Prior studies have revealed that psychological empowerment enhances employees' task proficiency by increasing their concentration, persistence, resilience, and effort at work (Thomas and Velthouse, 1990; Bonias et al., 2010). It also spurs employees into a more active rather than passive role as they execute their job responsibilities, leading to superior adaptive and proactive performance (Zhang et al., 2017; Xu and Zhang, 2022). Accordingly, psychological empowerment does not only help employees perform their job requirements adequately (i.e., task proficiency) but also releases their potential to adapt to the changes (i.e., task adaptivity) and to take the initiative and make positive changes in their work roles (i.e., task proactivity; Martin et al., 2013). Based on the above, we propose that:

> *Hypothesis* 1: Psychological empowerment mediates the positive relationship between self-leadership and task (a) proficiency, (b) adaptivity, and (c) proactivity.

Moderating role of supervisor close monitoring

Supervisor close monitoring refers to a type of external control through which supervisors "keep close tabs on their subordinates to ensure that they do what they are told, perform tasks in expected ways, and do not do things that the supervisor might disapprove of" (George and Zhou, 2001, 515). This type of supervisory behavior represents a type of external regulation which signals to employees that they need to act in line with the rules and expectations set by the organization. Under supervisor close monitoring, employees are likely to feel that they are being regularly monitored and controlled by their supervisor (George and Zhou, 2001; Zhou, 2003).

Prior research assigns a predominantly negative connotation to supervisor close monitoring (Son et al., 2017; Lebel and Patil, 2018; Kim, 2019) although there are a handful of studies suggesting that close monitoring might also create positive outcomes when it helps employees satisfy their primary psychological needs (e.g., relatedness and competence; Mishra and Ghosh, 2020). The level and impact of close monitoring is deemed particularly controversial in remote working conditions. On the one hand, direct observation or monitoring by supervisors is likely to be limited under remote work, which provides little room for real-time control of employees' task-focused behaviors (Gong and Sims, 2023). On the other hand, when managers are unable to monitor employee performance directly, they may feel distressed that employees disregard task-oriented behaviors (Whitener et al., 1998; Kurland and Cooper, 2002; Dimitrova, 2003) and thus they may increase their surveillance and control in the remote work setting (Sitkin and Roth, 1993; Forbes, 2021; Gan et al., 2022). As such, it is possible to observe both low and high supervisory control (in the form of close monitoring) under remote working conditions.

In this study, we propose that supervisor close monitoring will affect the motivational, self-empowering process starting with self-leadership and leading to better work role performance negatively. As discussed previously, employees following self-leadership strategies tend to feel more autonomously motivated (i.e., psychologically empowered) in their job. On the contrary, when these employees are closely monitored, their psychological empowerment might decline as the external control and regulation by the supervisor deteriorates

their sense of self-determination, strongly clashing with the self-management nature of self-leadership.

Specifically, under supervisor close monitoring, employees tend to work primarily to avoid punishment and criticism (Son et al., 2017) and thus show less effort to go beyond the job requirements (Rietzschel et al., 2014; Lee et al., 2019). Feeling a lack of autonomy and impact in their job, self-leaders will be particularly reluctant or demotivated to perform their job duties proficiently. Similarly, close monitoring might weaken these employees' sense of control and competency in their job (Kim, 2019) and impair their self-regulation resources (Lee et al., 2019), limiting their adaptivity. When self-leaders know that their performance is closely tracked, they will find it difficult and even risky (Lebel and Patil, 2018) to immediately adapt to new situations—unless they believe that their supervisor will approve the way they act. Finally, supervisor close monitoring is likely to discourage self-leaders' voluntary and autonomous motivation to engage in proactive actions (Son et al., 2017) as these might contradict the predetermined rules and regulations and thus prompt their supervisor's disapproval. Although self-leadership strategies tend to stimulate feelings of autonomy or discretion, which have been discussed as the preconditions for proactivity at work (e.g., Grant and Ashford, 2008; Bindl and Parker, 2010), excessive external control and regulation by supervisors might alleviate this triggering effect. In line with the previous arguments, we hypothesize:

> *Hypothesis* 2: Supervisor close monitoring moderates the indirect effect of self-leadership on individual task (a) proficiency, (b) adaptivity, and (c) proactivity through empowerment such that this effect is weaker (stronger) when supervisor close monitoring is high (low).

We tested the previous hypotheses in two different studies. In Study 1, we shed light on the relationships between self-leadership, psychological empowerment, and work role performance by implementing a time-lagged design. In Study 2, we tested our theoretical model (Figure 1), which also involved the moderating effect of supervisor close monitoring, with a cross-lagged two wave design.

Methodology (study 1)

Sample and procedure

We collected data from a sample of 174 white-collar employees from a broad range of jobs and organizations who work in Istanbul, Turkey. Participants were obtained *via* standardized recruitment messages in professional and social networking sites (LinkedIn and Twitter), personal networks of the researchers, and snowball sampling. As we aimed to test our model primarily in the remote working context, we required that participants work at least 23 h or 3 days a week from home to be included in the study, considering that under Turkish Labor Law, regular full-time workers work at least 45 h a week. Participants were also expected to have minimum face-to-face interaction with their supervisors and coworkers when they were working in the office. As such, only those individuals (a) who worked at least 23 h or 3 days a week from home and (b) who either did not interact or interacted minimally with their supervisors (and coworkers) in the office received an online survey through which they evaluated their self-leadership strategies and psychological empowerment (Time 1). One week after the initial survey, employees completed a second survey, which included questions about their task proficiency, adaptivity, and proactivity (Time 2). Data collection commenced in April 2020, when majority of the white-collar employees in Turkey were working remotely due to the health and safety precautions for COVID-19 pandemics,[1] and lasted for 1 month.

Initially, 226 employees were contacted, 210 of whom agreed to participate in our study. After eliminating the incomplete survey forms (i.e., forms with unanswered questions) and those dropped out of the sample in the second week of data collection, we had the full data for 174 employees, representing a response rate of 77%. 98% of the employees were working remotely (at home or at another location away from the employer's location) at least 23 h or 3 days a week. The remaining 2% were fieldworkers (who can be also considered remote workers). Participants' average age was 39.95 years (SD = 6.99), and their average job tenure and work experience were 8.15 years (SD = 6.12) and 14.39 years (SD = 7.67), respectively. Among these employees, 62% were females and majority of the participants (97%) had an undergraduate or graduate degree. Finally, employees in the sample were working in various sectors (e.g., banking and finance, education, consultancy) and departments (e.g., strategy/business

1 The first COVID-19 case in Turkey was reported on 11 March 2020, and initial precautions were taken subsequently. Namely, thousands of people were quarantined, and schools, universities, and business enterprises were locked down. With the country's infection rate among the highest in Europe, in April 2021, Turkey entered its first nationwide lockdown (BBC News, 2021). In the initial phases, Turkey seemed to have coped relatively well with the pandemic considering the low number of confirmed cases, timely isolation, protection, and tracing measures, and strong healthcare system (e.g., The Turkish health system has the highest number of intensive care units in the world at 46.5 beds per 100,000 people; Aydın-Düzgit et al., 2021; DBA Turkey, 2021). In the later stages, however, certain administrative and capacity-related problems arose. By the end of August 2021, Turkey had the higher cumulative number of positive cases (per million people) than many other countries (Our World in Data, 2022). The government initiated a massive vaccination campaign in January 2021, primarily covering healthcare workers and elderly citizens. Although the government kept many businesses open and allowed companies to determine their own guidelines regarding workers throughout the pandemic (Economist, 2020), private enterprises were strongly encouraged to switch to remote work at different phases of the pandemic.

development, human resources management), increasing the generalizability of our study.

Measures

We first developed the survey forms in Turkish and then translated the questions into Turkish in line with Brislin (1986) back-translation method. All the items were assessed with 5-point Likert scales, as explained in more detail below.

Self-leadership

We used the Abbreviated Self-Leadership Questionnaire (ASLQ; Houghton et al., 2012) to assess employees' self-leadership practices. The ASLQ is a nine-item, condensed version of the 35-item Revised Self-Leadership Questionnaire (RSLQ; Houghton and Neck, 2002), which has good reliability and validity in comparison to the original RSLQ (Nel and van Zyl, 2015; Mahembe et al., 2017). Sample items are: "I work toward specific goals I have set for myself," and "Sometimes I picture in my mind a successful performance before I actually do a task." The rating scheme involved 1 = strongly disagree to 5 = strongly agree ($\alpha = 0.81$).

Psychological empowerment

We measured psychological empowerment with Spreitzer (1995) 12-item empowerment scale, based on four cognitions: meaning, competence, self-determination, and impact. Sample items involve: "The work I do is very important to me" (meaning; $\alpha = 0.91$), "I am confident about my ability to do my job"; (competence; $\alpha = 0.91$), "I can decide on my own how to go about doing my work" (self-determination; $\alpha = 0.88$), and "I have significant influence over what happens in my department" (impact; $\alpha = 0.94$). The rating scale ranged from 1 = strongly disagree to 5 = strongly agree ($\alpha = 0.92$).

Work role performance

We adopted Griffin et al. (2007) work role performance scales to evaluate employees' work role performance. Participants were requested to evaluate the extent to which they had performed the respective behaviors over the last month, e.g., "Carried out the core parts of his/her job well" (task proficiency), "Adapted well to changes in core tasks" (task adaptivity), and "Come up with ideas to improve the way in which his/her core tasks are done" (task proactivity). They provided their answers on a scale ranging from "very little/none" (1) to "a great deal" (5). Reliabilities were satisfactory (0.84, 0.81, and 0.87, respectively) for all three aspects of work role performance.

Controls

Both theoretical and empirical evidence revealed that there is an effect of gender, experience, and tenure on employees' task proficiency (e.g., Griffin et al., 2007; Avey et al., 2010), task adaptivity (e.g., García-Chas et al., 2015; Wu et al., 2017), and task proactivity (e.g., Thomas et al., 2010). Hence, we incorporated gender (0 = female, 1 = male), work experience, and tenure as control variables that may influence our outcome variables.

Preliminary analyses

We performed several confirmatory factor analyses (CFAs) with AMOS 27 to examine the fit scores of the overall measurement model (in which all five constructs were separately represented) and test the distinctiveness of the constructs. Specifically, we compared the relative fit of four-, three-, two-, and single-factor models to the five-factor measurement model. We also checked the relative fit of the common-method factor model against a model involving self-reported items (i.e., self-leadership and psychological empowerment; see Appendix Table A1 for details).[2] In all CFAs, the five-factor model demonstrated better fit than the alternative models [$\chi^2(197) = 340.86$, $p < 0.01$, CFI = 0.92, TLI = 0.91, RMSEA = 0.07, RMR = 0.05, SRMR = 0.07]. Harman's single-factor test also demonstrated a very poor fit [$\chi^2(207) = 552.32$, $p < 0.01$, CFI = 0.63, TLI = 0.59, RMSEA = 0.14, and SRMR = 0.12]. Common-method factor model was created such that the measured items did not only load on their conceptual factors, respectively, but also loaded on a single method factor. In this way, unobservable sources of common method variance can be integrated to the model as latent factors (Williams and Anderson, 1991). The findings showed that the model that involved a single (common) method factor revealed lower fit scores than the two-factor model (i.e., the model with two independent factors, i.e., self-leadership and psychological empowerment).

We further tested the convergent and discriminant validity of the self-reported measures (i.e., self-leadership and psychological empowerment) by checking the factor loadings, average variance extracted (AVE), and the shared variance between constructs. All factor loadings were significant ranging from 0.50 to 0.88 and 0.66 to 0.76 for self-leadership and psychological empowerment, respectively. Moreover, AVE values exceed 0.50 for both constructs

2 In all CFAs, psychological empowerment was included as higher-order construct because the higher-order model demonstrated a significantly better fit than the single-factor model [$\Delta\chi2(4)=700.776$, $p<0.01$] and the orthogonal first-order model (i.e., the model in which the four lower-order factors are uncorrelated; $\Delta\chi2(4)=183.908$, $p<0.01$). The higher-order model exhibited a similar fit to the oblique first-order model in which the four lower-order factors are correlated [$\Delta\chi2(2)=3.32$, $p<0.01$]. Credé and Harms (2015) suggested that the validity of higher-order model should not be presumed as a result of only model comparisons and researchers should apply further tests. In this study, we apply the "Target Coefficient (TC) 1" and "Target Coefficient 2" tests (Marsh, 1987) to evaluate whether the higher-order factor of empowerment sufficiently explained the covariation among the first-order factors. Both the TC1 (0.96) and the TC2 (0.96) were close to 1 which showed support for the higher order modeling (Marsh, 1987).

(i.e., 0.53 for self-leadership and 0.51 for psychological empowerment) further validating their convergent validity (Fornell and Larcker, 1981). The discriminant validity was also verified as the AVE of each construct was greater than the square of the correlation (ρ^2 = 0.24) between constructs (Fornell and Larcker, 1981). Heterotrait-monotrait (HTMT) criterion test validated this finding by showing that the correlation between constructs (r = 0.49) were less than the cut-off value of 0.90 (Henseler et al., 2015).

Overall, the findings showed that the respondents could distinguish the five self-reported measures well, and common method variance was not a critical concern for the subsequent analyses.

Results (study 1)

Table 1 demonstrates the means, standard deviations, reliabilities, and correlations for the main variables.

We tested the relationships in our mediation model by applying structural equation modeling (SEM) methodology with AMOS 27. The results revealed that the model had a reasonable fit to the data [$\chi^2(255) = 446.27$, $p < 0.05$; CFI = 0.90; TLI = 0.88; RMSEA = 0.07; and SRMR = 0.08; Mulaik et al., 1989; Hu and Bentler, 1999]. Moreover, the results showed that after controlling performance outcomes for gender, tenure, and experience, self-leadership was positively related to psychological empowerment ($\beta = 0.53$, $p < 0.01$), and the effect of empowerment on task proficiency ($\beta = 0.51$, $p < 0.01$), task adaptivity ($\beta = 0.28$, $p < 0.05$), and task proactivity was also significant ($\beta = 0.41$, $p < 0.05$). Given these results, we also checked the indirect effects of self-leadership on three different aspects of work role performance. We calculated the confidence intervals (CIs) of the indirect effects by performing bootstrapping (specifying 5,000 replications) in the AMOS 23 program. As shown in Table 2, the results revealed a significantly positive indirect impact of self-leadership on (a) task proficiency [$\beta = 0.27$, p < 0.01, 95% CI = (0.09, 0.68)], (b) task adaptivity [$\beta = 0.15$, $p < 0.10$, 95% CI = (0.00, 0.54)], and (c) task proactivity [$\beta = 0.22$, p < 0.01, 95% CI = (0.06, 0.54)]. These findings provided initial support for Hypothesis 1.

Methodology (study 2)

Sample and procedure

In Study 2, we gathered data from 135 employees and their supervisors working in small and medium-sized firms in Istanbul, Turkey. An independent research firm, which had a well-established SME network in different sectors, conducted the data collection process as part of a wider research project examining the correlates of self-leadership. As in Study 1, employees who worked at least 23 h or 3 days a week from home and had minimum interaction with their supervisors and coworkers in the office environment were included in the study. Data collection started in June 2020 and lasted for 2 months.

The survey data were collected through an online survey system at two time points (2 weeks apart). At Time 1, SME employees were asked to answer questions about their self-leadership behaviors, psychological empowerment, and demographics. They also evaluated their supervisors' monitoring behaviors. Two weeks later (Time 2), they were asked to answer the same questions, using the measures employed at Time 1. Moreover, at Time 2, supervisors were requested to evaluate the work role performance along three behavioral dimensions: task proficiency, task adaptivity, and task proactivity. At Time 1, surveys were distributed to 200 SME employees *via* the online survey system. 160 employees filled the online survey forms at Time 1, with a response rate of 80%. Of these, 150 employees completed the Time 2 surveys, indicating a response rate of 94%. At the same period, we received 140 matching supervisor surveys. Of these, five cases were dropped as they included missing ratings for at least two or more of the performance dimensions. Excluding these, 135 complete surveys were used in the analyses.

Among the employees, the average age was 36.17 years (SD = 8.82), and the mean job tenure and experience were 3.04 years (SD = 2.57) and 9.65 years (SD = 6.76), respectively. Females constituted 51% of the overall sample. Respondents primarily had a university degree (54%), followed by high school (33%), and graduate degrees (13%). As in Study 1, employees in the sample were working in various sectors (e.g., food and beverage, computer/technology, real-estate) and departments (e.g., finance and accounting, operations, and marketing), holding different formal positions (i.e.,

TABLE 1 Descriptives and correlations between variables (Study 1).

		Mean	SD	1	2	3	4	5	6	7	8
1	Gender	0.40	0.49	-							
2	Tenure	8.15	6.12	0.10	-						
3	Work experience	14.39	7.67	0.01	0.62**	-					
4	Self-leadership	3.78	0.61	−0.06	−0.15*	(0.81)					
5	Psychological empowerment	3.63	0.76	0.08	0.18*	0.26**	0.35**	(0.92)			
6	Task proficiency	3.92	0.73	−0.05	0.06	0.10	0.21**	0.36**	(0.84)		
7	Task adaptivity	3.81	0.72	−0.03	0.04	0.07	0.33**	0.34**	0.68**	(0.81)	
8	Task proactivity	4.19	0.67	0.02	−0.05	−0.04	0.37**	0.39**	0.38**	0.64**	(0.87)

$n = 174$. Gender: "0" = Female, "1 = Male. Reliability coefficients are in parentheses.
*$p < 0.05$; **$p < 0.01$.

TABLE 2 Mediation results (Study 1).

Outcome: Task proficiency				Outcome: Task adaptivity				Outcome: Task proactivity			
Direct and indirect effects and 95% confidence intervals											
Standardized direct effects				**Standardized direct effects**				**Standardized direct effects**			
Parameter	**Estimate**	**Lower**	**Upper**	**Parameter**	**Estimate**	**Lower**	**Upper**	**Parameter**	**Estimate**	**Lower**	**Upper**
SL → PE	0.53**	0.22	0.77	SL → PE	0.53**	0.22	0.77	SL → PE	0.53**	0.22	0.77
SL → TProf	0.04	−0.31	0.37	SL → TAdapt	0.28	−0.07	0.59	SL → TPro	0.23	−0.08	0.49
PE → TProf	0.51**	0.25	0.87	PE → TAdapt	0.28*	0.02	0.76	PE → TPro	0.41**	0.15	0.72
Standardized indirect effects				**Standardized indirect effects**				**Standardized indirect effects**			
SL → PE → TProf	0.27*	0.09	0.68	SL → PE → TAdapt	0.15*	0.00	0.54	SL → PE → TPro	0.22**	0.06	0.54

$n = 135$ (bootstrapping by specifying a sample of size 5,000). SL, self-leadership; PE, psychological empowerment; TProf, task proficiency; TAdapt, task adaptivity; TPro, task proactivity. *$p < 0.05$; **$p < 0.01$.

managers/non-managers). In our sample, employees from the same organization were reporting to a single (the same) supervisor.

Measures

Following the same procedure with Study 1, all the scales went through a translation and back-translation process and were measured by 5-point Likert scales. For the self-leadership, psychological empowerment, and work role performance (i.e., task proficiency, task adaptivity, and task proactivity), we used the same measures previously described in Study 1. The internal consistency reliabilities of these measures in the Study 2 ranged from 0.72 to 0.90. In addition, for Study 2, we incorporated supervisor close monitoring using the following measure.

Supervisor close monitoring

Supervisor close monitoring was measured by the 6-item scale developed by George and Zhou (2001). Participants (employees) were asked to evaluate their supervisor's close monitoring behavior using George and Zhou (2001) six-item measure (see Appendix). The rating scheme involved 1 = strongly disagree to 5 = strongly ($\alpha = 0.83$).

As in Study 1, we controlled for the effects of employees' gender, experience, and tenure to avoid possible confounding effects.

Preliminary analyses

Given that self-leadership, psychological empowerment, and supervisor close monitoring were rated by the employees themselves, we conducted several CFAs with AMOS 27 to examine whether employee scores on self-reported measures denoted idiosyncratic constructs. For all CFAs, we included psychological empowerment as a higher-order factor as the higher-order model fitted the data better than the single-factor model [$\Delta\chi^2(4) = 53.98$, $p < 0.01$] and the orthogonal first-order model [$\Delta\chi^2(4) = 242.45$, $p < 0.01$]. The higher-order model showed a comparable fit to the oblique first-order model [$\Delta\chi^2(2) = 1.12$, $p < 0.01$].

The findings revealed an acceptable fit for the hypothesized three-factors (Time 1) and two-factors (Time 2) structure, for the data collected at two-time phases. For the Time 1 data, the hypothesized structure, where self-leadership, psychological empowerment, and supervisor close monitoring constituted the three different factors, had a reasonable fit [$\chi^2(101) = 168.47$, CFI = 0.94; RMSEA = 0.07; SRMR = 0.05; Mulaik et al., 1989; Hu and Bentler, 1999]. On the other hand, the alternative models, including the single factor model had a poorer fit [$\Delta\chi^2(3) = 216.49$, $p < 0.01$]. The findings also showed that the model that involved a single (common) method factor revealed lower fit scores than the three-factors model (i.e., the model with three independent factors for self-leadership, psychological empowerment, and supervisor close monitoring) We observed the same pattern for the self-reported Time 2 data (i.e., self-leadership and psychological empowerment). Specifically, the model where self-leadership and psychological empowerment were represented by two different factors, had a good fit [$\chi^2(34) = 68.10$, CFI = 0.94; RMSEA = 0.09; SRMR = 0.05; Hu and Bentler, 1999; Mulaik et al., 1989] while the alternative models (i.e., single factor model and the two-factors model with a common-factor) had a poorer or at least a similar fit.[3]

We further tested the discriminant validity among the self-reported constructs by checking whether the average variance extracted (AVE) for each construct was (at Time 1 and Time 2) greater than its shared variance with any of the other constructs (Fornell and Larcker, 1981). The discriminant validity was verified for Time 1 data as the AVE of each construct (i.e., 49%, 61%, and 44% for self-leadership, psychological empowerment, and supervisor close monitoring, respectively) was greater than the square of the correlation (ρ^2) between that specific construct and any others. Although the AVE values for self-leadership and psychological empowerment at Time 2 were slightly lower than the square of the correlation between these constructs (Fornell and Larcker, 1981), Heterotrait-monotrait (HTMT) criterion test conveyed discriminant validity by showing that the correlation

3 Model comparisons for Time 1 and Time 2 data can be found at Appendix Table A2.

between constructs (r = 0.84) were less than the cut-off value of 0.90 (Henseler et al., 2015).

Additionally, we performed multi-group CFAs to confirm the measurement equivalence of both self-leadership and psychological empowerment across the two-time frames (Vandenberg and Lance, 2000). First, we ran a multi-group CFA in which the self-leadership item loadings were set as identical across Times 1 and 2. This model fitted the data reasonably well, $\chi^2(23) = 102.59$, $p < 0.01$; CFI = 0.88; SRMR = 0.07, denoting a configural invariance of self-leadership measures across the two time points. The multi-group CFA also confirmed the configural invariance of psychological empowerment measures across two time points [$\chi^2(7) = 17.66$, $p < 0.01$; CFI = 0.98; SRMR = 0.03]. Taken together, the findings showed that the factorial structure and item loadings of self-leadership and psychological empowerment remained the same across two periods. Thus, we could investigate the relationships among these constructs measured at two distinct time points.

Analytic strategy for the mediation hypothesis

We collected the data of SME employees' self-leadership and psychological empowerment in both Time 1 and Time 2 and employed a cross-lagged panel data design with AMOS 27 (Selig and Preacher, 2009) to examine the nature of the relationship between self-leadership and psychological empowerment. Figure 2 depicts our cross-lagged model in which work role performance dimensions (measured in Time 2) were positioned as the outcome of self-leadership and psychological empowerment. To test our hypotheses, we followed the procedure described by Zhang et al. (2016).

Because both self-leadership and psychological empowerment are based on employee perceptions and there are few empirical studies which suggested empowerment as an antecedent of self-leadership (e.g., Wilson, 2011), it may be problematic to make clear inferences whether self-leadership triggers psychological empowerment, or the reverse is also true. The cross-lagged design may help solve this problem by testing both directions of causality at the same time while controlling for the impact of each variable at a previous time (Zhang et al., 2016). Specifically, while simultaneously testing the relationship between Time 1 self-leadership and Time 2 psychological empowerment and Time 1 empowerment and Time 2 self-leadership, the effects of Time 1 self-leadership and Time 1 psychological empowerment on their Time 2 equivalents were also considered.

Results (study 2)

Table 2 demonstrated the descriptive statistics and inter-correlations for the study variables.

Mediation of psychological empowerment

Results revealed that after controlling for possible reverse causation (i.e., psychological empowerment at Time 1 affects self-leadership at Time 2), self-leadership affected psychological empowerment significantly ($\beta = 0.63$, $p < 0.01$), and the effects of empowerment on task proficiency ($\beta = 0.59$, $p < 0.01$), task adaptivity ($\beta = 0.60$, $p < 0.01$), and task proactivity ($\beta = 0.51$, $p < 0.01$) were also significant (Figure 3).

Given these results, we estimated the indirect effects of self-leadership on work role performance through empowerment by testing the product of two parameters, path estimate from self-leadership to empowerment, and path estimate from empowerment to the respective performance outcome. We checked the confidence interval of these indirect effects using the bootstrapping procedure. Our results showed that, with 5,000 bootstrapping replications, there was a significant indirect effect of self-leadership on (a) task proficiency [$\beta = 0.26$, $p < 0.01$, 95% CI = (0.05, 0.82)], (b) task adaptivity [$\beta = 0.27$, $p < 0.01$, 95% CI = (0.08, 0.75)], and (c) task proactivity [$\beta = 0.26$, $p < 0.01$, 95% CI = (0.07, 0.77)]. Taken together, these findings provided support for our Hypothesis 1.

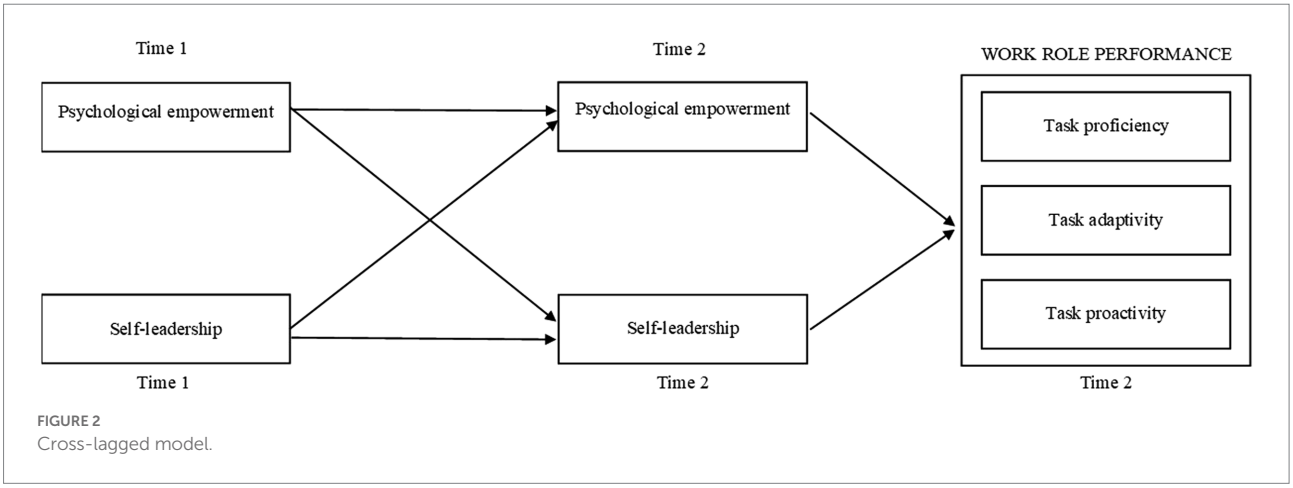

FIGURE 2
Cross-lagged model.

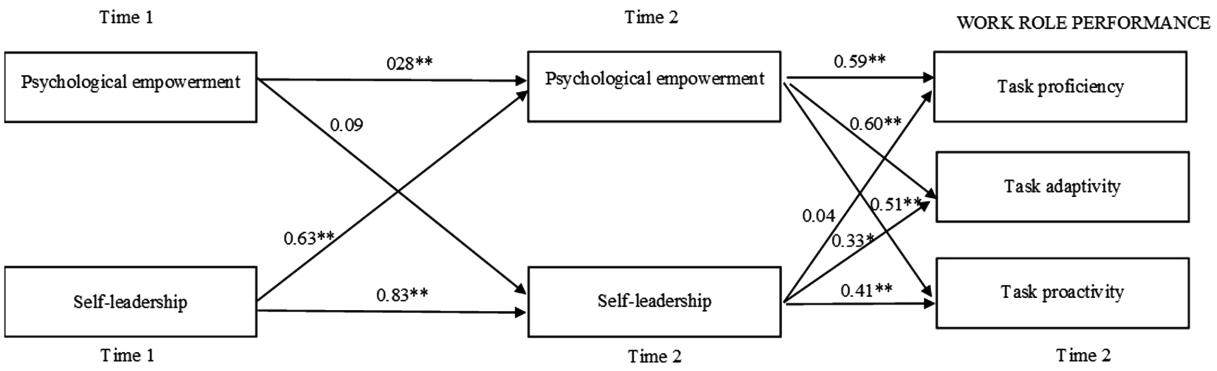

FIGURE 3
Cross-lagged model with path coefficients. **$p < 0.01$, *$p < 0.05$.

Moderation of the indirect effect

To test the moderating effect of supervisor close monitoring on the mediation model, we performed multi-group analysis and χ^2 difference test (specifying a bootstrapping sample of 5,000 at a 95% confidence interval). For this purpose, we divided the sample into two groups (one high and one low on the moderator, that is, supervisor close monitoring) with a median split procedure. We conducted a separate multi-group analysis for each performance outcome. In each analysis, we checked a Chi-square difference between the constrained model in which hypothesized affected were constrained to be equal across the low and high groups and an unconstrained model in which the same paths varied freely across two groups. The moderating hypothesis was verified if the unconstrained model demonstrated a significantly lower chi-square than the constrained model.

The results showed that for the performance outcomes of task proficiency, task adaptivity, and task proactivity, χ^2 difference between the unconstrained model (i.e., the model in which none of the structural paths was constrained for the equality of their weights) and constrained model (i.e., the path between self-leadership and psychological empowerment was set to be equal across two groups) was significant (model with task proficiency: $\Delta\chi^2(1) = 18.83$, $p < 0.01$; model with task adaptivity: $\Delta\chi^2(1) = 18.05$, $p < 0.01$, and model with task proactivity: $\Delta\chi^2(1) = 17.77$, $p < 0.01$). This suggests that supervisor close monitoring is likely to moderate the indirect effect of self-leadership on the work role performance.

The bootstrapping results of moderated models for both low close monitoring and high close monitoring groups are presented in Table 3. As shown in this table, multi-group models displayed a good fit with the data. These results showed that the indirect effect of self-leadership on task proficiency was non-significant for employees who experienced low supervisor close monitoring in their job as well as for those who were closely monitored by their supervisors. Thus, Hypothesis 2a was not supported.[4] Further, in support of Hypothesis 2b, the results revealed that the indirect effect of self-leadership on task adaptivity was significant only for those employees who were loosely monitored by their supervisors [$\beta = 0.54$, $p < 0.05$, 95% CI = (0.10, 3.08)]. Similarly, the indirect relationship between self-leadership and task proactivity was significant only for those employees who were not closely monitored by their supervisors [$\beta = 0.51$, $p < 0.5$, 95% CI = (0.4, 4.01)]. Hence, Hypothesis 2b and 2c were supported (Table 4).

Discussion

In this study, we aimed to understand the relationships among self-leadership, psychological empowerment, and work role performance, and scrutinize the moderating effect of supervisor close monitoring on these relationships. Drawing primarily on SDT (Deci et al., 2017), we developed two hypotheses: First, we suggested that psychological empowerment, as an autonomous motivational state, links self-leadership to positive performance outcomes, including increased task proficiency, adaptivity, and proactivity. Second, we considered supervisor close monitoring as an external control and regulation mechanism that exacerbates the previously described self-empowerment process.

We conducted two separate studies to test these hypotheses. In Study 1, we found that psychological empowerment played a mediator role in the relationship between self-leadership and work role performance. This finding was supported by our cross-lagged design in Study 2. Furthermore, in line with Hypothesis 2, we found that supervisor close monitoring moderated the indirect

4 Because the samples in multi-group analysis consist of only 66 (for low supervisor close monitoring) and 69 (for high supervisor close monitoring) employees, there was concern about statistical power of the analysis. Thus, a *post-hoc* power analysis was performed (Cohen, 1988) for the non-significant indirect effect of self-leadership on task proficiency using the online tool created by Soper (2020). For both groups (i.e., low and high supervisor close monitoring), observed statistical power of the non-significant effect was 0.99 at the 0.05 level ($R^2_{low} = 0.55$, $R^2_{high} = 0.39$), which was above the threshold of 0.8. As such, adequate statistical power was achieved for the non-significant indirect effect in question.

TABLE 3 Decriptives and correlations between variables (Study 2).

		Mean	*SD*	1	2	3	4	5	6	7	8	9	10	11
1	Gender	0.50	0.50	-										
2	Tenure	3.28	3.21	−0.01	-									
3	Work experience	9.67	6.82	0.10	0.47**	-								
4	T1 Self-leadership	3.56	0.64	−0.01	0.04	−0.18*	(0.85)							
5	T1 Psychological empowerment	3.37	0.83	0.09	0.01	−0.06	0.58**	(0.92)						
6	T2 Self-leadership	3.52	0. 71	−0.06	0.02	−0.17*	0.93**	0.56**	(0.86)					
7	T2 Psychological empowerment	3.67	0.59	0.03	−0.11	−0.14	0.65**	0.67**	0.59**	(0.90)				
8	Supervisor close monitoring	3.32	0.81	−0.04	0.10	−0.04	0.40**	0.53**	0.38**	0.48**	(0.83)			
9	Task proficiency	3.41	0.89	−0.15	0.01	−0.09	0.40**	0.38**	0.33**	0.51**	0.34**	(0.74)		
10	Task adaptivity	3.48	0.82	−0.03	0.19*	0.03	0.57**	0.47**	0.48**	0.52**	0.44**	0.64**	(0.75)	
11	Task proactivity	3.27	0.79	−0.17	−0.01	−0.13	0.40**	0.36**	0.37**	0.45**	0.34**	0.79**	0.52	(0.72)

$n = 135$. Gender: "0" = Female, "1 = Male. Reliability coefficients are in parentheses. T1, Time 1; T2, Time 2.
*$p < 0.05$; **$p < 0.01$.

TABLE 4 Moderated mediation results.

Outcome: Task proficiency (H1a) model fit: $\chi^2(192) = 269.19$, CFI = 0.90; RMSEA = 0.06; SRMR = 0.07

Direct and indirect effects and 95% confidence intervals—Low close monitoring

Standardized direct effects

Parameter	Estimate	Lower	Upper
SL → PE	0.84**	0.55	0.99
SL → TProf	0.46	−1.03	2.50
PE → TProf	0.23	−1.87	1.56

Standardized indirect effects

SL → PE → TProf	0.20	−1.23	2.24

Direct and indirect effects and 95% confidence intervals—High close monitoring

Standardized direct effects

Parameter	Estimate	Lower	Upper
SL → PE	0.24	−0.27	0.61
SL → TProf	−0.04	−0.65	0.42
PE → TProf	0.63**	0.18	1.06

Standardized indirect effects

SL → PE → TProf	0.15	−0.20	0.64

Outcome: Task adaptivity (H1b) model fit: $\chi^2(192) = 256.40$, CFI = 0.91; RMSEA = 0.05; SRMR = 0.07

Direct and indirect effects and 95% confidence intervals—Low close monitoring

Standardized direct effects

Parameter	Estimate	Lower	Upper
SL → PE	0.84**	0.55	0.99
SL → TAdapt	0.23	−1.78	0.93
PE → TAdapt	0.65	−0.24	2.33

Standardized indirect effects

SL → PE → TAdapt	0.54*	0.10	3.08

Direct and indirect effects and 95% confidence intervals—High close monitoring

Standardized direct effects

Parameter	Estimate	Lower	Upper
SL → PE	0.24	−0.30	0.61
SL → TAdapt	0.45	−0.03	0.87
PE → TAdapt	0.31	−0.14	0.67

Standardized indirect effects

SL → PE → TAdapt	0.18	−0.04	0.35

Outcome: Task proactivity (H1c) model fit: $\chi^2(192) = 289.53$, CFI = 0.88; RMSEA = 0.06; SRMR = 0.07

Direct and indirect effects and 95% confidence intervals—Low close monitoring

Standardized direct effects

Parameter	Estimate	Lower	Upper
SL → PE	0.84**	0.55	0.99
SL → TPro	0.27	−1.85	0.91
PE → TPro	0.60	−0.14	2.39

Standardized indirect effects

SL → PE → TPro	0.51*	0.04	4.01

Direct and indirect effects and 95% confidence intervals—High close monitoring

Standardized direct effects

Parameter	Estimate	Lower	Upper
SL → PE	0.27	−0.30	0.61
SL → TPro	0.31	0.00	0.79
PE → TPro	0.44	−0.04	0.74

Standardized indirect effects

SL → PE → TPro	0.12	−0.04	0.44

$n = 135$ (bootstrapping by specifying a sample of size 5,000). SL, self-leadership; PE, psychological empowerment; TProf, task proficiency; TAdapt, task adaptivity; TPro, task proactivity.
*$p < 0.05$; **$p < 0.01$.

effect of self-leadership on task adaptivity and proactivity such that this effect was non-significant under high supervisor close monitoring. However, we did not obtain the same finding for task proficiency. Hence, Hypothesis 2 was partially supported.

Theoretical implications

From a theoretical standpoint, our findings extend the boundaries of psychological empowerment theory (Zimmerman, 1995, 2000) and SDT (Deci et al., 2017) to self-leadership research by emphasizing the motivational process of self-empowerment, which places employees at the heart of their own empowerment (Matsuo, 2019; van der Stoep, 2019). In this study, we presented that self-leadership is likely to enhance employees' psychological empowerment that has spillover effects on subsequent performance outcomes. Our results implied that self-leadership helps employees find their job more meaningful and feel more competent, autonomous, and impactful in their jobs, which in turn contributes

to their task proficiency, adaptivity, and proactivity. With these findings, we also addressed an important gap in the current research regarding the empowering mechanisms that connect self-leadership to performance outcomes. Although previous studies have focused on the mediating impact of individual differences and affective-psychological states (i.e., self-efficacy and job satisfaction) in the relationship between self-leadership and employee performance, the literature lacks theoretical and empirical evidence regarding the impact of autonomous motivational states in translating the self-leadership practices into superior work role performance. Drawing upon the basic premises of "workplace self-determination model" (Deci et al., 2017), we attract attention to this "black box" issue of self-empowerment and move beyond the findings of previous studies.

Moreover, our study sheds light on whether and how supervisors' close monitoring shapes the employees' self-empowerment process. In line with the previous studies which underlined the drawbacks of close monitoring particularly in traditional work settings (e.g., Son et al., 2017; Kim, 2019; Lee et al., 2019), our results showed that supervisor close monitoring alleviated the indirect positive impact of self-leadership on employees' task adaptivity and proactivity under remote working conditions. This finding implies that close monitoring by supervisors, which characterizes an external control or regulatory mechanism according to SDT, might damage self-leaders' autonomous motivation to perform adaptively and proactively. Since both adaptivity and proactivity are change-oriented behaviors and require self-initiated future-oriented actions (Griffin et al., 2010), supervisor close monitoring might interfere with self-leaders' autonomy and make them conform to the rules and expectations of their supervisors. As a result, these self-leading employees might work just enough to avoid punishment and criticism (Son et al., 2017) and show little or no effort to enhance their adaptive or proactive performance (Rietzschel et al., 2014; Lee et al., 2019).

On the other hand, our findings indicated that self-leadership had no indirect impact on employees' task proficiency (*via* psychological empowerment) either under high or low close monitoring. The reason for this may be those subordinates, particularly those with self-leading capabilities, need an adequate supervision (i.e., not extremely loose, or tight control; Son et al., 2017) to feel more empowered and show higher performance in remote working settings. This is also an ongoing debate in the teleworking research where some researchers recommend a new way of supervision including more directive behaviors while others do not support the tight control of the tasks (Dimitrova, 2003; Lautsch et al., 2009). Our findings substantiate both views by implying that self-leaders might perceive extremely high levels of external control on regular tasks as excessive supervision and low levels of control as inadequate supervision under remote work conditions. As such, on the one hand, high levels of supervisory control might damage the trust-based supervisor-subordinate relationship and break the spell of psychological empowerment for self-leaders. On the other hand, self-leaders might perceive low levels of supervisory control as negligent behavior (Choi et al., 2009) as they fail to receive clear information and feedback regarding the core aspects of their job in the uncertain, remote working environment (Son et al., 2017). That is, although self-leaders can set their own goals and working toward them, they might still need some coaching or guidance, particularly in remote work settings, regarding performance expectations of their superiors. This is because while working remotely self-leaders might develop concerns about being professionally isolated, namely they might "fear that when they are out of sight, they are out of mind for promotions and other organizational rewards" (Kurland and Cooper, 2002; p. 111).

Taken together, our findings speak to the importance of considering employee needs, perceptions and expectations, work context, and the different aspects of work role performance while evaluating the moderating role of supervisory control in the employee-initiated self-empowerment process.

Practical implications

Our study has several implications for organizations and managers who aim to enhance their employees' psychological empowerment and work role performance, particularly within the remote work context. First, managers need to encourage their subordinates to freely use their self-leadership skills as this will increase their autonomous motivation and help them feel more psychologically empowered. In line with Manz (1992), who portrays self-leadership capability as "truly the heart of empowerment" (p. 9), we found that self-leadership enhanced employees' psychological empowerment, which in turn increased their work role performance. As such, from a human resource perspective, organizations need to lay the necessary groundwork for the development and implementation of self-leadership skills among their existing employees and consider these critical skills as a part of their recruitment and selection efforts as well as their performance evaluation and incentive structures.

Second, our results suggest that self-leadership is a key merit for enhancing employees' work-role performance particularly in remote work conditions in which individuals need to motivate and regulate themselves in most cases. Hence, it is critical to support employees with ongoing professional trainings that will improve their self-leadership and self-regulation skills. Previous research has validated this argument empirically by showing that individuals who received self-leadership trainings (e.g., thought self-leadership training) experienced increased mental performance, positive affect, job satisfaction and decreased negative affect compared with those who do not receive such trainings (Neck and Manz, 1996). In a recent study, Goldsby et al. (2021) have particularly underlined that self-leadership trainings act as a catalyzer to enhance the individual performance of those who are receiving professional improvement programs. Specifically, the authors have proposed that (certified) professional training programs would be more effective for employees with strong self-leadership skills in that self-leaders would know how to apply the insights of the trainings over time (Goldsby et al., 2021), which would save organizations from the costs of providing similar trainings periodically.

Third, our findings demonstrated that high supervisor close monitoring impaired the psychological empowerment of self-leaders and diminished their willingness to behave adaptively and proactively in their job. Self-leaders may perceive high close monitoring as an intimidation or a pressure for adjusting to the expectations of their supervisors. As a result, these employees may refrain from using novel ways of thinking or finding paths for adaptation. Our findings revealed that, particularly in situations where employee adaptivity and proactivity matter, supervisors should avoid constantly looking over self-leaders' shoulders and let these employees use their self-management skills. On the other hand, our findings also implied that even though self-leaders have the capacity to self-manage and self-monitor their core tasks (which is represented by task proficiency), they might still need a certain level of supervision (Son et al., 2017). This need might be closely associated with the conditions of constant change and uncertainty in new work environment. Under these circumstances, the level of monitoring that the employees receive from their supervisors is critical as it affects whether and how self-leaders capitalize on close supervision to attain superior work role performance. When the supervisor monitoring is adequate, self-leaders can get sufficient feedback and guidance to nurture their empowerment at work and enhance their core task performance. On the other hand, when the level of supervisor close monitoring is on extremes (very high or very low), it might impair self-leaders' empowerment and the resulting job performance. Accordingly, supervisors should neither closely monitor nor leave self-leaders completely on their own in the accomplishment of their core tasks.

Limitations and future research agenda

Our research has some limitations that might guide the future research. The first limitation is the common method bias and the use of a self-reported measure of work role performance in Study 1. Although we intended to overcome this limitation in Study 2 by employing a cross-lagged design and including supervisor-rated employee performance, future research can investigate employees' work role performance with a much more objective measure. This would better address methodological issues regarding the subjective measurement of performance and the plausible common method bias.[5]

Second, our study investigates the performance outcomes of self-leadership and supervisor close monitoring with samples from Turkey that has been characterized as a power-distant, collectivist country (Hofstede, 1980; Aycan, 2008; Bedi, 2020). Yet, prior research has revealed that even the cross-cultural generalizability of self-leadership dimensions is lacking and thus scholars need to work with cross-cultural samples to identify generalizable self-leadership behaviors (Neubert et al., 2006; Georgianna, 2007). Based on this, future research can gather data from cross-culturally comparative samples or within different cultural contexts to validate our findings and to investigate whether and how cultural values or characteristics moderate the performance outcomes of self-leadership.

Another limitation of our study lies in the small sample size of both studies. Although we endeavored to increase the sample size particularly in the second study, conducting the data collection in two different waves and receiving performance evaluations from direct supervisors made it difficult to increase the sample size within the predetermined time frame and budget of the project. On the other hand, despite the small sample size and using a time-lagged design, we were able to validate most of our hypotheses. Still, future studies might replicate and extend the current findings with larger and more representative samples, in which the respondents work remotely for extended time periods.

In our study, we aimed to reach employees who worked primarily from home and who had minimum interaction with their supervisors and coworkers in the office environment. Although the majority of the employees in our sample were full-time remote workers ($n_{full\text{-}time} = 146$ out of 174, 84% for Study 1 and $n_{full\text{-}time} = 146$ out of 160, 91%; $n_{full\text{-}time} = 126$ out of 135, 93% for Study 2, Time 1 and Time 2, respectively), we acknowledge the need for future studies to test our model with employees who work as permanent, full-time remote workers.

Finally, our findings suggest that the outcomes of close supervision for self-leaders may heavily depend on the level of monitoring is performed by supervisors as well as the type of expected performance outcome. In the case of adaptive and proactive performance, self-leaders may suffer from close supervision as it might get in the way of their psychological empowerment. On the other hand, supervisor close monitoring, if implemented at an optimum level (i.e., adequate supervision) might have nourishing effects on self-leaders' core job performance. Hence, it is important for future studies to clarify what should be the adequate level of monitoring that is implemented by the supervisors for different performance outcomes (i.e., proficiency, adaptivity, proactivity) and in in different work contexts (e.g., remote work, virtual teams).

Conclusion

Exploring the indirect impact of self-leadership on work role performance *via* psychological empowerment, this study

5 To deal with the common method bias in both studies, we applied some procedural remedies. In the survey design, items of the mediator variable (psychological empowerment) were presented before the independent variable (self-leadership) as recommended by Podsakoff et al. (2003). Moreover, we measured all variables using well-validated scales to reduce the measurement error and thereby to minimize the occurrence of common method bias. Finally, in Study 1, we measured employees' job performance 1 week after the initial application of the survey.

revealed that psychological empowerment is an influential mechanism that links self-leadership to work role performance. On the other hand, the moderating impact of supervisor close monitoring was found for two of the work role performance outcomes (task adaptivity and proactivity). Such findings are noteworthy for managers and human resource management professionals as they speak to the importance of (a) laying the necessary ground for the development and implementation of self-leadership skills in remote work settings and (b) determining the appropriate level of monitoring provided to self-leaders—as it might be necessary to enhance their task proficiency, but redundant for increasing their task adaptivity and proactivity.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

Author contributions

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

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2022.988105/full#supplementary-material

References

Amundsen, S., and Martinsen, Ø. L. (2015). Linking empowering leadership to job satisfaction, work effort, and creativity: the role of self-leadership and psychological empowerment. *J. Leadersh. Org. Stud.* 22, 304–323. doi: 10.1177/1548051814565819

Avey, J. B., Nimnicht, J. L., and Pigeon, N. G. (2010). Two field studies examining the association between positive psychological capital and employee performance. *Leadersh. Org. Dev. J.* 31, 384–401. doi: 10.1108/01437731011056425

Aycan, Z. (2008). "Cross-cultural approaches to leadership," in *The handbook of cross cultural management research*. eds. P. B. P. Smith, M. F. Peterson and D. C. Thomas (Thousand Oaks, CA: Sage), 219–238.

Aydın-Düzgit, S., Kutlay, M., and Keyman, E. F. (2021). Politics of pandemic management in Turkey. *IPC Policy Brief*, 20211025–00101541.

Bailey, S. F., Barber, L. K., and Justice, L. M. (2018). Is self-leadership just self-regulation? Exploring construct validity with HEXACO and self-regulatory traits. *Curr. Psychol.* 37, 149–161. doi: 10.1007/s12144-016-9498-z

BBC News (2021). Covid: Turkey enters first full lockdown (29 April 2021). Available at: https://www.bbc.com/news/world-europe-56912668 (Accessed October 9, 2022).

Bedi, A. (2020). A meta-analytic review of paternalistic leadership. *App. Psy.* 69, 960–1008. doi: 10.1111/apps.12186

Bindl, U. K., and Parker, S. K. (2010). "Proactive work behavior: forward-thinking and change-oriented action in organizations," in *APA handbook of industrial and organizational psychology*. *Vol. 2*. ed. S. Zedeck (Washington, DC: American Psychological Association), 567–598.

Bonias, D., Bartram, T., Leggat, S. G., and Stanton, P. (2010). Does psychological empowerment mediate the relationship between high performance work systems and patient care quality in hospitals? *Asia Pac. J. Hum. Resour.* 48, 319–337. doi: 10.1177/1038411110381667

Brislin, R. W. (1986). "The wording and translation of research instruments," in *Field methods in cross-cultural research*. eds. W. J. Lonner and J. W. Berry (Beverly Hills, CA: Sage), 137–164.

Castellano, S., Chandavimol, K., Khelladi, I., and Orhan, M. A. (2021). Impact of self-leadership and shared leadership on the performance of virtual R & D teams. *J. Bus. Res.* 128, 578–586. doi: 10.1016/j.jbusres.2020.12.030

Cerasoli, C. P., Nicklin, J. M., and Ford, M. T. (2014). Intrinsic motivation and extrinsic incentives jointly predict performance: a 40-year meta-analysis. *Psychol. Bull.* 140, 980–1008. doi: 10.1037/a0035661

Chaijukul, Y. (2010). An examination of self-leadership performance mechanism model in Thai private organization. *J. Behav. Sci.* 5, 1–14. doi: 10.1007/s12144-021-01697-5

Choi, J. N., Anderson, T. A., and Veillette, A. (2009). Contextual inhibitors of employee creativity in organizations: the insulating role of creative ability. *Gr. Organ. Manag.* 34, 330–357. doi: 10.1177/1059601108329811

Chong, S., Huang, Y., and Chang, C. H. D. (2020). Supporting interdependent telework employees: a moderated-mediation model linking daily COVID-19 task setbacks to next-day work withdrawal. *J. Appl. Psychol.* 105, 1408–1422. doi: 10.1037/apl0000843

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. *2nd Edn*. Hillsdale, New Jerssey, NJ: Lawrence Earlbaum Associates.

Costantini, A., and Weintraub, J. (2022). The benefits of being proactive while working remotely: leveraging self-leadership and job crafting to achieve higher work engagement and task significance. *Front. Psychol.* 13:833776. doi: 10.3389/fpsyg.2022.833776

Credé, M., and Harms, P. D. (2015). 25 years of higher-order confirmatory factor analysis in the organizational sciences: a critical review and development of reporting recommendations. *J. of Organ. Behav.* 36, 845–872. doi: 10.1002/job.2008

DBA Turkey. (2021). Covid-19 situation in Turkey. Available at: https://www.dbaturkey.org/covid-19/ (Accessed October 9, 2022).

Deci, E. L., Olafsen, A. H., and Ryan, R. M. (2017). Self-determination theory in work organizations: the state of a science. *Ann. Rev. Organ. Psychol. Organ. Behav.* 4, 19–43. doi: 10.1146/annurev-orgpsych-032516-113108

Dimitrova, D. (2003). Controlling teleworkers: supervision and flexibility revisited. *New Technol. Work Employ.* 18, 181–195. doi: 10.1111/1468-005X.00120

Economist (2020). What Turkey got right about the pandemic. Available at: https://www.economist.com/europe/2020/06/04/what-turkey-got-right-about-the-pandemic (Accessed October 9, 2022).

Forbes (2021). Monitoring remote workers: The good, the bad and the ugly. Available at: https://www.forbes.com/sites/forbesagencycouncil/2021/12/08/monitoring-remote-workers-the-good-the-bad-and-the-ugly/?sh=77d7b0b11da8 (Accessed October 11).

Fornell, C., and Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *J. Market. Res.* 18, 39–50. doi: 10.1177/002224378101800104

Gan, J., Zhou, Z. E., Tang, H., Ma, H., and Gan, Z. (2022). What it takes to be an effective "remote leader" during covid-19 crisis: the combined effects of supervisor control and support behaviors. *Int. J. Hum. Res. Man.* doi: 10.1080/09585192.2022.2079953

García-Chas, R., Neira-Fontela, E., and Varela-Neira, C. (2015). Comparing the explanatory capacity of three constructs in the prediction of engineers' proficiency, adaptivity, and proactivity. *Hum. Resour. Manage.* 54, 689–709. doi: 10.1002/hrm.21639

George, J. M., and Zhou, J. (2001). When openness to experience and conscientiousness are related to creative behavior: an interactional approach. *J. Appl. Psychol.* 86, 513–524. doi: 10.1037/0021-9010.86.3.513

Georgianna, S. (2007). Self-leadership: a cross-cultural perspective. *J. Man. Psy.* 22, 569–589. doi: 10.1108/02683940710778440

Gephart, R. P. Jr. (2002). Introduction to the brave new workplace: organizational behavior in the electronic age. *J. Organ. Behav.* 23, 327–344. doi: 10.1002/job.143

Goldsby, M. G., Goldsby, E. A., Neck, C. B., Neck, C. P., and Mathews, R. (2021). Self-leadership: a four-decade review of the literature and trainings. *Admin. Sci.* 11:25. doi: 10.3390/admsci11010025

Gong, B., and Sims, R. L. (2023). Psychological contract breach during the pandemic: how an abrupt transition to a work from home schedule impacted the employment relationship. *J. Bus. Res.* 154:113259. doi: 10.1016/j.jbusres.2022.08.023

Griffin, M. A., Neal, A., and Parker, S. K. (2007). A new model of work role performance: positive behavior in uncertain and interdependent contexts. *Acad. Manage. J.* 50, 327–347. doi: 10.5465/amj.2007.24634438

Grant, A. M., and Parker, S. K. (2009). Redesigning work design theories: the rise of relational and proactive perspectives. *Acad. of Manage. Ann.* 317–375. doi: 10.1080/19416520903047327

Griffin, M. A., Parker, S. K., and Mason, C. M. (2010). Leader vision and the development of adaptive and proactive performance: a longitudinal study. *J. Appl. Psychol.* 95, 174–182. doi: 10.1037/a0017263

Hauschildt, K., and Konradt, U. (2012). Self-leadership and team members' work role performance. *J. Manag. Psychol.* 27, 497–517. doi: 10.1108/02683941211235409

Henseler, J., Ringle, C. M., and Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *J. Acad. Market Sci.* 43, 115–135. doi: 10.1007/s11747-014-0403-8

Hofstede, G. (1980). *Culture's consequences: International differences in work-related values*. Beverly Hills, CA: Sage Publications.

Houghton, J. D., Dawley, D., and DiLiello, T. C. (2012). The abbreviated self-leadership questionnaire (ASLQ): a more concise measure of self-leadership. *Internat. J. Leadersh. Stud.* 7, 216–232.

Houghton, J. D., and Neck, C. P. (2002). The revised self-leadership questionnaire: testing a hierarchical factor structure for self-leadership. *J. Man. Psychol.* 17, 672–691. doi: 10.1108/02683940210450484

Houghton, J. D., and Yoho, S. K. (2005). Toward a contingency model of leadership and psychological empowerment: when should self-leadership be encouraged? *J. Leadersh. Organ. Stud.* 11, 65–83. doi: 10.1177/107179190501100406

Hu, L. T., and Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Struct. Equ. Model. Multidiscip. J.* 6, 1–55. doi: 10.1080/10705519909540118

Inam, A., Ho, J. A., Sheikh, A. A., Shafqat, M., and Najam, U. (2021). How self-leadership enhances normative commitment and work performance by engaging people at work? *Curr. Psychol.* 1-14, 1–14. doi: 10.1007/s12144-021-01697-5

Kalra, A., Agnihotri, R., Singh, R., Puri, S., and Kumar, N. (2021). Assessing the drivers and outcomes of behavioral self-leadership. *Eur. J. Mark.* 55, 1227–1257. doi: 10.1108/EJM-11-2018-0769

Kim, S. L. (2019). The interaction effects of proactive personality and empowering leadership and close monitoring behaviour on creativity. *Creat. Innov. Manag.* 28, 230–239. doi: 10.1111/caim.12304

Kniffin, K. M., Narayanan, J., Anseel, F., Antonakis, J., Ashford, S. P., Bakker, A. B., et al. (2021). COVID-19 and the workplace: implications, issues, and insights for future research and action. *Am. Psychol.* 76, 63–77. doi: 10.1037/amp0000716

Konradt, U., Andreßen, P., and Ellwart, T. (2009). Self-leadership in organizational teams: a multilevel analysis of moderators and mediators. *Eur. J. Work Organ. Psy.* 18, 322–346. doi: 10.1080/13594320701693225

Kurland, N. B., and Cooper, C. D. (2002). Manager control and employee isolation in telecommuting environments. *J. High Technol. Managem. Res.* 13, 107–126. doi: 10.1016/S1047-8310(01)00051-7

Lautsch, B. A., Kossek, E. E., and Eaton, S. C. (2009). Supervisory approaches and paradoxes in managing telecommuting implementation. *Hum. Relat.* 62, 795–827. doi: 10.1177/0018726709104543

Lebel, R. D., and Patil, S. V. (2018). Proactivity despite discouraging supervisors: the powerful role of prosocial motivation. *J. Appl. Psychol.* 103, 724–737. doi: 10.1037/apl0000301

Lee, J., Yun, S., Lee, S., and Lee, J. (2019). The curvilinear relationship between self-efficacy and creativity: the moderating role of supervisor close monitoring. *J. Bus. Psychol.* 34, 377–388. doi: 10.1080/713769649

Mahembe, B., Engelbrecht, A., and Wakelin, Z. (2017). A study to assess the reliability and construct validity of the abbreviated self-leadership questionnaire: a south African study. *South Afr. J. Psychol.* 47, 356–366. doi: 10.1177/0081246316675139

Manz, C. C. (1986). Self-leadership: toward an expanded theory of self-influence processes in organizations. *Acad. Manage. Rev.* 11, 585–600. doi: 10.5465/amr.1986.4306232

Manz, C. C. (1992). Self-leadership. The heart of empowerment. *J. Qual. Part.* 15, 80–85.

Manz, C. C., and Sims, H. P. Jr. (1980). Self-management as a substitute for leadership: a social learning perspective. *Acad. Manage. Rev.* 5, 361–367. doi: 10.5465/amr.1980.4288845

Marques-Quinteiro, P., and Curral, L. A. (2012). Goal orientation and work role performance: predicting adaptive and proactive work role performance through self-leadership strategies. *J. Psychol.* 146, 559–577. doi: 10.1080/00223980.2012.656157

Marques-Quinteiro, P., Vargas, R., Eifler, N., and Curral, L. (2019). Employee adaptive performance and job satisfaction during organizational crisis: the role of self-leadership. *Eur. J. Work Organ. Psy.* 28, 85–100. doi: 10.1080/1359432X.2018.1551882

Marsh, H. W. (1987). The hierarchical structure of self-concept and the application of hierarchical confirmatory factor analysis. *J. Educ. Meas.* 24, 17–39. doi: 10.1111/j.1745-3984.1987.tb00259.x

Martin, S. L., Liao, H., and Campbell, E. M. (2013). Directive versus empowering leadership: a field experiment comparing impacts on task proficiency and proactivity. *Acad. Manage. J.* 56, 1372–1395. doi: 10.5465/amj.2011.0113

Matsuo, M. (2019). Personal growth initiative as a predictor of psychological empowerment: the mediating role of job crafting. *Hum. Resour. Dev. Quart.* 30, 343–360. doi: 10.1002/hrdq.21347

Mayfield, M., and Mayfield, J. (2021). Sound and safe: the role of leader motivating language and follower self-leadership in feelings of psychological safety. *Admin. Sci.* 11, 1–30. doi: 10.3390/admsci11020051

Mayfield, J., Mayfield, M., and Neck, C. P. (2021). Speaking to the self: how motivating language links with self-leadership. *Int. J. Bus. Commun.* 58, 31–54. doi: 10.1177/2329488841773186

Mishra, M., and Ghosh, K. (2020). Supervisor monitoring and subordinate work attitudes: a need satisfaction and supervisory support perspective. *Leadersh. Org. Dev. J.* 41, 1089–1105. doi: 10.1108/LODJ-05-2019-0204

Morin, A. J., Meyer, J. P., Bélanger, É., Boudrias, J. S., Gagné, M., and Parker, P. D. (2016). Longitudinal associations between employees' beliefs about the quality of the change management process, affective commitment to change and psychological empowerment. *Hum. Relat.* 69, 839–867. doi: 10.1177/0018726715602046

Mulaik, S. A., James, L. R., Van Alstine, J., Bennett, N., Lind, S., and Stilwell, C. D. (1989). Evaluation of goodness-of-fit indices for structural equation models. *Psychol. Bull.* 105, 430–445. doi: 10.1037/0033-2909.105.3.430

Müller, T., and Niessen, C. (2019). Self-leadership in the context of part-time teleworking. *J. Organ. Behav.* 40, 883–898. doi: 10.1002/job.2371

Neck, C. P., and Houghton, J. D. (2006). Two decades of self-leadership theory and research: past developments, present trends, and future possibilities. *J. Manag. Psychol.* 21, 270–295. doi: 10.1177/0018726715602046

Neck, C. P., and Manz, C. C. (1996). Thought self-leadership: the impact of mental strategies training on employee cognition, behavior, and affect. *J. Organ. Behav.* 17, 445–467.doi:10.1002/(SICI)1099-1379(199609)17:5<445::AID-JOB770>3.0.CO;2-N

Nel, P., and Van Zyl, E. (2015). Assessing the psychometric properties of the revised and abbreviated self-leadership questionnaires. *SA Hum. Resour. Manag.* 13, 1–8. doi: 10.4102/sajhrm.v13i1.661

Neubert, M. J., and Cindy, W. (2006). Investigation of the generalizability of the Houghton and Neck revised self-leadership questionnaire to a Chinese context. *J. Man. Psy.* 21, 360–373. doi: 10.1108/02683940610663132

Our World in Data (2022). Turkey: Coronavirus pandemic country profile. Available at: https://ourworldindata.org/coronavirus/country/turkey (Accessed October 9, 2022).

Panagopoulos, N. G., and Ogilvie, J. (2015). Can salespeople lead themselves? Thought self-leadership strategies and their influence on sales performance. *Ind. Mark. Manag.* 47, 190–203. doi: 10.1016/j.indmarman.2015.02.043

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., and Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *J. Appl. Psychol.* 88, 879–903. doi: 10.1037/0021-9010.88.5.879

Rietzschel, E. F., Slijkhuis, M., and Van Yperen, N. W. (2014). Close monitoring as a contextual stimulator: how need for structure affects the relation between close monitoring and work outcomes. *Eur. J. Work Organ. Psy.* 23, 394–404. doi: 10.1080/1359432X.2012.752897

Selig, J. P., and Preacher, K. J. (2009). Mediation models for longitudinal data in developmental research. *Res. Hum. Dev.* 6, 144–164. doi: 10.1080/15427600902911247

Sitkin, S. B., and Roth, N. L. (1993). Explaining the limited effectiveness of legalistic "remedies" for trust/distrust. *Org. Sci.* 4, 367–392. doi: 10.1287/orsc.4.3.367

Son, S. C. Y., Cho, D. H., and Kang, S. W. (2017). The impact of close monitoring on creativity and knowledge sharing: the mediating role of leader-member exchange. *Creat. Innov. Manag.* 26, 256–265. doi: 10.1111/caim.12219

Soper, D. S. (2020). Post-hoc statistical power calculator for multiple regression [software], Available online at: https://www.danielsoper.com/statcalc/ (Accessed October 10, 2022).

Spreitzer, G. M. (1995). Psychological empowerment in the workplace: dimensions, measurement, and validation. *Acad. Manage. J.* 38, 1442–1465. doi: 10.5465/256865

Sun, L. Y., Zhang, Z., Qi, J., and Chen, Z. X. (2012). Empowerment and creativity: a cross-level investigation. *Leadersh. Q.* 23, 55–65. doi: 10.1016/j.leaqua.2011.11.005

Thomas, K. W., and Velthouse, B. A. (1990). Cognitive elements of empowerment: an "interpretive" model of intrinsic task motivation. *Acad. Manage. J.* 15, 666–681. doi: 10.5465/amr.1990.4310926

Thomas, J. P., Whitman, D. S., and Viswesvaran, C. (2010). Employee proactivity in organizations: a comparative meta-analysis of emergent proactive constructs. *J. Occup. Organ. Psychol.* 83, 275–300. doi: 10.1348/096317910X502359

van der Stoep, J. J. (2019). Power to the people: employee empowerment in contemporary organizations. Available at: https://research.vu.nl/ws/portalfiles/portal/79047696/complete+dissertation.pdf

Vandenberg, R. J., and Lance, C. E. (2000). A review and synthesis of the measurement invariance literature: suggestions, practices, and recommendations for organizational research. *Organ. Res. Meth.* 3, 4–70. doi: 10.1177/109442810031002

Wang, B., Liu, Y., Qian, J., and Parker, S. K. (2021). Achieving effective remote working during the COVID-19 pandemic: a work design perspective. *App. Psychol.* 70, 16–59. doi: 10.1111/apps.12290

Whitener, E. M., Brodt, S. E., Korsgaard, M. A., and Werner, J. M. (1998). Managers as initiators of trust: an exchange relationship framework for understanding managerial trustworthy behavior. *Acad. Manage. Rev.* 23, 513–530. doi: 10.2307/259292

Wilson, J. H. (2011). Freedom at work: psychological empowerment and self-leadership. *Inter. J. Bus. Pub. Admin.* 8, 106–124.

Williams, L. J., and Anderson, S. E. (1991). Job satisfaction and organizational commitment as predictors of organizational citizenship and in-role behaviors. *J. of Manage.* 17, 601–617. doi: 10.1177/014920639101700305

Wu, C.-H., Tian, A. W., Luksyte, A., and Spitzmueller, C. (2017). On the association between perceived overqualification and adaptive behavior. *Pers. Rev.* 46, 339–354. doi: 10.1108/PR-05-2015-0134

Xu, Y., and Zhang, M. (2022). The study of the impact of empowering leadership on adaptive performance of faculties based on chain mediating. *Front. Psychol.* 13:938951. doi: 10.3389/fpsyg.2022.938951

Zhang, M. J., Law, K. S., and Lin, B. (2016). You think you are big fish in a small pond? Perceived overqualification, goal orientations, and proactivity at work. *J. Organ. Behav.* 37, 61–84. doi: 10.1002/job.2024

Zhang, X., Qian, J., Wang, B., Jin, Z., Wang, J., and Wang, Y. (2017). Leaders' behaviors matter: the role of delegation in promoting employees' feedback-seeking behavior. *Front. Psychol.* 8:920. doi: 10.3389/fpsyg.2017.00920

Zhou, J. (2003). When the presence of creative coworkers is related to creativity: role of supervisor close monitoring, developmental feedback, and creative personality. *J. Appl. Psychol.* 88, 413–422. doi: 10.1037/0021-9010.88.3.413

Zimmerman, M. A. (1995). Psychological empowerment: Issues and illustrations. *Amer. J. of Commun. Psychol.* 23, 581–599. doi: 10.1007/BF02506983

Zimmerman, M. A. (2000). "Empowerment theory: Psychological, organizational, and community levels of analysis," in *Handbook of Community Psychology*. eds. Rappaport and E. Seidman (New York, NY: Kluwer Academic/Plenum), 43–63.

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Working from home and its challenges for transformational and health-oriented leadership

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The Covid-19 crisis forced many employees to abruptly relocate their workplace from the office to their homes. As working from home is expected to remain part of our working world, consequences for leadership need to be examined. Our study aims to investigate the concrete challenges regarding the feasibility of transformational leadership and health-oriented leadership in this remote setting. Therefore, we collected quantitative and qualitative data of 23 leaders and 18 employees from various organizations in Germany. Both groups were asked to report their experiences during working from home in comparison to the traditional office setting. Findings of our study provide a comprehensive understanding regarding the underlying mechanism that impede transformational and health-oriented leadership in the remote setting. Among them participants reported a lack of social presence, limited informal chats, communication difficulties and lack of mutual trust. Based on our findings we derive practical implications for leaders and HR practitioners.

KEYWORDS

working from home, virtual leadership, transformational leadership, health-oriented leadership, virtual communication

Introduction

The COVID-19 crisis provoked immense changes in the world of working. To avoid getting infected and spreading the virus many employees were forced to abruptly relocate their workplace from the office to their homes (Kaushik and Guleria, 2020). Accordingly, working from home (WFH) increased significantly in most organizations (Hans-Böckler-Stiftung, 2021) and brought both challenges and opportunities. Positive consequences that emerged with WFH are for example better integration of family and work, less distraction from colleagues and less commuting (Al-Habaibeh et al., 2021) whereas reduced communication with colleagues, isolation and an inadequate home office environment (e.g., no separate room for work activities, poor internet connection…) have come up as challenges (Xiao et al., 2021). One group that experiences a particularly strong transformation and increased challenges in their daily working life are leaders (Kirchner et al., 2021). Previous literature has already claimed that the principles and concepts of leadership found in the traditional office setting cannot be simply transferred to the remote

setting (Hoch and Kozlowski, 2014). For example, leaders report an increase in working hours, additional administration and difficulties in keeping in touch with their followers (Kirchner et al., 2021). Another challenge that goes along with the reduced contact are difficulties in motivating followers and in maintaining trust in their work ethics and engagement (Avolio et al., 2001; Bell and Kozlowski, 2002). While there is already some understanding of general challenges and demands for leadership, the impact of WFH for specific leadership styles is still unclear. In our study we focus on the two well-established leadership styles transformational leadership (TFL; Bass and Riggio, 2006) and health-oriented leadership (HOL; Franke et al., 2014) as their effectiveness for employees' performance (Wang et al., 2011) and health (Franke and Felfe, 2011; Arnold and Rigotti, 2021; Kaluza et al., 2021) was proven in numerous studies for the traditional office setting. Leaders who execute these leadership styles are perceived as charismatic and inspiring (Bass and Riggio, 2006) and are well aware of the health status of their employees (Franke et al., 2014). This leads to increased performance, commitment and satisfaction among employees (Judge and Piccolo, 2004; Braun et al., 2013; Klebe et al., 2021). However, as social interaction is limited during WFH (Lal et al., 2021) especially these employee-oriented leadership styles that thrive on regular contact and face-to-face communication might suffer.

Previous studies on the effectiveness of remote transformational leadership provide inconsistent results. While Purvanova and Bono (2009) report an increase of TFL in an experimental remote setting, others found that effectiveness decreased with geographically dispersed teams (Hoch and Kozlowski, 2014; Eisenberg et al., 2019). Reasons for these contradictory results could be the feasibility of TFL and how leaders behave in the remote context. Therefore, it is necessary to investigate the challenges regarding the feasibility of TFL and HOL in the WFH context and to derive practical implications. To date there are only few studies that have addressed this question. Among them, Liebermann et al. (2021) conducted interviews with leaders in the public sector to investigate the difficulties to display TFL when switching from the office to WFH and identified general demanding working conditions (e.g., workload, time pressure, role conflicts) which become stronger in the remote context. Similarly, Efimov et al. (2020) conducted interviews to analyze HOL behaviors of remote leaders and found that distance makes it more difficult to detect signs of stress.

As literature is scarce, there is a need for a more comprehensive understanding of how specific characteristics of the digital context impair or facilitate the feasibility of sub-dimensions of TFL and HOL. To close this research gap, we collected quantitative and qualitative data from 23 leaders and 18 employees who were asked to directly compare their experiences during WFH with the office setting. We chose a quantitative and qualitative approach because the combination of both methods provides a deeper insight than either method alone (Bryman, 2003). While the quantitative data allow us to identify systematic differences between WFH and working in the office, the qualitative data shed deeper light on the reasons and causes for the differences between the two contexts. Further we decided to collect data from both leaders and employees as past research has only focused on the leader perspective (Efimov et al., 2020; Liebermann et al., 2021). We decided to include the perspectives of employees as they are the ones who are directly affected by the leadership styles and may report different experiences.

The purpose of our study is to bring new insights into the factors that might impede TFL and HOL during WFH. Based on our findings we derive practical implications for leaders. Leaders need to be aware of the challenges for leadership during WFH and the factors that influence feasibility. Only by addressing these challenges, leaders will be able to successfully and effectively lead their employees in the remote context. These implications are especially relevant when leaders and employees spend most of their working time at home and the possibility to compensate the challenges by meeting regularly in the office is limited. Our findings will contribute to the literature on WFH with focusing on TFL and HOL by identifying relevant boundary conditions and offering new perspectives for further research.

Theory and research questions

Leadership and working from home

The Covid-19 crisis acted as an accelerator for WFH (Wethal et al., 2022). Before, in most organizations only small parts of the staff worked regularly from home, often with agreements that allow only one working day from home in a week. The COVID-19 pandemic interrupted this situation and enforced all employees to work full time from home if their job could be accomplished outside of the office (Steude, 2021). Many employees benefited from WHF due to more flexible working hours and better integration of work and private life (Al-Habaibeh et al., 2021). Because of that about 50% of the employees wish to remain in a hybrid working model in the future with 2 or 3 working days a week from home and even 21% wish to spend almost their entire working time from home (Krick et al., 2022). Also, many organizations support WFH and tend to permanently transfer some of their employees to remote positions to save costs (Gartner, 2020). As it is to be expected that WFH remains part of our working world, consequences and challenges need to be examined and addressed.

One group that experiences particular challenges are leaders (Kirchner et al., 2021). Their leadership role becomes more challenging. At the same time it gets more relevant to keep the team together and to ensure cooperation among followers (Contreras et al., 2020). Leadership tasks can be generally divided into two categories: (1) monitoring and managing of ongoing activities in the department and within the team and (2) communication, collaboration and shaping team processes (Bell and Kozlowski, 2002). Regarding the first leadership function, leaders have additional administrative tasks like reorganizing

projects and ensuring collaboration during WFH. Regarding the second leadership function, leaders suffer from limited communication and interaction with their followers (Kirchner et al., 2021). The digitalized communication might provoke misunderstandings because the tone of a message is not conveyed in written language. For example, humor and irony are more difficult to understand (van Wart et al., 2019). Moreover, for leaders it is more difficult to access their followers due to the physical distance. It needs more effort to start a conversation and especially spontaneous informal chats are limited (van Wart et al., 2016; Kirchner et al., 2021). Leaders need to make an extra effort to create cohesion and team spirit between followers and to develop new employees into one work unit in the remote setting (Kozlowski et al., 1996). Overall, it is important to understand that leadership in the remote context follows its own rules (Avolio and Kahai, 2003). Leaders must adapt to the new remote conditions and adopt new communication and relationship building methods (Contreras et al., 2020).

While there is already some understanding regarding general challenges for leadership in the new employees into one work unit in the remote setting (Kozlowski et al., 1996), literature regarding the consequences of WFH for specific leadership styles that depend on regular communication and face-to-face interaction is scarce. Two of these leadership styles which are well-established are TFL (Bass and Riggio, 2006) and HOL (Franke and Felfe, 2011; Franke et al., 2014). In the following we will elaborate on specific challenges and consequence for these leadership styles during WFH and explore if and to what extent they are still feasible in a setting with limited interaction and communication.

Transformational leadership

TFL is one of the most studied leadership styles in the current literature and has proven its effectiveness for performance, job satisfaction and commitment in the traditional office setting in numerous studies (Judge and Piccolo, 2004; Tims et al., 2011; Wang et al., 2011; Braun et al., 2013). The concept of TFL aims to increase intrinsic motivation of employees and differentiates four sub-dimensions: (1) idealized influence (acting as a role model; transmitting values and beliefs), (2) inspirational motivation (inspiring, motivating with demanding goals; emphasizing team spirit), (3) intellectual stimulation (encouraging followers to think outside the box) and (4) individualized consideration (knowing and considering the individual needs and strengths of followers; Bass and Riggio, 2006).

Empirical evidence found in the traditional office setting cannot be simply transferred to the remote setting (Hoch and Kozlowski, 2014). Effectiveness and feasibility might differ in a context with limited interaction, digital communication and lack of social interaction. However, the few studies that have investigated TFL in the remote context show inconsistent results. While some studies found that the effectiveness decreases (Hoch and Kozlowski, 2014; Eisenberg et al., 2019), others report the opposite (Purvanova and Bono, 2009). Possible reasons for a decrease of TFL could be the lack of contact and the use of digital media for communication (Hoch and Kozlowski, 2014; Eisenberg et al., 2019). Eisenberg et al. (2019) speculate that leaders' authenticity is declined due to the distance and lack of face-to-face interaction. In contrast, Purvanova and Bono (2009) found that TFL is more effective for team performance in a setting with only e-mail communication, compared to a face-to-face setting. They explain their results by suggesting that leaders might put more effort into displaying TFL behaviors in the remote setting to compensate the uncertain and ambiguous situation. In a current study, Liebermann et al. (2021) conducted interviews in the public sector during the Covid-19 crisis and found that primarily demanding working conditions become stronger in the WFH context and therefore challenge the feasibility of TFL.

In the following we outline which specific challenges may influence the feasibility of the different sub-dimensions of TFL during WFH. *Idealized influence* might be hindered because of the limited contact and interaction between leaders and employees. They only talk occasionally with each other or not even at all (Kirchner et al., 2021). This lack of contact might impede being perceived as role model. As the bonding between leader and employee is looser and more fragile, inspiring messages from the leader might be perceived as inauthentic and out of place. Further missing information in conversations like tone, mimics, gesture and body language might lead to misunderstandings (Wang et al., 2020) and hence impair the effects of inspirational messages. This is in line with Eisenberg et al. (2019) who speculate that the geographic distance makes it more difficult for leaders to be perceived as authentic role models and to reach followers on an emotional level. A challenge for *inspirational motivation* is primarily that leaders no longer receive much information from their followers. Bell and Kozlowski (2002) assume that in the remote setting it is difficult for leaders to capture the atmosphere within the team and to manage team dynamics. Therefore, it might be more difficult to share a common vision and to encourage the team spirit. Also, Liebermann et al. (2021) found that the lack of communication impairs the assessment of the followers' level of motivation so that leaders do not know when to intervene. *Intellectual stimulation* might be challenged due to the fact that there is often no adequate technological equipment like videoconferencing tools (Liebermann et al., 2021) so that leaders and followers cannot elaborate on ideas face-to-face with each other and have no possibility to share their screens to show something and ensure common understanding. Also, meetings are more efficient and more accurately timed so there might be less room for brainstorming, letting thoughts flow and taking time to develop ideas. Creative thinking also needs breaks. But these might feel strange and lead to misunderstandings during digital communication because the other person does not know if the break is related to a technical problem, distraction or thinking processes. Further, the generation of new ideas often happens in spontaneous chats (McAlpine, 2018) which are limited during WFH. *Individualized consideration* may decrease in the remote

context as this dimension particularly thrives on regular contact and communication. To consider the individual needs and strengths of followers, leaders must know them very well. However, during WFH leaders do barely get any private information about their followers as spontaneous informal chats are limited. Eisenberg et al. (2019) postulate that as it is more difficult for leaders to recognize when followers need help and support, they feel more inhibited to approach them proactively.

Research Question 1: Which challenges do leaders perceive in executing (a) idealized influence, (b) inspirational motivation, (c) intellectual stimulation, and (d) individualized consideration when WFH compared to working in the office?

Research Question 2: To what extent do employees perceive (a) idealized influence, (b) inspirational motivation, (c) intellectual stimulation, and (d) individualized consideration from their leader when WFH compared to working in the office? And what are the reasons for different perceptions?

Health-oriented leadership

While TFL rather focuses on increasing employees' performance, satisfaction, and engagement, HOL specifically aims to increase health and well-being (Franke et al., 2014). As a multidimensional construct, HOL consists of the three components StaffCare (leaders considering and actively promoting their followers' health), leader SelfCare and follower SelfCare (taking care of one's own health). Each of these components can be broken down into the three sub-dimensions of value, awareness, and behavior (Franke et al., 2014). In our study we mainly focus on StaffCare and its three sub-dimensions because we aim to particularly investigate the challenges for leadership. SelfCare we conducted just in employees' interviews. StaffCare *value* means attaching importance and willingness to take over responsibility for the health of followers as a leader. *Awareness* means being aware and sensitive of warning signals regarding the health status of followers. *Behavior* refers to promoting and engaging in concrete health-oriented activities (e.g., encouraging to take breaks and participate in occupational health programs, improving work environments). While there is much evidence for positive effects of HOL for employees' health in the traditional office setting (Franke et al., 2014; Klug et al., 2019; Arnold and Rigotti, 2021; Kaluza et al., 2021) it is unclear if these findings can be transferred to the remote setting. To date, we are only aware of one study that deals with HOL in a remote setting. Efimov et al. (2020) conducted an interview study with leaders of virtual teams and identified first insights regarding feasibility and possible action steps to promote HOL. However, the concrete challenges and opportunities regarding the three sub-dimensions are still unclear. In the following we will outline which specific challenges may influence the feasibility of the different sub-dimensions. Regarding *value*, it can be assumed that leaders attach less importance to promoting followers' health in the WFH context because they have less access to their followers and therefore, they might feel less responsible for their health. In their study, Efimov et al. (2020) found that leaders do not feel responsible for employees' health but for creating a healthy environment. However, it is questionable if leaders succeed in doing this. Moreover, as communication is very limited (Kirchner et al., 2021) leaders might use the few conversations they have with their followers for rather talking about tasks and goals and not about health issues. *Awareness* might also be challenged during WFH. Warning signals for health issues are often conveyed over mimics, body language and tone. This nonverbal information is especially limited when communication only happens *via* digital media (Fayard et al., 2021). So, it can be expected that it becomes more difficult for leaders to recognize when their followers feel stressed or sick. This assumption goes along with the findings from Efimov et al. (2020). Additionally, followers might be more hindered to disclose private health issues to their leader because it is more difficult to develop a trustful atmosphere in the remote context. In terms of the third sub-dimension health-oriented *behavior*, we assume that leaders see fewer possibilities to influence working conditions from the distance. For example they do not see the working hours of their employees, how often they take breaks or if they suffer from technical challenges. Based on this, leaders might take less action steps to proactively promote followers' health.

Research Question 3: Which challenges do leaders perceive in executing the three StaffCare dimensions (a) value, (b) awareness, and (c) behavior when WFH compared to working in the office?

Research Question 4: To what extent do employees perceive StaffCare and its three dimensions (a) value, (b) awareness, and (c) behavior when WFH compared to working in the office? And what are the reasons for different perceptions?

Materials and methods

To answer our research questions, we collected quantitative data with a standardized survey and qualitative data with semi-structured interviews from 23 leaders and 18 followers who are employed in different organizations in Germany.

Sample

All participants were recruited through personal networks of the authors. Inclusion criteria were leaders and employees who regularly WFH and from the office and are therefore able to compare both settings. Among the participants with leadership responsibility were 10 women and 13 men at the age between 29 and 62 years ($M = 42.02$). They are all employed and work in one of the following industries: IT, consulting, public sector, engineering, event management, automobile, or retail. At the time of the data collection, they had between 1 and 30 years of leadership experience ($M = 7.62$) and worked between 1 and 5 days a week from home ($M = 2.71$). Among the participants without

leadership responsibility were 13 women and 5 men at the age between 20 and 57 years ($M = 39.12$). They are also all employed, report to a direct leader and work in one of the following industries: IT, consulting, public sector, finances, insurances, e-commerce, logistics or retail. At the time of the data collection, they worked between 1 and 4 days a week from home ($M = 2.50$).

Procedure

We started the data collection with a quick warm-up. In this phase, we collected descriptive data from the participants and informed them about the purpose of the study and data security. Afterwards participants received a survey with items regarding the four dimensions of TFL and the three dimensions of HOL and were asked to rate them on a scale from 1 (does not apply at all) – 5 (fully applies). For each dimension they received one item and were asked to first rate to what extent it applies when they are working at home and second to rate to what extent it applies when they are working collocated in the office. Leaders were asked to do a self-assessment of their own leadership style and employees were asked to assess the leadership style of their direct leader. In a next step, the qualitative interview started. Participants were asked to elaborate on their ratings. For each item they explained why they perceive it as challenged in the WFH context compared to the traditional office setting. Or, when their rating was higher in the WFH context which opportunities they experienced. The interview ended with a closing statement and gave the participants the opportunity to report any experiences that they had made and were not addressed to this point.

Materials

The items used to assess TFL were derived from the MLQ (Felfe, 2006) while the items to assess HOL are based on the instrument of Franke et al. (2014). The interview guide was first pre-tested with academics and practitioners to check for its content validity and comprehensibility. The modified interview guideline was then pilot tested with two participants to check its appropriateness for the target population before the interview process started. The interviews were conducted between June 2021 and July 2022 *via* videocall or telephone and lasted between 45 and 90 min.

Analysis

The qualitative data were analyzed and interpreted according to Mayring (2022). The interviews were read and screened for common patterns and similarities by the authors. In a first step, categories were developed deductively based on the previous literature. Then the coding tree was enriched inductively with categories based on the transcripts. All steps of the analysis were carried out by the authors. Agreements and disagreements of the screenings and categorization from the authors were discussed and resulted in adjusting the categories for finding the best fit of the data. To analyze the quantitative data, we calculated means and paired t-tests. The premises for the paired t-test were met except for the premise of normal distribution. However, due to the explorative approach of our study and since the paired t-test is considered to be very robust to violations (Pagano, 2012), we decided to continue with the data.

Results

Transformational leadership

Idealized influence

Leaders perceive restriction to display idealized influence in the remote setting compared to the traditional office setting [WFH: $M = 3.59$, $SD = 0.96$; office: $M = 4.45$, $SD = 0.51$; $t(21) = 4.31$; $p = 0.000$]. Employees also perceive less idealized influence when working remotely although the difference is not significant [WFH: $M = 3.11$, $SD = 1.23$; office: $M = 3.50$, $SD = 1.15$; $t(17) = 1.94$; $p = 0.069$].

The main reason for the decrease of idealized influence mentioned by the leaders is the lack of contact and social presence. Leaders report that role modelling needs face-to-face interaction and goes hand in hand with perceiving the leader throughout the day and seeing how they work and interact with people *("Functioning as role model is created through presence and face-to-face interaction. Working from home is a barrier to this")*. However, there are also voices claiming that authenticity increases because followers see their leaders in a more private manner, e.g., when children interrupt a meeting *("Followers perceive me in a private setting. It happens that my son comes in during videoconferences. This makes me more accessible")*. Further, leaders mentioned that online meetings are rather task-oriented. There is no room to talk about values and beliefs as it is in the office during face-to-face meetings *("Online meetings are more efficient and task-oriented. There is barely room for talking about values, beliefs and visions")*. However, leaders report that the challenges depend on the relationship they have with their followers. While less challenges occur with followers they know very well, more occur with new followers to whom they do not have a strong bonding. The interviewed employees confirm that the lack of social presence is a main challenge *("When I work at home, I hear almost nothing from my manager. That's why he does not influence me or conveys any values and beliefs")*. They also reported that that their leaders do not trust them to work efficiently or at all at home which impairs their relationship in terms of mutual confidence and makes it difficult to perceive leaders as role models *("My manager has no trust in me and my colleagues. She does not think we are really working when we are at home")*.

It can be concluded that idealized influence deteriorates in a setting with limited contact and social presence. Perceiving the

leader throughout the day and in different situations is important for idealized influence as well as opportunities to talk about private, non-work-related topics. It seems that strong relationships and trust between leaders and followers may compensate the challenges. An overview of the challenges and opportunities is provided in Table 1.

Inspirational motivation

Leaders perceive more restrictions to display inspirational motivation during WFH compared to the office setting [WFH: $M = 3.59$, $SD = 1.05$; office: $M = 4.32$, $SD = 0.78$; $t(21) = 3.46$; $p = 0.002$] and also employees perceive less inspirational motivation at home [WFH: $M = 3.00$, $SD = 1.19$; office: $M = 3.50$, $SD = 1.30$; $t(17) = 2.67$; $p = 0.015$].

For leaders, the lack of social presence and interaction make it difficult to capture the team atmosphere. Leaders do not receive non-verbal cues, so it is difficult to assess the true emotions of their followers and to react appropriately. In contrast to the office setting, they do not get a feeling of the team spirit or upcoming conflicts *("In the remote setting it is difficult to sense when conflicts are upcoming or when the general mood decreases.")*. Further, digital communication and especially asynchronous communication hamper the transfer of enthusiasm and motivation. Even during videoconferences, the leaders receive barely any stimulating feedback on what they said so it is difficult and exhausting for them to reach their followers on an emotional level *("I do not know how to transfer enthusiasm and motivation via e-mail or chat. And also, during videoconferences it's difficult because I do not get any non-verbal signals.")*. The interviewed employees also report that lack of contact and social presence are main issues. From the distance, employees would not call their leaders to talk about motivation, team spirit and further topics that go beyond the actual work *("I would not dare to call my leader to talk about my level of motivation or the atmosphere in the team. I know that he is very busy and I do not want to interrupt him with something that is not task-related.")*. They also confirm that the communication *via* digital technologies hampers the transfer of enthusiasm. In the office they also get non-verbal cues from their leader which are important to convey emotions *("Usually my manager is someone who is very good at conveying motivation and enthusiasm for our long-term goals. But when we work from home, he does not do it at all. Or I just do not perceive it.")*.

Overall inspirational motivation seems to decrease in the remote setting (see Table 2). Main reasons for this are the lack of social presence and the communication *via* digital tools which makes it almost impossible to convey enthusiasm and motivation as important non-verbal cues are missing. Also, for leaders it is more difficult to sense the team spirit and to intervene when conflicts appear.

Intellectual stimulation

The quantitative data reveal that leaders find it more challenging to intellectual stimulate their followers when they are at home compared to the office setting [WFH: $M = 3.68$, $SD = 1.09$; office: $M = 4.09$, $SD = 0.87$; $t(20) = 1.56$; $p = 0.134$]. Employees rated the intellectual stimulation in both situations identical [WFH: $M = 4.18$, $SD = 0.88$; office: $M = 4.18$, $SD = 1.02$].

TABLE 1 Challenges and opportunities for idealized influence.

		M	*SD*	Challenges (−) and Opportunities (+)
Leaders $t(21) = 4.31$; $p = 0.000$)	WFH	3.59	0.96	**– lack of social presence impedes role modelling** "Functioning as role model is created through presence and face-to-face interaction. Working from home is a barrier to this." **- task-oriented online meetings impede vision communication** "Online meetings are more efficient and task-oriented. There is barely room for talking about values, beliefs and visions." **+ visibility of privacy supports authenticity** "Team members perceive me in a private setting. It happens that my son comes in during videoconferences. This makes me more accessible."
	Office	4.45	0.51	**+ social presence supports role modelling** "I think in the office I rather act as role model because my team members experience me at my work throughout the whole day and I constantly interact with them."
Employees $t(17) = 1.94$; $p = 0.069$)	WFH	3.11	1.23	**– lack of social presence impedes communication of values** "When I work at home, I hear almost nothing from my manager. That's why he does not influence me or conveys any values and beliefs." **- lack of contact reduces trust and confidence** "My manager has no trust in me and my colleagues. She does not think we are really working when we are at home."
	Office	3.50	1.15	**+ social presence supports role modelling** "In the office, I see how my manager works, talks to people and manages things. This inspires me a lot." **+ spontaneous, informal chats support communication of values** "I often speak spontaneously or during breaks with my manager. In these conversations I learn a lot about his values and beliefs."

TABLE 2 Challenges and opportunities for inspirational motivation.

		M	*SD*	Challenges (−) and Opportunities (+)
Leaders $t(21) = 3.46$; $p = 0.002$)	WFH	3.59	1.05	**– lack of contact (feedback) impedes capturing the team atmosphere** "In the remote setting it is difficult to sense when conflicts are upcoming or when the general mood decreases." **- digital communication hampers transfer of enthusiasm** "I do not know how to transfer enthusiasm and motivation *via* e-mail or chat. And also, during videoconferences it's difficult because I get any non-verbal signals."
	Office	4.32	0.78	**+ contact (feedback) supports capturing the team atmosphere** "In the office I see the emotions and level of motivation of my team members. So, I can easily intervene when something is going on" **+ spontaneous, informal chats transmit enthusiasm** "Motivating my team members usually happens in spontaneous informal chats and not during discussion of tasks. These chats happen very often when we are both in the office."
Employees $t(17) = 2.67$; $p = 0.015$	WFH	3.00	1.19	**– lack of contact impedes motivating the team** "I would not dare to call my leader to talk about my level of motivation or the atmosphere in the team. I know that he is very busy and I do not want to interrupt him with something that is not task related." **- digital communication hampers transfer of enthusiasm** "Usually my manager is someone who is very good at conveying motivation and enthusiasm for our long-term goals. But when we work from home, he does not do it at all. Or I just do not perceive it."
	Office	3.50	1.30	**+ social presence supports motivating the team** "In the office I communicate regularly with my leader so it easier to talk about motivation issues or issues within the team."

Although the differences of ratings are smaller and not significant there are still some challenges that leaders report. For example, they mentioned that they face difficulties to identify problems and challenges of their followers due to the lack of contact. As followers ask less questions and barely approach their leaders, it is difficult to know when problems need to be solved *("It's difficult for me to know if my followers have problems or to what extent they make progress with their tasks.")*. On the other side leaders described that followers are more autonomous which stimulates their own problem solving. They are more asked to develop solutions on their own, re-consider former working patterns and find new ways which increase their competencies and skills *("My followers are more on their own. They are more asked to find solutions and re-consider their working patterns by themselves.")*. A further challenge is that common creative thinking processes are impeded in online meetings without face-to-face communication and less possibilities for spontaneous visualization *("What is missing is the opportunity to go to the blackboard together and develop something new.")*. Cooperation in online conferences is also more difficult because there is no real eye contact and leaders hardly get feedback from followers to assess if they have a common understanding *("It is hard to get spontaneous reactions in web meetings.")* and if followers are still mentally present and think along *("I know that during online meetings my followers often do other things simultaneously on their computer as I do sometimes. This makes it harder to discuss.")*. Online meetings are often shorter and more on point so that there is less room for brainstorming or developing ideas together. Without the eye contact it is more difficult to endure conversation breaks *("The pauses are unpleasant so that it goes on quickly instead of reflecting in silence.")*. This is even worsened when technical problems appear and the connection breaks down regularly *("When there are technical problems during online meetings a lot from the energy gets lost and followers rather hold back and do not say anything at all.")*. Employees rated the intellectual stimulation equally between WFH and in the office. However, they confirmed that they are less likely to approach their leader with questions in the remote setting *("My manager is less reachable. I feel more inhibited to call and ask questions compared to the office where we are always in direct contact.")*. On the other side, they report that they enjoy having more autonomy and being asked to develop ideas and solutions by themselves *("When working from home I have a lot more freedom. I tend to make my own decisions instead of constantly asking my leader for approval.")*.

Intellectual stimulation seems to be the dimension that is the least affected by the remote context. However, it depends on the kind of issues that are discussed. While talking about task-related questions that are relatively easy to answer works equally well in the remote setting, particularly brainstorming and creative thinking processes to develop new strategies or new working patterns are impeded. Reasons are the restrictions of digital communication, the lack of social presence and technical problems. An overview can be found in Table 3.

Individualized consideration

Leaders find it easier to individually consider their employees in the office compared to WFH [WFH: $M = 3.55$, $SD = 1.01$.; office: $M = 4.32$, $SD = 0.57$; $t(21) = 3.93$; $p = 0.001$]. Employees report the same whereas here differences are not significant [WHF: $M = 3.56$, $SD = 1.20$; office: $M = 3.67$, $SD = 1.03$; $t(17) = 1.46$; $p = 0.163$].

TABLE 3 Challenges and opportunities for intellectual stimulation.

		M	*SD*	Challenges (−) and Opportunities (+)
Leaders $t(20) = 1.56$; $p = 0.134$)	WFH	3.68	1.09	**– lack of contact impedes identification of problems** "It's difficult for me to know if my team members have problems or to what extent they make progress with their tasks." **- digital communication impairs creative thinking processes** "What is missing is the opportunity to go to the blackboard together and develop something new." **+ less contact supports autonomy and interdependence of team members** "My team members are more on their own. They are more asked to find solutions and re-consider their working patterns by themselves."
	Office	4.09	0.81	+ **face-to-face interactions with direct feedback support creativity** "Creative thinking processes like brainstorming is easier in the office because I get direct feedback from my team members."
Employees *no mean difference*	WFH	4.18	0.88	**– lack of contact hampers asking questions** "My manager is less reachable. I feel more inhibited to call and ask questions compared to the office where we are always in direct contact." **+ less contact supports autonomy and interdependence** "When working from home I have a lot more freedom. I tend to make my own decisions instead of constantly asking my leader for approval."
	Office	4.18	1.02	**+ social presence makes it easier to ask questions** "In the office, I can always ask my leader about anything, because he is in the office right next to me."

Leaders report that for knowing and considering their followers, they need regular informal, non-work-related chats. Informal conversation about private matters usually happens during common breaks or other spontaneous interactions. However, the lack of contact in the remote setting makes these interactions very scarce *("For me it is difficult to consider the needs because I do not know them. When we work from home, informal chats to talk about private, non-work-related issues hardly ever take place.")*. Further, it is more difficult to detect if a follower is unsatisfied or unhappy because non-verbal cues like facial expressions, tone or mood are missing. Leaders also feel that the communication over digital media impedes the willingness of their followers to disclose private matters *("When my followers work from home, they actually never talk with me about private issues or emotional things. I think it's strange for them to do this in an e-mail or over the phone.")*. Especially asynchronous media like e-mail or chat inhibit the communication of personal issues. Also, during synchronous meetings over telephone or video, the communication is rather task-oriented and there is less room for sharing non-work-related information.

Employees confirm that informal chats become very limited so that there are fewer opportunities to talk about personal issues *("When I work from home, I do not have informal chats with my leader. We barely speak directly at all and when we do it is completely task-related.")*. Accordingly, they claim that they often do not feel recognized by their leader. They have the feeling that their leaders do not care about them when they are at home as leaders do not know what they are working on or how they are doing *("I do not have the feeling that my manager knows what I'm doing and what my needs are.")*.

Our results show that individualized consideration decreases during WFH due to the lack of regular contact and informal spontaneous communication (see Table 4). While leaders think their followers are less willing to reach out to them and reveal private information, their employees have the feeling that their leaders lose interest in them as geographic distance increases. The communication over digital media even impedes the situation because non-verbal cues are missing and meetings become more formal and task-oriented.

Health-oriented leadership

Value

The quantitative ratings show that leaders rate followers' physical and psychological health promotion less during WFH compared to the office setting [WFH: $M = 3.18$, $SD = 1.40$; office: $M = 4.09$, $SD = 0.87$; $t(21) = 3.46$; $p = 0.002$].

In the interviews they state that they feel clearly less responsible for their follower's health during WFH. Hence, they rate the importance of health lower ("*As a leader, it is very important to me that our work environment is beneficial to our health. However, I can implement it much better in the office, perhaps because I feel more responsible.")*. As a reason leaders mentioned that their possibilities of influencing their followers' working environment at home is limited ("*I do not see how my employees work at home and therefore cannot influence it.")*. Instead, they ask for more individual initiative from followers ("*As a leader, you are familiar with the risks that occur in the office for your own followers. But when working from home, you do not know the personal living conditions and so you cannot influence them.*

TABLE 4 Challenges and opportunities for individual consideration.

		M	*SD*	Challenges (−) and Opportunities (+)
Leaders $t(21) = 3.93$; $p = 0.001$	WFH	3.55	1.01	**– lack of informal communication impedes consideration of needs** "For me it is difficult to consider their needs because I do not know them. When we work from home, informal chats to talk about private, non-work-related issues hardly ever take place." - **distance and digital communication impair disclosure of employees** "When my team members work from home, they actually never talk with me about private issues or emotional things. I think it's strange for them to do this in an e-mail or over the phone."
	Office	4.32	0.57	**+ richer communication supports consideration of needs** "In the office, I sense how my team members are really doing because I see their facial expressions and body language." **+ frequent communication supports consideration of needs** "I am constantly in exchange with my team members and spend every break with them. So, I get a very good impression of the current needs."
Employees $t(17) = 1.46$; $p = 0.163$	WFH	3.56	1.20	**– lack of informal communication impedes consideration of needs** "When I work from home I do not have informal chats with my leader. We barely speak directly at all and when we do it's completely task-related." - **distance and digital communication support feeling of not being recognized** "I do not have the feeling that my manager knows what I'm doing and what my needs are."
	Office	3.67	1.03	+ **frequent communication supports being recognized** "In the office, I we regularly communicate with each other. My leader gives me the feeling that she is interested in how I am doing and what my needs are."

Employees have a higher responsibility for themselves."). Followers confirm that their leaders value employees' health less during WFH compared to working in the office [WHF: $M = 3.06$, office: $M = 3.81$; $t(17) = 3.12$; $p = 0.006$]. Employees feel that the importance of health is better emphasized in an office context (*"I have the feeling that my leader can better demonstrate the value of health in the office."*). During WFH, employees even perceive that leaders attach more importance on the fulfilment of work tasks and their performance than on their health (*"In the daily work routine at home, my leader seems to place task assignments above the importance of our health."*). Because of that employees feel more self-responsible for their own health (*"I think it is difficult for my supervisor to be responsible for my health during working from home. I see more of the responsibility on myself."*).

Overall, both leaders and employees perceive a decrease of health-oriented value because leaders have less possibilities to influence the working environment at home (see Table 5). Both groups think that responsibility for health rather shifts from the leader to the followers compared to the office setting.

Awareness

From the leaders' perspective there is considerably less awareness for their followers' health when WFH compared to working in the office [WFH: $M = 2.86$, $SD = 0.94$; office: $M = 4.23$, $SD = 0.87$; $t(21) = 5.43$; $p = 0.000$].

Leaders reported that there are less opportunities for interaction and poorer communication quality with their followers during WFH. This means also less time for being aware for the mental and physiological health of their followers (*"I barely see my employees and therefore it's difficult to know their current concerns."*). This contrasts with the situation in the office, where spontaneous and informal conversations often take place. Leaders can recognize inconsistencies and signs for psychological stress in followers' behavior when working in the office (*"Mental health warning signs are easier to detect when you are constantly crossing each other and do not need specific scheduled conversations."*). From leaders' perspective it is unclear whether recognizing warning signals works equally well *via* video conferencing. Some report that it makes little or no difference. Others, however, say they miss the non-verbal cues (*"I am unsure if you can have the same awareness through digital communication media. It might also result from a lack of gestures and facial expressions."*). In addition, leaders mentioned that it is easier to deal with health concerns when they communicate face-to-face (*"Personal issues are not so easy to address during working from home. It is more pleasant in the office when you can see each other and also perceive the body language."*). Moreover, in the office it seems to be easier for employees to disclose concerns to their leader (*"However, I have the feeling that there is a lack of trust in digital conversations. I think my followers can open up to me better face-to-face."*). A further difficulty can be found in the general knowledge about health risks and its promotion. Leaders understand general health risks in the office context (*"I know the health risks for my employees that come along in our job working in the office."*) while they do not feel sufficiently informed about the situation during WFH. Information materials and trainings regarding possible health risks often relate to the traditional office context but not

TABLE 5 Challenges and opportunities for Value – HoL.

		M	*SD*	Challenges (–) and Opportunities (+)
Leaders $t(21) = 3.46$; $p = 0.002$	WFH	3.18	1.40	– **lower responsibility due to less control and influence** "I do not see how my employees work at home and therefore cannot influence it."
	Office	4.09	0.87	+ **higher responsibility** "I can implement it much better in the office, perhaps because I feel more responsible."
Employees $t(17) = 3.12$; $p = 0.006$	WFH	3.22	1.48	– **increased self-responsibility** "I think it is difficult for my supervisor to be responsible for my health during working from home, even if it is important to him. I see more of the responsibility on myself." - **priority of task assignment** "In the daily work routine at home, my leader seems to place task assignments above the importance of our health."
	Office	3.89	1.13	+ **higher visibility** "I have the feeling that my leader can better demonstrate the value of health in the office."

to WFH. Even if it is provided, it usually contains only advice regarding better ergonomic working conditions and not to possible psychological stressors as well as health warning signals (*"I certainly do not know many psychological risk factors of my employees' health specifically in the working from home context. There could be more than the blurring of private and working life because of too many working hours. But we did not receive any information regarding it."*). Similar to leaders, employees also believe that awareness of their leaders decreases during WFH [WFH: $M = 2.17$, $SD = 1.25$; office: $M = 2.78$, $SD = 1.17$; $t(17) = 3.05$; $p = 0.007$]. As a main reason for the decrease of awareness they mentioned the lack of contact and social presence ("*There is almost no contact when working from home, so my leader does not notice anything.*"). Employees also reported that for awareness informal communication is needed. They would not talk about health issues during official meetings. In the office these topics usually arise during spontaneous informal chats or common breaks. However, these opportunities are very limited so that leaders cannot know how they feel ("*When my leader contacts me, it's usually work-related. We barely ever talk about private matters. For example, he even does not ask how I'm doing today.*"). Further they argued that due to digital communication leaders do not perceive any non-verbal cues like tone, facial expression or gesture. But it is precisely these cues that provide important information about how someone is doing (*"I mostly communicate via e-mail or chat with my leader. So, she does not perceive any nonverbal information from me and therefore, she cannot assess how I am doing."*). This leads to an additional issue, when employees feel barriers in their disclosure and do not have the confidence to address personal concerns to their leader ("*When I work from home, I do not dare to approach my leader with my private concerns and open up. The feeling of an open door is somehow missing over there.*").

Summing up, the main reasons for the decrease of awareness during WFH are that leaders and their followers have less contact and social interaction. Important non-verbal cues are missing to assess the health and well-being of followers. Leaders also claim that they have lower competencies of health risk detection in this digital setting. An overview of the opportunities and challenges for awareness are displayed in Table 6.

Behavior

From a leaders' perspective there is less health-oriented behavior during WFH than in the office [WFH: $M = 3.36$, $SD = 0.95$; office: $M = 3.86$, $SD = 0.71$; $t(21) = 2.32$; $p = 0.031$].

Beside the challenges, leaders also report opportunities. Followers can benefit from more flexibility regarding their working conditions when WFH. They have more autonomy to organize their work in the way that suits them best. Leaders can also reduce the demands on employees with families by ensuring that they have greater autonomy in their work schedules (*"A big advantage when working from home is that it means more flexibility and freedom. This allows breaks to be taken more individually."*) This enables their followers to develop health-promoting working conditions at home. But apart from this, for leaders there are no further instruments regarding health-promotion during WFH. They feel that their options to proactively promote health when their followers work at home are very limited ("*I cannot change the working conditions at my followers' homes or control them in their way of working. I have no power over this at all.*"). Employees also perceive less health-oriented behavior from their leaders when they are at home [WFH: $M = 2.28$, $SD = 1.07$; office: $M = 2.50$, $SD = 0.99$; $t(17) = 1.72$; $p = 0.104$] although the difference is not significant. Employees report that their leaders do not try to proactively take care of their psychological strains and health (*"So far, I have not received a lot of support from my leader. She does not proactively check in with me or pass any health offers. But this may also be because there are no programs in our organization."*).

Health-oriented behavior from leaders seems to suffer in the remote context. Although leaders have the possibilities to offer their followers more autonomy and flexibility regarding work schedules, they still feel that they have no influence when

the team is at home. Employees report that they feel less supported (see Table 7).

In addition to the previous findings, we also asked employees to rate their own SelfCare during WFH. Employees rated the importance of their own health promotion *(value)* less when WFH compared to working from the office [WFH: $M = 3.78$, $SD = 0.81$; office: $M = 4.11$, $SD = 0.83$; $t(17) = 2.06$; $p = 0.055$]. However, it can be noted that employees are more aware and sensitive of warning signals *(awareness)* regarding their own health status when WFH compared to the office

TABLE 6 Challenges and opportunities for Awareness – HoL.

		M	*SD*	Challenges (–) and Opportunities (+)
Leaders $t(21) = 5.43$; $p = 0.000$	WFH	2.86	0.94	– **lack of information about psychological stressors** "I certainly do not know many psychological risk factors of my employees' health specifically in the working from home context." - **less interaction-time and contact** "I barely see my employees and therefore it's difficult to know their current concerns." - **insecurity regarding the use of digital communication tools** "I am unsure if you can have the same awareness through digital communication media. It might also result from a lack of gestures and facial expressions."
	Office	4.23	0.87	+ **more trust** "I have the feeling that there is a lack of trust in digital conversations. I think my team members can open up to me better face-to-face." + **easier to detect non-verbal warning signals** "Mental health warning signs are easier to detect when you are constantly crossing each other and do not need specific scheduled conversations." + **personal issues are more pleasant to discuss** "Personal issues are not so easy to address during working from home. It is more pleasant in the office when you can see each other and also perceive the body language."
Employees $t(17) = 3.05$; $p = 0.007$	WFH	2.17	1.25	– **less digital communication and interaction** "There is almost no contact when working from home, so my leader does not notice anything." - **communication is rather task-related** "When my leader contacts me, it *via* email or telephone, and it is typically work-related. For example, he even does not ask how I'm doing today." - **experience disclosure barriers** "When I work from home, I do not dare to approach my leader with my private concerns and open up. The feeling of an open door is somehow missing over there."
	Office	2.78	1.17	+ **more room for personal concerns and possibilities to express them** "I feel more visible to my leader in the office, also because we cross paths, I can just walk in and, we talk more often."

TABLE 7 Challenges and opportunities for Behaviour - HoL.

		M	*SD*	Challenges (–) and Opportunities (+)
Leaders $t(21) = 2.32$; $p = 0.031$	WFH	3.36	0.95	– **no practical instruments for reducing stress** "I feel left alone. There are no specific instruments for reducing stress when my employees work from home." - **no control or influence** "In any case, I cannot change the working conditions at my team members' homes or control them in their way of working. I have no power over this at all." + **offering followers more autonomy** "A big advantage when working from home is that it can mean more flexibility and freedom. This allows breaks to be taken more individually."
	Office	3.86	0.71	+ **more control and direct influence** "I am able to provide more appropriate working hours and break schedules in the office."
Employees $t(17) = 1.72$; $p = 0.104$	WFH	2.28	1.07	– **leaders are less proactive** "So far, I have not received a lot of support from my supervisor. She does not proactively check in with me or pass any health offers. But this may also be because there are no programs."
	Office	2.50	0.99	+ **organizations offer health programmes** "My company provides health programs that can be participated in at the office."

setting [WFH: $M = 3.61$, $SD = 0.98$; office: $M = 3.17$, $SD = 0.86$; $t(17) = -1.92$; $p = 0.072$]. They also behave more health-oriented during WFH compared to working in the office [WHF: $M = 3.83$, $SD = 1.04$; office: $M = 3.44$, $SD = 0.78$; $t(17) = -1.44$; $p = 0.168$]. They find it easier to demonstrate a health-oriented behavior because on one hand they are more flexible and have more freedom to organize their working day and on the other hand they are less under the observation of their leader and colleagues ("*It's much easier when I work from home. Here, I can rather decide for myself and I am unobserved.*").

Discussion

In our study we investigated challenges to display the dimensions of TFL and HOL in the remote setting by collecting quantitative and qualitative data from leaders and employees. Both groups reported quite similar differences between WFH and working in the office and both showed that feasibility of TFL and HOL seems to be considerably more difficult when WFH. We were able to identify five common core challenges that are causes for the decrease of the investigated leadership styles.

Lack of social presence and interaction

One of the main challenges regarding the feasibility of TFL and HOL is the lack of social presence and regular interaction. Since both leadership styles are built on frequent contact and communication they suffer from a setting with limited contact. Especially non-verbal cues like facial expressions, gesture, body language and tone are very limited when communication happens only over digital media (Kayworth and Leidner, 2000; Wang et al., 2020). In our study leaders reported that this impairs the awareness for health-related warning signals as these are often not directly disclosed but can be rather discovered over non-verbal clues (e.g., when employees are unusually quiet or when they look tired and exhausted). Dimoff and Kelloway (2019) found that for most leaders the recognition of health-related warning signals is already difficult in the traditional office setting. Accordingly, it is even worse in a setting with no non-verbal cues. Moreover, in line with the findings of Hinds and Weisband (2003) we found that conveying emotions like enthusiasm and sensing the atmosphere within the team becomes increasingly difficult in the remote setting. As Avolio et al. (2001) claimed, leaders need to take over a more proactive role to ensure and create social bondings between followers. This is particularly relevant for inspirational motivation. Also idealized influence is challenged due to the lack of social presence which impairs role modelling. Employees need to perceive the leader throughout the workday and during different situations like managing tasks or interacting with others to be perceived as a role model which is limited during WFH.

Lack of spontaneous and informal conversations

In line with Kirchner et al. (2021) we found that a key challenge to both TFL and HOL are fewer possibilities for spontaneous informal chats about private, non-work-related subjects. These seem to diminish with advancing digitization (Antoni and Syrek, 2017). In addition, meetings and discussion in the remote context become rather task-oriented and efficient. These findings are supported by Klebe et al. (2021), who confirm that task-focused communication increases within teams that face volatile and new work situations. While in the office there are many opportunities to chat about private matters apart from official meetings (e.g., encounters at the coffee machine, common lunch breaks or spontaneous chats on the floor), they do only exist to a very limited amount during WFH and need to be proactively initiated. During our interviews employees revealed that they rather disclose personal needs, emotions and health-oriented issues in exact these informal settings. Accordingly, leaders can barely recognize them during WFH which impedes particularly individualized consideration and health-oriented awareness.

Digital communication and technical problems

In addition to the lack of social presence and informal conversation, the communication over digital media and technical problems (e.g., connection break downs, issues with software and updates) further challenge the feasibility of TFL and HOL. Leaders face especially difficulties when communication happens mainly over asynchronous media like e-mail or chat. According to the media richness theory (Daft and Lengel, 1986) these communication technologies do not include rich information like non-verbal cues and might rather lead to misunderstandings. In our study leaders reported that they find it difficult to display intellectual stimulation and develop creative thinking processes in a digital setting where they barely receive any feedback from followers in the form of eye contact, nodding or smiling. It might also happen that followers are thrown out of chats, that voices are distorted or that messages come in delated due to network problems (Kayworth and Leidner, 2000). These technical problems hinder a stable and rich conversation and might inhibit followers to proactively participate in discussions. Hogg and Reid (2006) confirm that the restrictions based on the digitalized communication make it difficult to socially connect, to communicate ideas and novel information and to assess if there is a common understanding. These and further technical problems therefore harm TFL and HOL.

Less trust and bonding

During WFH the interpersonal relationships and ties between leaders and employees also affect TFL and HOL. Both leaders and

employees feel less close to each other due to fewer interactions, less informal conversation, and increased task-orientation. A further reason for the detachment of leaders and followers is the lack of mutual trust and confidence during WFH. As some leaders do not trust their followers to work efficiently or at all from home, their bonding and perception of the leader as role model is impeded. Wang et al. (2020) confirm that in the remote setting it is difficult to assess the mood and emotions of others which hampers the formation of a strong bonding. As a strong relationship is also necessary for health disclosure in the workplace (Li and Lee, 2021), awareness decreases. It is worth highlighting, that leaders report that these experienced challenges regarding TFL and HOL apply stronger to new employees. If a strong tie and connection does already exist, challenges like lack of contact and informal discussions do not matter as much for the investigated leadership styles. Whereas regarding new employees, leaders feel more challenged and insecure to communicate effectively and convey motivation and enthusiasm. Purvanova and Bono (2009) support this finding by claiming that in the remote context leader need to increase their effort to create a strong bonding and relationship while in the office this evolves almost automatically by itself.

Less responsibility of the leader

During WHF leaders experience that their influence on followers and control diminishes as there are fewer opportunities for monitoring (Kayworth and Leidner, 2000; Bell and Kozlowski, 2002). Therefore, leaders feel less responsible for their employees which affects particularly the HOL dimension value and behavior. Leaders stated that they cannot influence the working conditions or health behavior of their followers at home anyway. Hence, they shift the responsibility to their followers. They are rather asked to take care of themselves. Also, when challenges occur during work employees tend to feel left alone because their leader is less accessible. On the other side, the shift of responsibilities increases autonomy and independence of followers which supports the development of new competencies. They receive more opportunities to solve problems and make decisions on their own. The fact that personal responsibility and independence of employees grow goes along with previous literature suggesting that new leadership concepts like team leadership and self-leadership become more relevant in the remote setting (Kayworth and Leidner, 2000; Bell and Kozlowski, 2002; Müller and Niessen, 2018).

Strengths and limitations

Our study provides several strengths and limitations. As an immense rise of flexible working environments and WFH is to be expected, research about its consequences for specific leadership styles are needed. Our study provides a comprehensive understanding regarding the feasibility of TFL and HOL dimensions during WFH.

However, generalizability of our findings is limited. While the sample size is adequate for interviews and our explorative approach, it is considered to be too small for quantitative hypothesis testing. Our quantitative data were not normally distributed and although the paired t-test is known to be relatively robust against violations of normal distribution, we recommend an extension of this study with a clear quantitative focus and larger sample size. Additionally, we only collected data from German employees. Also, participants without managerial responsibility were mainly female which might have led to different results than a sample with balanced gender ratio. Future studies need to validate our findings with cross-sectional or longitudinal studies with larger and more representative sample sizes. Second, the retrospective data design allowed us to investigate individual experiences and differences between WFH and working in the office. But there is a forgetfulness bias as participants may not remember all relevant factors. Also, causal claims cannot be made. Therefore, future studies need to enhance our findings with experimental settings to identify the causal effects of for example informal communication, lack of non-verbal cues or willingness to disclose on HOL and TFL. Moreover, the interviewed leaders and employees did not work together in dyads, so we did not have matched data. Due to organizational reasons, it was not possible for us to collect this kind of data. It would be interesting to compare the perceptions of leaders with the perceptions of their direct followers. We recommend for future research to consider using matched data for further qualitative or quantitative studies.

However, our study has also some strengths. One of them is that we used a mixed methods approach and collected quantitative and qualitative data to gain a comprehensive understanding. Another strength lies in our sample. As we interviewed participants within our personal network there was a huge willingness to trust and open up about their individual challenges. Further, we included data from both employees and leaders and reached a sufficiently large sample. Since both groups independently reported similar challenges, the validation of our study can be considered good. In addition, we asked the same individuals to directly compare the situation in the office with the situation at home. This with-in design allows us to identify direct differences and reasons why the feasibility of HOL and TFL is compromised in a remote setting.

Practical implications

In our study we identified different challenges for the feasibility of TFL and HOL which must be addressed by leaders and HR practitioners to ensure effective leadership during WFH. A main challenge for TFL and HOL is the lack of contact and communication and missing of non-verbal cues. In line with Bell and Kozlowski (2002) we recommend using videoconferences over meetings without camera for team meetings and discussions of complex tasks. Benefits are

that the camera transmits some non-verbal cues like facial expressions and encourages followers to be more present and proactive. Seeing the manager directly simplifies the communication of emotions such as enthusiasm and team spirit, and at the same time it makes it easier to recognize health problems. However, also in videoconferences challenges for TFL and HOL occur. Organizations need to ensure that leaders and followers have adequate equipment at home to reduce technical problems. Further, leaders need to be aware that inspirational messages might not reach their followers as expected. They might also have less possibilities to perceive health issues or other problems of followers. Therefore, they need to schedule more time during the day to actively discuss questions, needs and concerns with their followers. During these meetings leaders should be open and transparent about their own current responsibilities, tasks and challenges. Doing this might compensate the lack of social presence and facilitate perceiving the leader as role model and hence increase idealized influence. In addition, next to these formal meetings, we recommend leaders to actively take time for informal chats (e.g., virtual coffee break, virtual lunch break, team-building activities) during regular working time. Scheduling frequent interactions was also suggested by Krebs et al. (2006) to develop trust in the digital context. However, individual circumstances must be considered. It is counterproductive to intensify work–family conflicts of employees or disregard their boundaries between work and private life by arranging additional events outside of working hours (Wang et al., 2021). Leaders need to balance the amount of informal activities with their employees.

Leaders also need new feedback tools and instruments to proactive enquire and assess their follower's concerns and the mood within the team. This allows them to intervene quickly when challenges and issues within the teams arise. Moreover, leaders need to be aware that they still have an influence on their followers and cannot just shift their responsibility towards them. Specific health-oriented instruments might increase health-related behaviors of leaders. Among our interviewed leaders, none of them received training or specific information on how to effectively lead during WFH. Accordingly, it seems that to date there is a lack of specific instruments to train leaders on promoting health-oriented behaviors (e.g., physical activity of their employees, prevention of stress and boundary management) and on detecting health-related warning signals for mental health issues.

Conclusion

Our research was novel in exploring specific challenges for leaders regarding the feasibility of TFL and HOL during WHF. By using quantitative and qualitative data from both leaders and employees, we identified various challenges for the investigated leadership styles. Among them lack of social presence, communication difficulties, lack of mutual trust and weaker ties were reported. Our study provides a first comprehensive understanding regarding the underlying mechanism that effect TFL and HOL. Based on our findings we derived recommendations and practical implications for leaders and HR practitioners.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

Ethical review and approval were not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

Author contributions

DT, KS, and JF developed the research question and study design. DT and KS collected and analyzed the data and wrote the first draft of the manuscript. JF revised the manuscript. All authors contributed to the article and approved the submitted version.

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The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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References

Al-Habaibeh, A., Watkins, M., Waried, K., and Javareshk, M. B. (2021). Challenges and opportunities of remotely working from home during Covid-19 pandemic. *Glob. Transit.* 3, 99–108. doi: 10.1016/j.glt.2021.11.001

Antoni, C. H., and Syrek, C. (2017). Digitalisierung der Arbeit: Konsequenzen für Führung und Zusammenarbeit. *Gruppe. Interaktion. Organisation. Zeitschrift Für Angewandte Organisationspsychologie (GIO)* 48, 247–258. doi: 10.1007/s11612-017-0391-5

Arnold, M., and Rigotti, T. (2021). Is it getting better or worse? Health-oriented leadership and psychological capital as resources for sustained health in newcomers. *Appl. Psychol.* 70, 709–737. doi: 10.1111/apps.12248

Avolio, B. J., and Kahai, S. (2003). Adding the "E" to E-leadership. *Organ. Dyn.* 31, 325–338. doi: 10.1016/S0090-2616(02)00133-X

Avolio, B. J., Kahai, S., and Dodge, G. (2001). E-leadership: implications for theory, research, and practice. *Leadersh. Q.* 11, 615–668. doi: 10.1016/S1048-9843(00)00062-X

Bass, B. M. (1985). Leadership: Good, better, best. *Organ. Dyn.* 13, 26–40. doi: 10.1016/0090-2616(85)90028-2

Bass, B. M., and Riggio, R. E. (2006). *Transformational leadership*. London: *Psychology Press*.

Bell, B. S., and Kozlowski, S. W. J. (2002). A typology of virtual teams. *Group Org. Manag.* 27, 14–49. doi: 10.1177/1059601102027001003

Braun, S., Peus, C., Weisweiler, S., and Frey, D. (2013). Transformational leadership, job satisfaction, and team performance: a multilevel mediation model of trust. *Leadersh. Q.* 24, 270–283. doi: 10.1016/j.leaqua.2012.11.006

Bryman, A. (2003). *Quantity and quality in social research*. London: Routledge.

Contreras, F., Baykal, E., and Abid, G. (2020). E-leadership and teleworking in times of COVID-19 and beyond: what we know and where do we go. *Front. Psychol.* 11:590271. doi: 10.3389/fpsyg.2020.590271

Daft, R. L., and Lengel, R. H. (1986). Organizational information requirements, media richness and structural design. *Manag. Sci.* 32, 554–571. doi: 10.1287/mnsc.32.5.554

Dimoff, J. K., and Kelloway, E. K. (2019). Signs of struggle (SOS): the development and validation of a behavioural mental health checklist for the workplace. *Work Stress.* 33, 295–313. doi: 10.1080/02678373.2018.1503359

Efimov, I., Harth, V., and Mache, S. (2020). Health-oriented self-and employee leadership in virtual teams: a qualitative study with virtual leaders. *Int. J. Environ. Res. Public Health* 17:519. doi: 10.3390/ijerph17186519

Eisenberg, J., Post, C., and DiTomaso, N. (2019). Team dispersion and performance: the role of team communication and transformational leadership. *Small Group Res.* 50, 348–380. doi: 10.1177/1046496419827376

Fayard, A.-L., Weeks, J., and Khan, M. (2021). Designing the hybrid office. *Harv. Bus. Rev.* 99, 114–123.

Felfe, J. (2006). Validierung einer deutschen Version des "Multifactor Leadership Questionnaire" (MLQ Form 5 x Short) von. *Zeitschrift Für Arbeits-Und Organisationspsychologie A&O* 50, 61–78. doi: 10.1026/0932-4089.50.2.61

Franke, F., Ducki, A., and Felfe, J. (2014). 3.2 Gesundheitsförderliche Führung. Trends Der Psychologischen Führungsforschung: Neue Konzepte. *Methoden Und Erkenntnisse* 27:253.

Franke, F., and Felfe, J. (2011). "Diagnose gesundheitsförderlicher Führung – Das Instrument "Health-oriented Leadership,"" in *Fehlzeiten-Report 2011*. eds. B. Badura, A. Ducki, H. Schröder, J. Klose and K. Macco (Berlin Heidelberg: Springer), 3–13.

Franke, F., Felfe, J., and Pundt, A. (2014). The impact of health-oriented leadership on follower health: development and test of a new instrument measuring health-promoting leadership. *German Journal of Human Resource Manag.: Zeitschrift Für Personalforschung* 28, 139–161. doi: 10.1177/239700221402800108

Gartner (2020). Gartner CFO survey reveals 74% intend to shift some employees to remote work permanently. Available at: https://www.gartner.com/en/newsroom/press-releases/2020-04-03-gartner-cfo-surey-reveals-74-percent-of-organizations-to-shift-some-employees-to-remote-work-permanently2

Hans-Böckler-Stiftung (2021, February 16). "Anteil der im homeoffice arbeitenden beschäftigten in deutschland vor und während der corona-Pandemie 2020 und 2021 (Proportion of employees working from home in Germany before and during the Corona pandemic in 2020 and 2021)," in *Statista*. Available at: https://de.statista.com/statistik/daten/studie/1204173/umfrage/befragung-zur-homeoffice-nutzung-in-der-corona-pandemie/

Hinds, P. J., and Weisband, S. P. (2003). "Knowledge sharing and shared understanding in virtual teams," in *Virtual Teams That Work: Creating Conditions for Virtual Team Effectiveness*. eds. C. B. Gibson and S. G. Cohen (Jossey-Bass in San Francisco), 21–36.

Hoch, J. E., and Kozlowski, S. W. J. (2014). Leading virtual teams: hierarchical leadership, structural supports, and shared team leadership. *J. Appl. Psychol.* 99, 390–403. doi: 10.1037/a0030264

Hogg, M. A., and Reid, S. A. (2006). Social identity, self-categorization, and the communication of group norms. *Commun. Theory* 16, 7–30. doi: 10.1111/j.1468-2885.2006.00003.x

Judge, T. A., and Piccolo, R. F. (2004). Transformational and transactional leadership: a meta-analytic test of their relative validity. *J. Appl. Psychol.* 89, 755–768. doi: 10.1037/0021-9010.89.5.755

Kaluza, A. J., Weber, F., van Dick, R., and Junker, N. M. (2021). When and how health-oriented leadership relates to employee well-being—the role of expectations, self-care, and LMX. *J. Appl. Soc. Psychol.* 51, 404–424. doi: 10.1111/jasp.12744

Kaushik, M., and Guleria, N. (2020). The impact of pandemic COVID-19 in workplace. *European J. Business and Manag.* 12, 1–10. doi: 10.7176/EJBM/12-15-02

Kayworth, T., and Leidner, D. (2000). The global virtual manager: a prescription for success. *Eur. Manag. J.* 18, 183–194. doi: 10.1016/S0263-2373(99)00090-0

Kirchner, K., Ipsen, C., and Hansen, J. P. (2021). COVID-19 leadership challenges in knowledge work. *Knowl. Manag. Res. Pract.* 19, 493–500. doi: 10.1080/14778238.2021.1877579

Klebe, L., Felfe, J., and Klug, K. (2021). Healthy leadership in turbulent times: the effectiveness of health-oriented leadership in crisis. *Br. J. Manag.* 32, 1203–1218. doi: 10.1111/1467-8551.12498

Klug, K., Felfe, J., and Krick, A. (2019). Caring for oneself or for others? How consistent and inconsistent profiles of health-oriented leadership are related to follower strain and health. *Front. Psychol.* 10:2456. doi: 10.3389/fpsyg.2019.02456

Kozlowski, S. W. J., Gully, S. M., Salas, E., and Cannon-Bowers, J. A. (1996). *Advances in interdisciplinary studies of work teams: Team leadership*.

Krebs, S. A., Hobman, E. V., and Bordia, P. (2006). Virtual teams and group member dissimilarity. *Small Group Res.* 37, 721–741. doi: 10.1177/1046496406294886

Krick, A., Felfe, J., Neidlinger, S. M., Klebe, L., Tautz, D., Schübbe, K., et al. (2022). *Auswirkungen von Homeoffice: Ergebnisse einer bundesweiten Studie mit Führungskräften und Mitarbeitenden*. Available at: https://www.hsu-hh.de/psyaow/newsblog-aus-unserem-dtec-projekt-digital-leadership-and-health/

Lal, B., Dwivedi, Y. K., and Haag, M. (2021). Working from home during Covid-19: doing and managing technology-enabled social interaction with colleagues at a distance. *Inf. Syst. Front.* 1–18. doi: 10.1007/s10796-021-10182-0

Li, J.-Y., and Lee, Y. (2021). Information-seeking strategy and likelihood of workplace health disclosure. *CCIJ* 26, 521–540. doi: 10.1108/CCIJ-04-2020-0073

Liebermann, S. C., Blenckner, K., Diehl, J.-H., Feilke, J., Frei, C., Grikscheit, S., et al. (2021). Abrupt implementation of telework in the public sector during the COVID-19 crisis. *Zeitschrift Für Arbeits-Und Organisationspsychologie A&O* 65, 258–266. doi: 10.1026/0932-4089/a000367

Mayring, P. (2022). *Qualitative content analysis: A step-by-step guide*. London: SAGE.

McAlpine, K. L. (2018). Flexible work and the effect of informal communication on idea generation and innovation. *Acad. Manag. Proc.* 2018:15092. doi: 10.5465/AMBPP.2018.205

Müller, T., and Niessen, C. (2018). Self-leadership and self-control strength in the work context. *J. Manag. Psychol.* 33, 74–92. doi: 10.1108/JMP-04-2017-0149

Pagano, R. R. (2012). *Understanding statistics in the behavioral sciences*. United States: Cengage Learning.

Purvanova, R. K., and Bono, J. E. (2009). Transformational leadership in context: face-to-face and virtual teams. *Leadersh. Q.* 20, 343–357. doi: 10.1016/j.leaqua.2009.03.004

Steude, D. H. (2021). Challenges of remote leadership in a digitalized working world 4.0. *Manag. Organ. Syst. Res.* 85, 65–86. doi: 10.1515/mosr-2021-0005

Tims, M., Bakker, A. B., and Xanthopoulou, D. (2011). Do transformational leaders enhance their followers' daily work engagement? *Leadersh. Q.* 22, 121–131. doi: 10.1016/j.leaqua.2010.12.011

van Wart, M. R., and Pierce, S. (2016). The rise and effect of virtual modalities and functions on organizational leadership: Tracing conceptual boundaries along the e-management and e-leadership continuum. *Rev. Adm. Sci.* 12, 102–122. Retrieved from https://rtsa.ro/tras/index.php/tras/article/view/507

van Wart, M., Roman, A., Wang, X., and Liu, C. (2019). Operationalizing the definition of e-leadership: identifying the elements of e-leadership. *Int. Rev. Adm. Sci.* 85, 80–97. doi: 10.1177/0020852316681446

Wang, B., Liu, Y., and Parker, S. K. (2020). How does the use of information communication technology affect individuals? A work design perspective. *Acad. Manag. Ann.* 14, 695–725. doi: 10.5465/annals.2018.0127

Wang, G., Oh, I.-S., Courtright, S. H., and Colbert, A. E. (2011). Transformational leadership and performance across criteria and levels: a meta-analytic review of 25 years of research. *Group Org. Manag.* 36, 223–270. doi: 10.1177/1059601111401017

Wang, X., Zhang, Z., and Chun, D. (2021). How does mobile workplace stress affect employee innovative behavior? The role of work-family conflict and employee engagement. *Behav. Sci.* 12:2. doi: 10.1111/apps.12290

Wethal, U., Ellsworth-Krebs, K., Hansen, A., Changede, S., and Spaargaren, G. (2022). Reworking boundaries in the home-as-office: boundary traffic during COVID-19 lockdown and the future of working from home. *Sustain.: Sci. Pract. Policy* 18, 325–343. doi: 10.1080/15487733.2022.2063097

Xiao, Y., Becerik-Gerber, B., Lucas, G., and Roll, S. C. (2021). Impacts of working from home during COVID-19 pandemic on physical and mental well-being of office workstation users. *J. Occup. Environ. Med.* 63, 181–190. doi: 10.1097/JOM.0000000000002097

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Coworking spaces vs. home: Does employees' experience of the negative aspects of working from home predict their intention to telework in a coworking space?

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In this study, we investigated the determinants of employees' intention to telework in a coworking space, with the assumption that employees' experience with the negative aspects of teleworking from home would impact their intention to telework in a coworking space in the future. A sample of 268 French teleworkers answered an online questionnaire measuring their experience of several negative aspects of teleworking from home (e.g., perceived social isolation), and their opinion toward teleworking in a coworking space (perceived usefulness, perceived feasibility, attitude and behavioral intention). Results indicate that perceived social isolation and perceived lack of working comfort when working from home directly impacted how useful participants perceived teleworking in a coworking space to be, and indirectly their intention to telework in a coworking space in the future. Budget, management agreement and job compatibility were, however, identified as factors mitigating participants' intention to telework in a coworking space, even if perceived as potentially beneficial.

KEYWORDS

teleworking, teleworking location, coworking spaces, attitude, behavioral intention, job satisfaction

Introduction

Advances in information and communication technologies and, more recently, the COVID-19 health crisis, have contributed to the democratization of teleworking among company employees (Mann and Holdsworth, 2003; Gajendran and Harrison, 2007; Vayre and Pignault, 2014; Vayre, 2019; Wang et al., 2021). Teleworking (also referred to as remote working, telecommuting) is broadly defined as "an alternative work arrangement in which employees perform tasks elsewhere that are normally done in a primary or central workplace, for at least some portion of their work schedule", using ICTs to communicate with colleagues and others outside the organization (Gajendran and Harrison, 2007, p. 1525). Although home is the most common location for teleworking

(Gajendran and Harrison, 2007; Vayre and Pignault, 2014; Wang et al., 2021), an increasingly popular location has emerged in the last decade, referred to as coworking spaces (Akhavan, 2021; Orel and Bennis, 2021).

Coworking spaces consist of alternative workplaces offering all the facilities necessary to work in good conditions (e.g., office equipment and internet connection), combined with areas dedicated to relaxation and exchange between users (Scaillerez and Tremblay, 2017; Akhavan, 2021; Orel and Bennis, 2021). The use of these spaces increased considerably in the 2010s, with an estimated number of 3.1 million users worldwide in 2022, and five million expected by 2024 (Statista, 2022a). While the primary users of coworking spaces are self-employed or freelance workers looking for an affordable place to work away from home, the proportion of employees teleworking is growing, reaching one third of users in 2019 (Deskmag, 2019). However, while the motivations of self-employed workers to use a coworking space have been the subject of several studies (Gerdenitsch et al., 2016; Orel, 2019; Robelski et al., 2019; Appel-Meulenbroek et al., 2021; Lashani and Zacher, 2021; Rådman et al., 2022), the reasons why employees may favor coworking spaces over home as a place to telework are largely unknown.

In this study, we investigated the determinants of employees' intention to telework in a coworking space, with the assumption that teleworkers' dissatisfaction with home-based teleworking (e.g., perceived social isolation) would impact their intention to telework in a coworking space. For this purpose, we conducted a questionnaire survey among a large sample of teleworkers, measuring their satisfaction with home-based teleworking and their opinion toward teleworking in a coworking space. Before presenting the study in greater detail, the relevant literature is reviewed.

Coworking spaces are considered to be part of a wider set of new urban spaces, referred to as third-places (Scaillerez and Tremblay, 2017; Akhavan, 2021; Orel and Bennis, 2021). The term "third-place" was initially introduced by Oldenburg (1989), to designate all places where workers could carry on their professional activity and gather outside their home (referred to as the "first-place") and the company premises ("second-place"). Deriving from this definition, new forms of urban spaces identifying themselves as "third-places" have emerged from the 2000s onwards, some dedicated to creativity and innovation (e.g., FabLab), others to professional activity (e.g., business incubators).

Coworking spaces are a category of third-place dedicated to professional activity and aimed at nomadic workers (Scaillerez and Tremblay, 2017; Akhavan, 2021; Orel and Bennis, 2021). They offer the necessary facilities (e.g., desk, office chair, computer equipment, and internet connection) to carry out one's professional activity, upon payment of an access fee. These workspaces are most often combined with shared catering and relaxation areas (e.g., kitchen and sofas), in order to encourage interaction and the creation of social links between users (Akhavan, 2021; Orel and Bennis, 2021). Indeed, one of the main objectives of coworking space owners (referred to as "hosts") is to encourage the creation of a community of users, through the organization of professional or informal events, which differentiates them from other shared workspaces such as flex offices (Orel and Bennis, 2021). In 2020, ∼20,000 coworking spaces were in operation worldwide, and this number is expected to double by 2024 (Statista, 2022b).

While coworking spaces are open to all workers, regardless of their status and sector of activity, self-employed workers in the sector of ICT, marketing or consulting remain their primary users (Deskmag, 2019). According to several studies, the main reason for this population's interest in coworking spaces is to overcome a feeling of socio-professional isolation and to find social support (Spinuzzi, 2012; Gerdenitsch et al., 2016; Bianchi et al., 2018; Robelski et al., 2019; Spinuzzi et al., 2019; Lashani and Zacher, 2021; Rådman et al., 2022; Wright et al., 2022). Self-employed workers are at risk of experiencing a pronounced feeling of socio-professional isolation in the absence of colleagues to lean on if difficulties are encountered in the course of their work (Gerdenitsch et al., 2016). Joining a coworking space can help to break this feeling of isolation, by finding social support from other users of the space (occasional help with a task and collaboration) and regain the feeling of belonging, if not to a work group, at least to a community of users (Gerdenitsch et al., 2016; Bianchi et al., 2018; Lashani and Zacher, 2021; Wright et al., 2022). In this regard, Gerdenitsch et al. (2016) found that perceived social support from other coworking space users improved self-employed workers' job satisfaction and reduced their intention to quit their job.

In addition to finding social support, the use of a coworking space may help self-employed workers to better separate professional and private life, by relocating work outside the home and thus adding a physical separation between private life and work (Orel, 2019). The diversity of users' professional profiles also offers opportunities for knowledge sharing and professional networking which may help self-employed workers to expand their professional skills and activity (Spinuzzi, 2012; Spinuzzi et al., 2019; Rese et al., 2020). Finally, the mere provision of comfortable working facilities can enhance self-employed workers' productivity and health if their home workspace proves insufficient in terms of comfort or ergonomic qualities (Robelski et al., 2019, 2021; Lashani and Zacher, 2021; Rådman et al., 2022).

Although self-employed workers still constitute the majority of users of coworking spaces, the proportion of teleworking employees has become substantial. In a worldwide survey conducted by the magazine Deskmag in 2019, 37% of the 2,668 users of coworking spaces who answered the survey were teleworking employees (vs. 28% in the 2012 survey). To date, very little research has been conducted to understand why employees may decide to telework in a coworking space instead of (or alongside) home. There are, however, some negative

consequences of teleworking that may contribute to explaining this "relocation" of work.

The advantages and disadvantages of teleworking have been the topic of a large number of studies during the last decades (Bailey and Kurland, 2002; Mann and Holdsworth, 2003; Gajendran and Harrison, 2007; Garrett and Danziger, 2007; Vayre and Pignault, 2014; Vayre, 2019), all the more so following the COVID-19 crisis and the switch of a significant proportion of employees to "forced" teleworking (Contreras et al., 2020; Bobillier-Chaumon et al., 2021; Wang et al., 2021). Despite this substantial body of work, there is currently no clear consensus on the impact of teleworking on employee performance and quality of life (Bailey and Kurland, 2002; Mann and Holdsworth, 2003; Garrett and Danziger, 2007; Vayre and Pignault, 2014; Vayre, 2019).

Several studies claim that teleworking has positive consequences on employees' productivity, in that teleworking contributes to reducing interruptions and distractions experienced in the office and thus improves employees' concentration and commitment at work (Bailey and Kurland, 2002; Mann and Holdsworth, 2003; Garrett and Danziger, 2007; Maruyama et al., 2009; Vayre and Pignault, 2014; Vayre, 2019). The flexibility in deciding how to organize one's working day (made possible by the elimination of time spent commuting) may also have a positive impact on work-life balance, by enabling employees to prioritize their activities and be more available for personal or family activities (Metzger and Cléach, 2004; Garrett and Danziger, 2007; Maruyama et al., 2009; Vayre and Pignault, 2014; Vayre, 2019). As a result, employees who telework on a regular basis may perceive an improvement in their job satisfaction and quality of life (Bailey and Kurland, 2002; Garrett and Danziger, 2007; Vayre and Pignault, 2014; Vayre, 2019).

Other studies, however, have highlighted that teleworking may have negative consequences, notably when done from home (Bailey and Kurland, 2002; Mann and Holdsworth, 2003; Metzger and Cléach, 2004; Maruyama et al., 2009; Vayre and Pignault, 2014; Vacherand-Revel et al., 2016; Vayre, 2019; Bobillier-Chaumon et al., 2021). As home becomes the second workplace, teleworkers may experience an overlap in space and time between their work life and their private life in the same way as the self-employed working from home (Vayre and Pignault, 2014; Vacherand-Revel et al., 2016; Orel, 2019; Vayre, 2019). This overlap can have a detrimental impact, first, on productivity by generating distractions and interruptions different from those experienced in the office, such as the need to care for young children or to carry out household tasks (Wang et al., 2021). It can also be detrimental for work-life balance and generate stress, if employees find themselves struggling to respond to both work and new family demands and free up time for themselves (Metzger and Cléach, 2004; Maruyama et al., 2009; Vayre and Pignault, 2014; Vacherand-Revel et al., 2016; Vayre, 2019). Despite the contribution of remote communication tools, the reduction in exchanges with colleagues imposed by distance can generate a feeling of solitude, erosion of the work group, and in some cases, social isolation, similar to that often experienced by self-employed workers (Cooper and Kurland, 2002; Gajendran and Harrison, 2007; Boboc et al., 2014; Vayre and Pignault, 2014; Vayre, 2019). Finally, employees may experience problems of working comfort (and over time, physical health) if their home workspace (office furniture, computer equipment) is inadequate (Robelski et al., 2019, 2021; Wang et al., 2021).

Overall, when the right working conditions are not met, the home may be a unsuitable place to telework (Müller et al., 2022). The health crisis linked to COVID-19, and the changeover of a significant part of the employees to "forced" telework has highlighted that some employees had a home unsuitable for work, due to lack of equipment or unfavorable family situations (Babic et al., 2021; Wang et al., 2021). Yet, workplace suitability is determinant for a successful transition to teleworking (Wang et al., 2021; Müller et al., 2022). Apart from the consequences in terms of wellbeing at work described above, Müller et al. (2022) recently demonstrated that workplace suitability is positively associated with work performance and collaboration, in the context of transition to teleworking. These results highlight that the workplace plays an important role in the success of teleworking deployment. When home proves to be an unsuitable place to telework, employees may need to look for an alternative workplace, such as coworking spaces.

In an exploratory study which remains, to our knowledge, the only one to have directly investigated teleworkers' opinions of coworking spaces (Lescarret et al., 2022), we conducted interviews with 20 employees teleworking on a regular basis (eight of whom were coworking space users) and questioned them on the perceived advantages and disadvantages of teleworking in coworking spaces. The results of these interviews showed that participants perceived coworking spaces as mainly useful for: (1) breaking the loneliness caused by teleworking at home and meeting new people, (2) improving productivity by eliminating sources of interruptions/distractions at home, (3) improving working comfort, and (4) separating private and professional life better. The cost of the access fees and the fear of an increase in commuting time were also identified as potential barriers to use. These results have yet to be replicated elsewhere, however, and the extent to which employees' experience of teleworking from home can predict their intention to telework in a coworking space remains to be investigated in more detail.

The present study aimed at better understanding the determinants of employees' intention to telework in a coworking space, and more specifically to what extent the experience of the negative aspects of teleworking from home (e.g., lack of social interaction at work) might contribute to this intention. To this end, we designed a survey measuring teleworkers' satisfaction regarding teleworking from home, and their opinion toward teleworking in a coworking space (perceived usefulness, perceived feasibility, attitude, and behavioral intention). This

survey was administered to a large sample of French teleworkers who were not currently users of a coworking space, to investigate whether their experience of the negative aspects of teleworking from home influenced their intention to telework in a coworking space in the future.

Indeed, according to several theories of human behavior prediction, including the Theory of Planned Behavior (Ajzen, 1991, 2020), the intention to adopt a certain behavior is a function of one's attitude toward this behavior, i.e., how favorable or unfavorable one is toward adopting the behavior. This attitude is impacted, in turn, by beliefs regarding the likely consequences of this behavior (Ajzen, 1991, 2020) and notably, whether one would benefit from adopting the behavior, i.e., the behavior's perceived usefulness (Davis, 1989; Legris et al., 2003; King and He, 2006). Our main assumption was that the experience of the negative aspects of teleworking from home would impact how useful employees perceive teleworking in a coworking space to be, their attitude toward it, and ultimately their intention to telework in a coworking space in the future—the remaining question being which negative aspects and to what extent.

Based on the literature on teleworking and our pilot study (Lescarret et al., 2022), we identified four negative aspects of teleworking from home that might affect employees' intention to telework in a coworking space: (1) perceived social isolation (Cooper and Kurland, 2002; Gajendran and Harrison, 2007; Boboc et al., 2014; Vayre and Pignault, 2014; Vayre, 2019), (2) perceived decline in productivity (Wang et al., 2021), (3) perceived lack of working comfort (Robelski et al., 2019, 2021; Wang et al., 2021), and (4) perceived lack of work-life separation (Metzger and Cléach, 2004; Maruyama et al., 2009; Vayre and Pignault, 2014; Orel, 2019; Vayre, 2019). As represented in Figure 1, we expected that teleworkers' experience of these negative aspects of teleworking from home would have a direct effect on their perception of the usefulness of teleworking in a coworking space, and an indirect effect on their intention to telework in a coworking space in the future, mediated by its effect on perceived usefulness and attitude toward teleworking in a coworking space. Our hypotheses were formulated as follows:

H1: *Perceived social isolation* when working from home (PSI) has a direct effect on the perceived usefulness of teleworking in a coworking space (PU) (H1a), and an indirect effect on the intention to telework in a coworking space in the future (BI), mediated by its effect on PU and attitude toward teleworking in a coworking space (ATT) (H1b).

H2: *Perceived decline in productivity* when working from home (PDP) have a direct effect on PU (H2a), and an indirect effect on BI, mediated by its effect on PU and ATT (H2b).

H3: *Perceived lack of working comfort* when working from home (PLWC) have a direct effect on PU (H3a), and an indirect effect on BI, mediated by its effect on PU and ATT (H3b).

H4: *Perceived lack of work-life* separation when working from home (PLWLS) have a direct effect on PU (H4a), and an indirect effect on BI, mediated by its effect on PU and ATT.

H5: PU has a direct effect on ATT.

H6: ATT has a direct effect on BI.

Additionally, we were interested in the factors that might hinder employees' intention to telework in a coworking space, even if employees had a positive attitude toward it. Research has shown that a positive attitude toward a certain behavior does not mean that this behavior is feasible, for a variety of reasons (Ajzen, 1991, 2020). In accordance with the literature on coworking spaces and our pilot study (Lescarret et al., 2022), we decided to test the influence of four factors that might moderate employees' intention to telework in a coworking space: (1) the ability to pay the access fee to the coworking space, i.e., budget, (2) the availability of a coworking space near home, i.e., localization, (3) the feasibility of carrying out work tasks in a coworking space, i.e., job compatibility, and (4), whether the management would agree to the employee teleworking in a coworking space, i.e., management agreement. As represented in Figure 1, we expected these factors to moderate the effect of participants' attitude toward teleworking in a coworking space on their intention to telework in a coworking space in the future, in such a way that the positive effect of attitude on behavioral intention would be higher when perceived feasibility was high (e.g., having a sufficient budget to pay the access fees) but lower when perceived feasibility was low. The hypotheses were formulated as follows:

Budget (H7), *Localization* (H8), *Job Compatibility* (H9), *and Management Agreement* (H10) moderates the positive effect of ATT on BI.

Methods

Sample

Two hundred and sixty-eight French company employees participated in the study (Mage = 36 years old, SD = 8.65, Minage = 22, Maxage = 64). Out of this sample, 58.2% of participants (N = 156) considered themselves as a woman, 41% (N = 110) as a man, and 0.7% (N = 2) as non-binary or transgender. 12.7% of participants (N = 34) teleworked

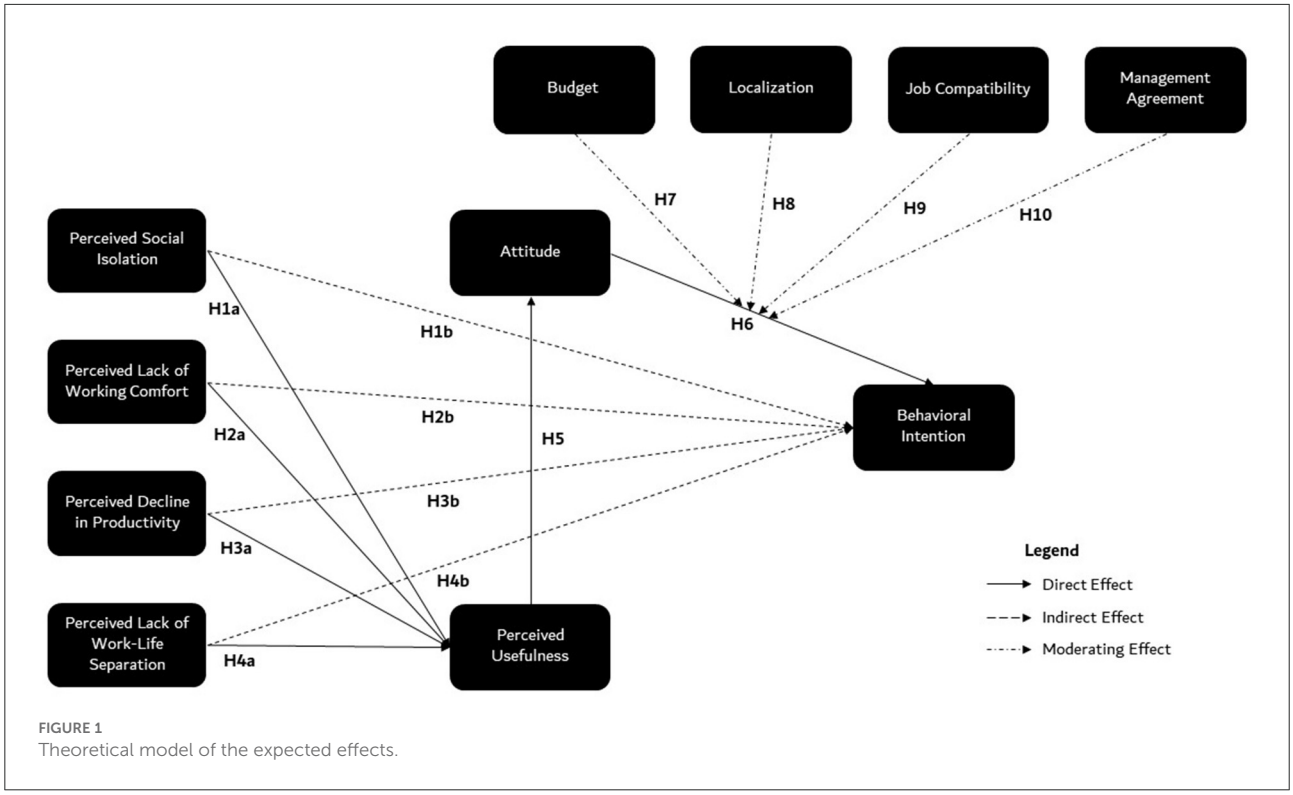

FIGURE 1
Theoretical model of the expected effects.

occasionally (less than once a week), 44.4% ($N = 119$) regularly (once or twice a week), and 42.9% ($N = 115$) 50% of their working hours or more. Most participants had a high position in the company organization (e.g., executives and engineers) and all had higher education qualifications, which corresponds to the demographics of French teleworkers before the COVID-19 crisis (DARES, 2019). All participants stated that they knew what a coworking space is, to some extent (34.7%, $N = 93$) or completely (65.3%, $N = 175$), but none were users of a coworking space at the time of the study.

Data collection took place from April to June 2022. Participants were recruited through professional networks (e.g., mailing list) and social networks (e.g., LinkedIn©). Participation was strictly voluntary, anonymous and the study protocol was approved by the Ethical Committee of the University of Toulouse before the data collection. The study was designed in full compliance with the ethical standards of the Declaration of Helsinki.

Table 1 summarizes the socio-demographic characteristics of the sample.

Measures

Home-based teleworking satisfaction

In order to assess the extent to which participants perceived their experience of teleworking from home as satisfactory (or unsatisfactory), a 16-item questionnaire was developed based on the interviews we conducted with teleworkers in our pilot study (Lescarret et al., 2022). The items tackled four dimensions: (1) perceived social isolation (e.g., "When I work from home, I tend to feel lonely"), (2) perceived decline in productivity (e.g., "When I work from home, I find it hard to concentrate on my work"), (3) perceived lack of working comfort (e.g., "When I work from home, my working comfort is insufficient"), (4) perceived lack of work-life separation (e.g., "When I work from home, I find it difficult to 'switch off' from work"). Participants had to indicate to what extent they agreed with each statement provided, on a 7-point Likert scale ranging from "Totally disagree" (scored 1) to "Totally agree" (scored 7). Negative items ("When I work from home, I tend to feel lonely") contrasted with reverse scaled positive items ("When I work from home, I manage to stay in touch with my colleagues") to prevent the emergence of an acquiescence bias (Schriesheim and Hill, 1981).

Participants' answers to the questionnaire were subjected to a Confirmatory Factor Analysis and a Reliability Analysis (CFA), using the R packages psych (Revelle, 2019) and lavaan (Rosseel et al., 2018). After the removal of two items with unsatisfactory factor loadings, the CFA indicated an acceptable fit of the four-factor structure. While the exact fit test proved significant, $\chi^2_{(71)} = 244.652$, $p < 0.001$, which may be explained by the sample size (Gatignon, 2010), comparative

TABLE 1 Sample description.

Category		%	N
Age		$M = 36.28$	$SD = 8.65$
Gender	Woman	58.2%	156
	Man	41%	110
	Non-binary/transgender	0.7%	2
Level of Education	Upper secondary-school	3.4%	9
	Bachelor/master	87.3%	234
	Ph.D.	9.3%	25
Marital status	Single	23.9%	64
	In a relationship	35.4%	95
	Married	40.7%	109
With children?	No	61.9%	166
	Yes	38.1%	102
Company size	<10 employees	9.7%	26
	(10:249) employees	25.4%	68
	(249: 4,999) employees	31.8%	88
	>5,000 employees	32.1%	86
Position in the company	Low (e.g., administrative assistant)	2.2%	6
	Intermediate (e.g., technician and sales consultant)	17.2%	46
	High (e.g., administrative executive and engineer)	80.6%	216
Teleworking intensity	Low (once or twice a month)	12.7%	34
	Moderate (once or twice a week)	44.4%	119
	High (50% of working hours or more)	42.9%	115
Teleworking location	From home, exclusively	84.3%	226
	Mostly from home, occasionally from other places (e.g., library)	14.2%	42
Do you know what a coworking space is?	Yes, to some extent	34.7%	93
	Yes, completely	65.3%	175

fit indexes were indicative of an acceptable model fit, with CFI = 0.931, TLI = 0.91 (Hu and Bentler, 1999). Reliability indexes also proved satisfactory for each dimension (all $\alpha > 0.80$). The scores obtained on each item selected on the basis of this analysis were summed and averaged for each dimension to obtain a score between 1 and 7. Table 2 provides the full list of items along with the factor loadings on each dimension.

Opinion toward teleworking in a coworking space

Perceived usefulness

After completing the teleworking satisfaction questionnaire, participants were provided with the following description of what a coworking space is: "*Coworking spaces are alternative workplaces dedicated to mobile workers (self-employed or teleworking employees). They offer the necessary facilities for professional practice (private or open-plan offices, meeting rooms, computer equipment), combined with spaces that are more conducive to relaxation and exchanges between users (sofas, restaurant space, etc.).*

It is possible to rent an office on a one-off basis (one day, for example) or on a more regular basis in the form of a monthly subscription. For example, the average rates for Toulouse are €15 (incl. tax) per day, €120 (incl. tax) for 10 days and €200/month (excl. tax) for unlimited use.

In addition to renting offices, the owners of these spaces regularly organize events aimed at encouraging exchanges between users, in the form of workshops to share practices, professional networking, or more informal events (yoga sessions, games, etc.)."

This description was provided in case participants were unsure what a coworking space was, and was written to be as neutral as possible, in order not to induce a positive (or negative) attitude toward coworking spaces based on the information provided.[1]

After reading the description, participants were asked to indicate to what extent they perceived that teleworking in a coworking space would be useful to them ("In my case, attending a coworking space to telework would be…"), on a 9-point bipolar scale ranging from −4 ("useless") to +4 ("useful").

Perceived feasibility

Participants were then asked to indicate, on a 7-point Likert scale ranging from "Totally disagree" (1) to "Totally agree" (7), to what extent they agreed with the following statements: "I have the budget to pay a subscription to a coworking space" (Budget), "I think I would easily find a coworking space close to my home" (Localization), "My job is feasible in a coworking space" (Job Compatibility), "I think my managers will agree to my working in a coworking space" (Management Agreement). The four items were found to be only weakly correlated with each other

1 The neutrality of the text was checked during our pilot study (Lescarret et al., 2022). We provided the description to the participants and asked them whether they considered that description negative, neutral or positive. All participants declared finding the description neutral ($N = 17$) or somewhat neutral ($N = 3$).

TABLE 2 Dimensions and corresponding items of the teleworking satisfaction questionnaire.

Factor	When I work from home…	Estimate	SE	*Z*	*p*
Perceived social isolation (α = 0.82)	…I tend to feel lonely	1.360	0.1109	12.3	<0.001
	…I still feel part of a working group*	1.316	0.0758	17.4	<0.001
	…I manage to stay in touch with my colleagues*	1.278	0.0722	17.7	<0.001
Perceived decline in productivity (α = 0.91)	…I find it hard to motivate myself to work	1.727	0.0916	18.8	<0.001
	… I find it difficult to concentrate on my work	1.671	0.0903	18.5	<0.001
	… I feel I am more productive than usual*	1.349	0.0844	16.0	<0.001
Perceived lack of working comfort (α = 0.92)	…my working comfort seems insufficient	1.485	0.0930	16.0	<0.001
	… I find it difficult to find a suitable space to work	1.581	0.0909	17.4	<0.001
	… I have all the necessary equipment to work efficiently*	1.461	0.0928	15.7	<0.001
	… I have a dedicated workspace that I find comfortable*	1.654	0.0898	18.4	<0.001
Perceived lack of work-life separation (α = 0.85)	…I find it hard to 'switch off' from work	1.320	0.1015	13.0	<0.001
	… I can easily find time for myself (or my family)*	0.999	0.0814	12.3	<0.001
	… I am satisfied with the balance between my professional and private life*	1.418	0.0900	15.8	<0.001
	… I feel that my work is intruding on my private life	1.220	0.0883	13.8	<0.001

Items marked with a (*) correspond to reverse-scaled items.

(see Appendix B) and were therefore considered separately in the analyses.

Attitude toward teleworking in a coworking space

Participants were then asked to answer a four-item questionnaire aimed at assessing to what extent they were in favor of (or against) teleworking in a coworking space. Participants had to indicate to what extent they agreed with statements such as ("I want to telework in a coworking space"), on a 7-point Likert scale ranging from "Totally disagree" (1) to "Totally agree" (7). The reliability of the scale proved to be very high (α = 0.95).

Behavioral intention

Finally, participants had to answer a four-item questionnaire designed to evaluate to what extent they intended to telework in a coworking space in the future. Participants had to indicate how far they agreed with statements such as ("I will enquire about coworking opportunities near me"), on a 7-point Likert scale ranging from "Totally disagree" (1) to "Totally agree" (7). The reliability of the scale proved to be excellent (α = 0.92).

Table 3 summarizes the set of scales used to assess participants' opinion of teleworking in coworking spaces.

Statistical analyses

All analyses were run using Jamovi software version 2.2 (The Jamovi Project, 2021), with the R packages psych: Procedures for Psychological, Psychometric and Personality Research (Revelle, 2019), lavaan: Latent Variable Analysis (Rosseel et al., 2018), car: Companion to Applied Regression (Fox and Weisberg, 2020), emmeans: Estimated Marginal Means (Lenth, 2020), and jAMM: jamovi Advanced Mediation Models (Gallucci, 2020).

Age, gender, level of education, marital status, number of children, position in the company, company size, teleworking intensity, and teleworking location were considered as control variables in the analyses.

Results

Appendix A provides the means, standard deviations, skewness and kurtosis coefficients observed on each measure. Appendix B indicates the correlations observed between the measures.

Preliminary analyses

Age, gender, level of education, marital status, number of children, position in the company, company size and

TABLE 3 Items used to measure: (1) Perceived usefulness, (2) Perceived feasibility, (3) Attitude, and (4) Behavioral intention.

Dimension	Items
Perceived usefulness	*"In my case, attending a coworking space to telework would be…"* Useless (−4)—Useful (+4)
Perceived feasibility	"*I have the budget to pay a subscription to a coworking space*" (Budget)
	"*I think I would easily find a coworking space close to my home*" (Localization)
	"*My job is feasible in a coworking* space" (Job compatibility)
	"*I think my managers will agree to my working in a coworking space*" (Management agreement)
Attitude ($\alpha = 0.95$)	"*If I had the opportunity, I would go to a coworking space to telework*"
	"*I want to telework in a coworking space.*"
	"*I am reluctant to telework in a coworking space.*"
	"*I am not interested in teleworking in a coworking space.*"
Behavioral Intention ($\alpha = 0.92$)	"*I will enquire about coworking opportunities near me*"
	"I intend to try teleworking in a coworking space for a day, to see if I like the experience"
	"I have no intention of attending a coworking space in the future"
	"*I am seriously considering attending a coworking space to telework (occasionally or regularly).*"

teleworking location proved not be significantly associated with the measures, and were thus not included in further analyses. Conversely, teleworking intensity was found to be associated with perceived social isolation, $F_{(2,95.2)} = 4.782$, $p = 0.010$, perceived usefulness, $F_{(2,98.8)} = 4.448$, $p = 0.014$, attitude, $F_{(2,101.2)} = 5.593$, $p = 0.005$, and behavioral intention, $F_{(2,102.2)} = 13.086$, $p < 0.001$. Table 4 indicates the results of the *post-hoc* tests (Games-Howell). Overall, employees who teleworked at least 50% of their working hours reported feeling more socially isolated when working from home, had a more positive attitude toward teleworking in coworking spaces, perceived it as more useful, and were more inclined to telework in a coworking space in the future than the other employees. As a result, teleworking intensity was considered as a potential moderator in the following analyses.

Hypotheses testing

We conducted a moderated mediation analysis, based on multiple linear regression modeling, to test our assumptions (Hayes, 2022). The R packages jAMM (Gallucci, 2020) and lavaan (Rosseel, 2019) were used to run the analysis. Behavioral Intention was included as the dependent variable; Perceived Social Isolation (PSI), Perceived Decline in

TABLE 4 Results of the *post-hoc* tests (Games-Howell) pertaining to the effect of teleworking intensity on perceived lack of social interaction, perceived usefulness, attitude, and behavioral intention.

	Teleworking intensity level		Low	Moderate	High
Perceived social isolation	Low ($M_{PSI} = 2.94$, $SD_{PSI} = 1.27$)	$M_{difference}$	—	−0.196	−0.697
		t-value	—	−0.800	−2.63
		df	—	52.1	67.5
		p-value	—	0.705	0.028
	Moderate ($M_{PSI} = 3.13$, $SD_{PSI} = 1.23$)	$M_{difference}$	—	—	−0.500
		t-value	—	—	−2.66
		df	—	—	213.5
		p-value	—	—	0.023
	High ($M_{PSI} = 3.63$, $SD_{PSI} = 1.61$)	$M_{difference}$	—	—	—
		t-value	—	—	—
		df	—	—	—
		p-value	—	—	—
Perceived usefulness	Low ($M_{UP} = -1.47$, $SD_{UP} = 2.44$)	$M_{difference}$	—	−0.252	−1.236
		t-value	—	−0.518	−2.44
		df	—	58.4	66.5
		p-value	—	0.863	0.045
	Moderate ($M_{UP} = -1.22$, $SD_{UP} = 2.71$)	$M_{difference}$	—	—	−0.984
		t-value	—	—	−2.60
		df	—	—	226.8
		p-value	—	—	0.027
	High ($M_{UP} = -0.23$, $SD_{UP} = 3.05$)	$M_{difference}$	—	—	—
		t-value	—	—	—
		df	—	—	—
		p-value	—	—	—
Attitude	Low ($M_{ATT} = 3.66$, $SD_{ATT} = 1.46$)	$M_{difference}$	—	0.0231	−0.712
		t-value	—	0.0773	−2.36
		df	—	64.3	65.9
		p-value	—	0.997	0.054
	Moderate ($M_{ATT} = 3.64$, $SD_{ATT} = 1.79$)	$M_{difference}$	—	—	−0.735
		t-value	—	—	−3.13
		df	—	—	231.6
		p-value	—	—	0.006
	High ($M_{ATT} = 4.37$, $SD_{ATT} = 1.81$)	$M_{difference}$	—	—	—
		t-value	—	—	—
		df	—	—	—
		p-value	—	—	—
Behavioral intention	Low ($M_{BI} = 2.08$, $SD_{BI} = 1.19$)	$M_{difference}$	—	−0.422	−1.262
		t-value	—	−1.76	−4.78
		df	—	60.2	81.2
		p-value	—	0.192	<0.001
	Moderate ($M_{BI} = 2.51$, $SD_{BI} = 1.37$)	$M_{difference}$	—	—	−0.839
		t-value	—	—	−4.02
		df	—	—	213.5
		p-value	—	—	<0.001

(Continued)

TABLE 4 (Continued)

Teleworking intensity level		Low	Moderate	High
High	$M_{difference}$	—	—	—
($M_{BI} = 3.36$,	t-value	—	—	—
$SD_{BI} = 1.79$)	df	—	—	—
	p-value	—	—	—

Productivity (PDP), Perceived Lack of Working Comfort (PLWC), and Perceived Lack of Work-Life Separation (PLWLS) as covariate predictors; Perceived Usefulness and Attitude as mediators; Budget, Localization, Job Compatibility, and Company as moderators. Because of its significant association with several measures (including Behavioral Intention), Teleworking Intensity was also included as a potential moderator of the tested effects. Multicollinearity proved moderate enough to identify the effect of individual predictors, as VIF coefficients ranged between 1.067 (Budget) and 3.408 (Attitude) (Sheather, 2009). Figure 2 provides an overview of the results of the moderated mediation analysis.

Model components

In line with H1a, Perceived Social Isolation had a strong positive effect on Perceived Usefulness, $\beta = 0.414$, $z = 6.342$, $p < 0.001$, and (to a smaller extent) on Attitude toward teleworking in coworking spaces, $\beta = 0.138$, $z = 2.785$, $p = 0.005$. Perceived Lack of Working Comfort also had a significant positive effect on Perceived Usefulness, $\beta = 0.188$, $z = 3.19$, $p = 0.001$, in accordance with H3a, but its effect on Attitude was not significant, $\beta = 0.026$, $z = 0.297$, $p = 0.766$. Perceived Decline in Productivity had no significant effect on Perceived Usefulness, $\beta = 0.094$, $z = 1.465$, $p = 0.143$, nor on Attitude, $\beta = 0.037$, $z = 0.82$, $p = 0.412$, thus invalidating H2a. In discordance with H4a, Perceived Lack of Work-Life Separation also had no significant impact on Perceived Usefulness, $\beta < 0.001$, $z = 0.141$, $p = 0.989$, or on Attitude, $\beta = 0.035$, $z = 0.952$, $p = 0.341$. No interaction effect between the covariates included as predictors were found on Perceived Usefulness, or on Attitude (all $p > 0.10$).

In line with the suspected mediated effects, Perceived Usefulness strongly and positively impacted Attitude, $\beta = 0.791$, $z = 16.627$, $p < 0.001$, and Behavioral Intention, $\beta = 0.310$, $z = 4.518$, $p < 0.001$. Attitude also proved to be a strong predictor of Behavioral Intention, $\beta = 0.544$, $z = 8.013$, $p < 0.001$. H5 and H6 were thus confirmed.

Direct and mediated effects on behavioral intention

None of the covariates included as predictors had a significant direct effect on Behavioral Intention. The direct effect of Perceived Lack of Work-Life Separation on Behavioral Intention was tendential, but small, and in the opposite direction to that expected, $\beta = -0.080$, $z = -1.941$, $p = 0.052$.

Although no significant direct effect of the covariates was found on Behavioral Intention, several indirect effects were noted. Perceived Social Isolation had a positive indirect effect on Behavioral Intention mediated by Perceived Usefulness, $\beta = 0.128$, $z = 3.679$, $p < 0.001$, and a positive indirect effect mediated by Attitude, $\beta = 0.075$, $z = 2.631$, $p = 0.009$. The full mediated path (PSI => PU => Attitude => BI) also proved significant, $\beta = 0.162$, $z = 4.672$, $p < 0.001$. As a result, the total effect of Perceived Social Isolation on Behavioral Intention was found to be significant and large, $\beta = 0.373$, $z = 5.08$, $p < 0.001$. These results provide support for H1b.

In line with H3b, Perceived Lack of Working Comfort also had a positive (albeit small) indirect effect on Behavioral Intention, mediated by Perceived Usefulness, $\beta = 0.058$, $z = 2.61$, $p = 0.009$. Although the effect of Perceived Lack of Working Comfort on Behavioral Intention mediated by Attitude was not significant, $\beta = 0.006$, $z = 0.297$, $p = 0.766$, the full mediated path (PLWC => PU => Attitude => BI) reached significance, $\beta = 0.073$, $z = 2.924$, $p = 0.003$. The total effect of Perceived Lack of Working Comfort on Behavioral Intention was moderate and positive, but only tendential, $\beta = 0.122$, $z = 1.858$, $p = 0.063$.

In discordance with H2b and H4b, however, no indirect effect of Perceived Decline in Productivity nor of Perceived Lack of Work-Life Separation was observed on Behavioral Intention, regardless of the mediators considered (all $p > 0.10$). Moreover, no indirect effect was found to be qualified with an interaction between the covariates. Table 5 recapitulates the results of the mediation analysis.

Moderated effects

Out of the four items of perceived feasibility included in the model (Budget, Localization, Job Compatibility, Management Agreement), three proved to be significant moderators of the positive effect of Attitude on Behavioral Intention: Cost, $\beta = 0.492$, $z = 2.529$, $p = 0.011$, Job Compatibility, $\beta = 0.176$, $z = 2.631$, $p = 0.008$, and Management Agreement, $\beta = 0.484$, $z = 3.047$, $p = 0.002$. Although this relationship was not expected, Cost was a significant moderator of the positive effect of Perceived Usefulness on Behavioral Intention as well, $\beta = 0.276$, $z = 3.332$, $p < 0.001$. These results provide support for H7, H9, and H10. Conversely, Localization had no moderating impact on the positive relationship between Attitude and Behavioral Intention, $\beta = 0.006$, $z = 0.297$, $p = 0.766$, nor on any other significant paths in the model. These results invalidate H6. Despite its association with several measures included in the

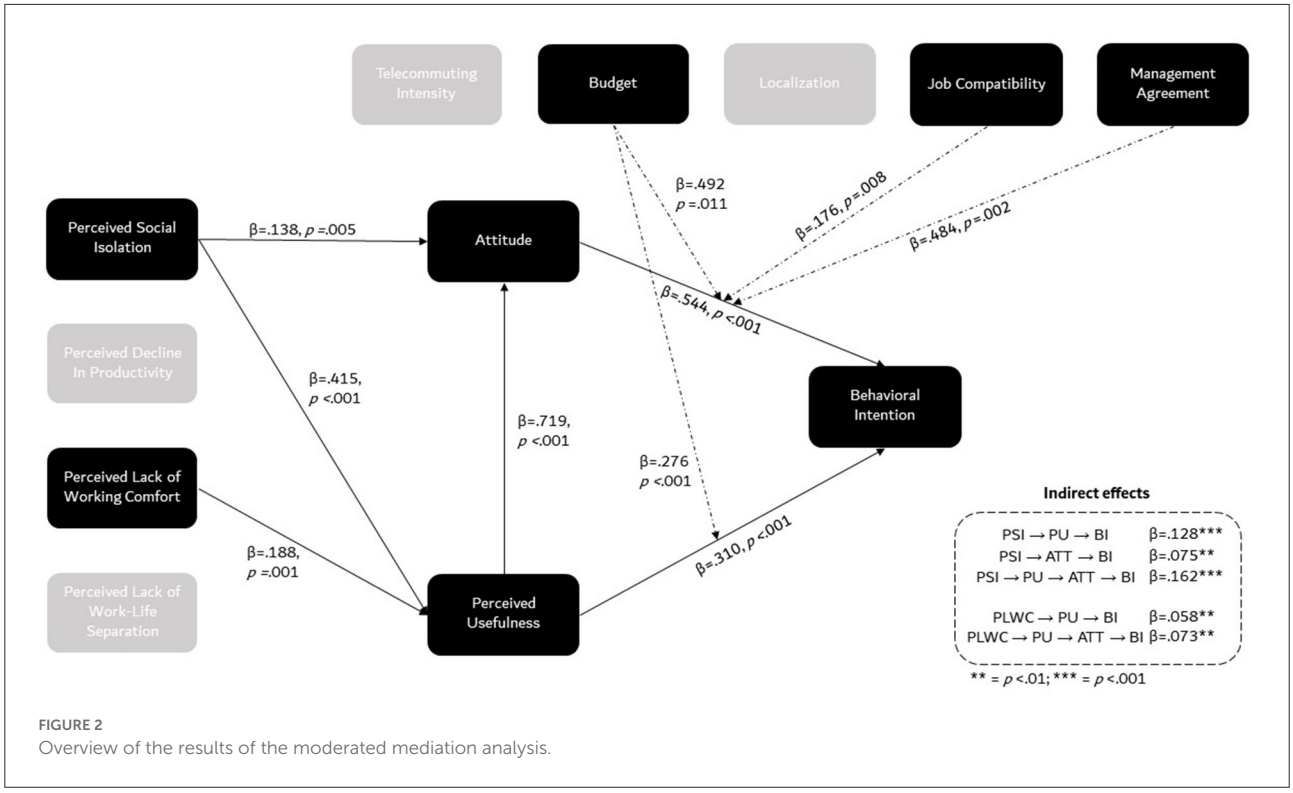

FIGURE 2
Overview of the results of the moderated mediation analysis.

model (see above), Teleworking Intensity was not found to be a significant moderator of any paths tested in the model, and no interactions between the factors included as moderators were found (all $p > 0.10$).

To clarify the moderating impact of Budget, Job Compatibility and Management Agreement on the relationship between Attitude and Behavioral Intention, we conducted single slope analyses by calculating the effect of the predictor (Attitude) on the dependent variable (Behavioral Intention) at different levels of the moderator (−1SD, average, +1SD). Table 6 provides the results of the single slope analyses and Figures 3–5 the single slope plot for each significant moderator (respectively, Budget, Job Compatibility, and Management Agreement). Overall, the pattern of results proved similar for all moderators. Although the positive effect of Attitude on Behavioral Intention remained strong and significant regardless of the moderators' levels (all $p < 0.001$), this effect was smaller when the Budget, Job Compatibility and Company Agreement scores were low (−1SD) and conversely, higher when the moderator scores were high (+1SD). These results further support H7, H9, and H10.

Discussion

This study aimed at better understanding the determinants of employees' intention to telework in a coworking space, with the assumption that employees' experience of the negative aspects of teleworking from home would impact their intention to telework in a coworking space in the future. More specifically, we expected that when employees experienced: (1) social isolation, (2) a decline in productivity, (3) a lack of working comfort, and (4) a spillover of work into their private life when working from home, they would perceive teleworking in a coworking space as more useful, have a more positive attitude toward it and thus be more inclined to telework in a coworking space in the future. However, the results of our study are not entirely in line with these assumptions.

As expected, the experience of a feeling of social isolation when working from home positively (and strongly) impacted how useful participants perceived teleworking in a coworking space to be, and indirectly how inclined they were to telework in a coworking space in the future. These results are particularly interesting in that they support the claim that perceived social isolation constitutes an important predictor of employees' intention to telework in a coworking space (Boboc et al., 2014; Gerdenitsch et al., 2016; Bianchi et al., 2018; Lashani and Zacher, 2021; Rådman et al., 2022; Wright et al., 2022). Since perceived social isolation had the strongest effect on perceived usefulness (and indirectly on behavioral intention) out of the four predictors investigated in our study, the prospect of feeling less lonely when teleworking and having more social interactions at work appears to be the main benefit perceived by employees of teleworking in a coworking

TABLE 5 Results of the mediation analysis.

Type	Effect	Estimate	SE	95% CI		β	*Z*	*p*
				Lower	Upper			
Indirect	PSI ⇒ UP ⇒ BI	0.1444	0.0392	0.0675	0.2213	0.1284	3.6796	<0.001
	PLWC ⇒ UP ⇒ BI	0.0579	0.0222	0.0144	0.1013	0.0581	2.6104	0.009
	PDP ⇒ UP ⇒ BI	0.0283	0.0203	−0.0115	0.0681	0.0291	1.3942	0.163
	PLWLS⇒ UP ⇒ BI	2.75e-4	0.0195	−0.0379	0.0385	2.29e-4	0.0141	0.989
	PSI ⇒ ATT ⇒ BI	0.0846	0.0322	0.0216	0.1477	0.0753	2.6310	0.009
	PLWC ⇒ ATT ⇒ BI	0.0068	0.0230	−0.0389	0.0518	0.0068	0.2972	0.766
	PDP ⇒ ATT ⇒ BI	0.0198	0.0243	−0.0278	0.0674	0.0204	0.8157	0.415
	PLWLS⇒ ATT ⇒ BI	−0.0231	0.0244	−0.0709	0.0248	−0.0192	−0.9454	0.344
	PSI ⇒ UP ⇒ ATT ⇒ BI	0.1825	0.0383	0.1074	0.2576	0.1623	4.7646	<0.001
	PLWC ⇒ UP ⇒ ATT ⇒ BI	0.0732	0.0250	0.0241	0.1222	0.0735	2.9243	0.003
	PDP ⇒ UP ⇒ ATT ⇒ BI	0.0358	0.0249	−0.0130	0.0847	0.0368	1.4364	0.151
	PLWLS⇒ UP ⇒ ATT ⇒ BI	3.47e-4	0.0246	−0.0479	0.0486	2.90e-4	0.0141	0.989
Component	PSI ⇒ UP	0.8300	0.1309	0.5735	1.0865	0.4147	6.3423	<0.001
	PLWC ⇒ UP	0.3327	0.1040	0.1288	0.5366	0.1878	3.1984	0.001
	PDP ⇒ UP	0.1628	0.1111	−0.0549	0.3805	0.0941	1.4657	0.143
	PLWLS ⇒ UP	0.0016	0.1120	−0.2179	0.2210	7.40e-4	0.0141	0.989
	PSI ⇒ ATT	0.1725	0.0619	0.0511	0.2939	0.1383	2.7854	0.005
	PLWC ⇒ ATT	0.0139	0.0468	−0.0778	0.1056	0.0126	0.2974	0.766
	PDP ⇒ ATT	0.0404	0.0492	−0.0561	0.1368	0.0374	0.8200	0.412
	PLWLS ⇒ ATT	−0.0470	0.0494	−0.1439	0.0498	−0.0354	−0.9520	0.341
	UP ⇒ ATT	0.4482	0.0270	0.3954	0.5010	0.7192	16.6274	<0.001
	UP ⇒ BI	0.1740	0.0385	0.0985	0.2495	0.3096	4.5177	<0.001
	ATT ⇒ BI	0.4906	0.0612	0.3706	0.6106	0.5442	8.0135	<0.001
Direct	PSI ⇒ BI	0.0085	0.0630	−0.1150	0.1319	0.0075	0.1343	0.893
	PLWC ⇒ BI	−0.0158	0.0469	−0.1077	0.0761	−0.0158	−0.3363	0.737
	PDP ⇒ BI	−0.0679	0.0494	−0.1647	0.0289	−0.0699	−1.3754	0.169
	PLWLS ⇒ BI	−0.0963	0.0496	−0.1935	9.17e-4	−0.0803	−1.9415	0.052
Total	PSI ⇒ BI	0.4200	0.0827	0.2580	0.5821	0.3735	5.0801	<0.001
	PLWC ⇒ BI	0.1221	0.0657	−0.0067	0.2509	0.1226	1.8580	0.063
	PDP ⇒ BI	0.0160	0.0702	−0.1215	0.1535	0.0165	0.2280	0.820
	PLWLS ⇒ BI	−0.1188	0.0707	−0.2574	0.0199	−0.0991	−1.6790	0.093

PSI, Perceived Social Isolation; PLWC, Perceived Lack of Working Comfort; PDP, Perceived Decline in Productivity; PLWLS, Perceived Lack of Work-Life Separation; UP, Perceived Usefulness; ATT, Attitude; BI, Behavioral Intention.

space, in the same way as identified for self-employed workers (Boboc et al., 2014; Gerdenitsch et al., 2016; Lashani and Zacher, 2021; Rådman et al., 2022). As participants who teleworked more than 50% of their working hours reported a stronger feeling of social isolation than the other participants when teleworking from home, which reproduces past findings (Bailey and Kurland, 2002; Mann and Holdsworth, 2003; Gajendran and Harrison, 2007; Vayre and Pignault, 2014; Vayre, 2019), the potential benefit of teleworking in a coworking space for social integration might be all the more substantial for employees who telework intensively and may explain why these participants also reported being more inclined to telework in a coworking space in the future.

Results are much more mixed concerning the effects of the other negative aspects of teleworking from home investigated in this study. Perceived lack of working comfort impacted positively how useful teleworking in a coworking space was perceived to by the participants, and indirectly participants' intention to telework in a coworking space. However, its effect on these measures proved smaller than that of perceived social isolation, and no effect of perceived decline in productivity, nor of perceived lack of work-life separation, was observed on either perceived usefulness, attitude or intention to telework in a coworking space in the future.

The lack of effect of perceived decline of productivity might be explained by the fact that, when participants did report a

TABLE 6 Results of the single slope analyses.

Moderator level	Estimate	SE	*Z*	*p*
Budget				
Average	0.677	0.0359	18.9	<0.001
Low (−1SD)	0.613	0.0479	12.8	<0.001
High (+1SD)	0.742	0.0508	14.6	<0.001
Job compatibility				
Average	0.656	0.0360	18.2	<0.001
Low (−1SD)	0.567	0.0511	11.1	<0.001
High (+1SD)	0.745	0.0507	14.7	<0.001
Management agreement				
Average	0.678	0.0354	19.2	<0.001
Low (−1SD)	0.573	0.0502	11.4	<0.001
High (+1SD)	0.782	0.0489	16.0	<0.001

The analyses show the effect of the predictor (Attitude) on the dependent variable (Behavioral Intention) at different levels of the moderators.

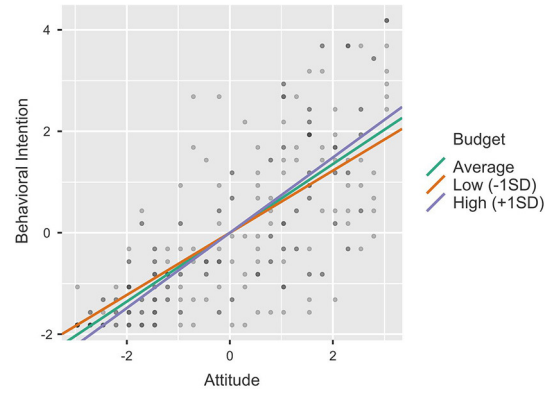

FIGURE 3
Single slope plot—Budget.

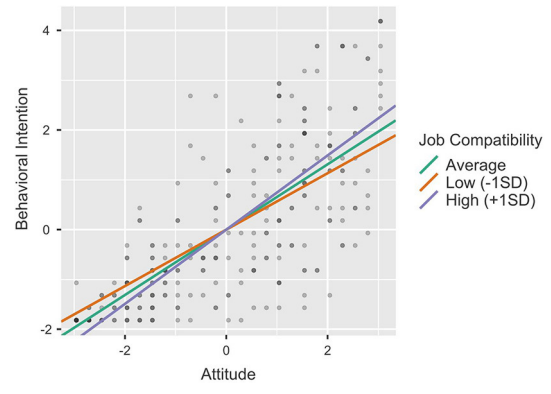

FIGURE 4
Single slope plot—Job compatibility.

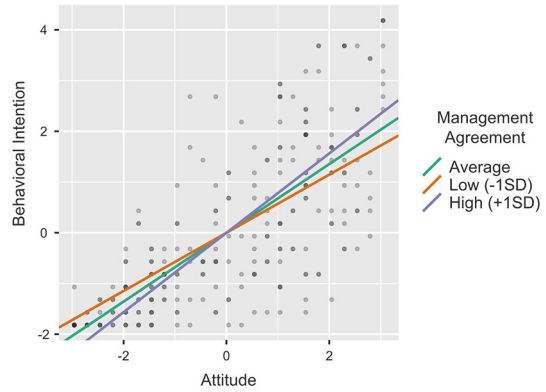

FIGURE 5
Single slope plot—Management agreement.

decline in productivity when teleworking from home, it was for operational (e.g., problems of communication in the team) or psychological reasons (e.g., dissatisfaction with the position) that a relocation of teleworking would not solve (Vayre and Pignault, 2014; Vayre, 2019). Likewise, participants may not have perceived that teleworking in a coworking space would solve any issues related to work-life balance. The experience of a work-life spillover when teleworking may be the result of work intensification and an increase in the number of hours worked that the relocation of teleworking would not address (Bailey and Kurland, 2002; Vayre and Pignault, 2014; Vayre, 2019). A limitation of our measure of perceived lack of work-life separation (and overall, of teleworking satisfaction) is that it did not consider whether teleworking was imposed by the company. When employees encounter work-life balance issues when teleworking because being at home generates family demands (e.g., taking care of children) or distractions that interfere with work, they have the option of returning to the company premises to work, if teleworking was initially *their* decision. In situations where telework is imposed (by the company or due to compelling circumstances) and home prove to be an unsuitable place to work (Müller et al., 2022), relocating telework to a coworking space can be one of the only alternatives to work in good conditions. These assumptions warrant testing in further studies.

In addition, this study highlighted certain factors that impede employees' intention to telework in a coworking space, even if this relocation of work is perceived as beneficial: budget, job compatibility and management agreement. As assumed, these three factors proved to be significant moderators of the effect of attitude on behavioral intention, as the positive effect of attitude on behavioral intention was weaker (albeit still significant and strong) when participants felt that: (1) they did not have the budget to afford the fees to access a coworking space, (2) their job was not entirely feasible in a coworking space, and (3) their management would be reluctant for them to work

in a coworking space. While the problem of job compatibility can hardly be circumvented, budget and management agreement issues might be solved by negotiation with the employers and an adjustment of company policies (provided that the company can afford to subsidize at least part of the cost of the subscription to a coworking space). This is all the more critical for employees who telework intensively. As the results of this study and past findings indicate, employees who telework intensively are more likely to experience a feeling of socio-professional isolation, detrimental to their job satisfaction, motivation and ultimately quality of life (Bailey and Kurland, 2002; Mann and Holdsworth, 2003; Gajendran and Harrison, 2007; Vayre and Pignault, 2014; Vayre, 2019). To the extent that teleworking in a coworking space can help reduce this feeling of isolation (Gerdenitsch et al., 2016; Bianchi et al., 2018; Robelski et al., 2019; Lashani and Zacher, 2021), offering coworking spaces as an alternative to the home as a place to telework seems necessary to allow this population to telework under better conditions.

Limitations of the study and research perspectives

Although this study provides valuable insights into the determinants of employees' intention to telework in a coworking space, some limitations should be considered. Firstly, by focusing on the negative aspects of teleworking as predictors of employees' intention to telework in a coworking space, this study leaves out several factors that may also affect this intention and potentially interact with a negative experience of teleworking from home. The type of work tasks performed by employees, their satisfaction with the position they hold are some examples. Subjective norms are also known to impact behavioral intention, regardless of the behavior considered (Ajzen, 1991, 2020). Although injunctive norms (i.e., "the expectation that a given referent individual or group approves or disapproves of performing the behavior", Ajzen, 2020, p. 315) are partly considered in the study through management agreement, the opinion of participants' colleagues regarding teleworking in a coworking space was not investigated. Prior experience with coworking spaces can also affect behavioral intention, depending on the quality of the experience (Ajzen, 2020). While frequency of use was controlled for in this study, as current users were excluded from participation, prior experience with coworking spaces was not verified. Further research is thus still needed to better understand which factors affect employees' intention to telework in a coworking space, and effectively contribute to the adoption of coworking spaces as a place to telework.

However, the question of the most appropriate model to investigate these factors remains. Technology acceptance models, such as TAM (Davis, 1989), UTAUT (Venkatesh et al., 2003), or more recently the human-technology-organization symbiosis (Brangier et al., 2010) appear inappropriate in the context of coworking spaces, in that these models were designed to investigate primarily the acceptance of the use of information systems. We chose the theory of planned behavior as a basis for this study precisely because of its lack of specificity. It is designed to predict any kind of behavior, not solely the use of a technology or an information system (Ajzen, 2020). Unfortunately, if the lack of specificity of the theory can be an advantage, it is also its main drawback. Unlike models of technology acceptance, which propose general dimensions (e.g., effort expectancy and performance expectancy) affecting attitude toward the technology studied, the theory of planned behavior does not propose dimensions affecting attitude toward a given behavior other than the very broad categories "behavioral" and "normative beliefs". What precisely these behavioral and normative beliefs consist of must be the subject of prior pilot studies, which we have done here, but with the risk that the pilot data may not be completely representative of the actual population investigated.

Some limitations related to our study sample should also be considered. Despite our efforts to gather the largest possible sample of teleworkers, the final sample size may not have allowed us to highlight some of the interactions between the variables included in our model. Moreover, our sample proved to be very homogeneous on certain socio-demographic variables (e.g., high position in the company and high level of education). Although these characteristics of our sample are representative of the characteristics of the French teleworker population before the COVID-19 crisis (DARES, 2019), a more varied sample in terms of position in the company or level of education might have revealed some disparities in satisfaction with telework or attitudes toward teleworking in coworking spaces. Finally, some limitations related to our measures remain to be considered. If the reliability of the scales was checked before further analyses, the construct validity of our measures was not directly assessed. Yet, the addition of a general job satisfaction measure would have allowed for an assessment of the convergent validity of the telework satisfaction scale. Such measures were not included in our study, which limits the significance of the results obtained.

Conclusion

Despite these limitations, this study is, to our knowledge, the first to have investigated the determinants of employees' intention to telework in a coworking space and, more specifically, the extent to which their experience of the negative aspects of home-based teleworking contributes to this intention. The results of the study show, in line with the literature on self-employed workers (e.g., Gerdenitsch et al., 2016), that the perception of social isolation when teleworking from home has a strong and positive impact on the perceived usefulness of teleworking in a coworking space, and indirectly on employees' intention to telework in a coworking space in the future. The perceived lack of working comfort at home also indirectly

and positively affects this intention, albeit to a lesser extent. Furthermore, three factors were identified as limiting the intention to telework in a coworking space, despite a positive attitude toward this behavior: budget, management agreement and job compatibility.

This study is a first step in understanding the factors predicting employees' intention to adopt coworking spaces as a place to telework, and now needs to be complemented by further studies investigating the effect of factors other than experience of home-based teleworking as predictors of behavioral intention and final adoption. These studies are necessary to identify the needs of employees seeking alternatives to the home as a place to telework, especially employees who telework intensively and who are most likely to experience the negative aspects of teleworking at home, such as social isolation.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Comité d'Ethique des Recherche, Université de Toulouse. The patients/participants provided their written informed consent to participate in this study.

Author contributions

CLes, CLem, and VL conceived and designed the study. CLes analyzed the data, interpreted the results, and drafted the article. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

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References

Ajzen, I. (1991). The theory of planned behavior. *Org. Behav. Hum. Decis. Proc.* 50, 179–211. doi: 10.1016/0749-5978(91)90020-T

Ajzen, I. (2020). The theory of planned behavior: frequently asked questions. *Hum. Behav. Emerg. Technol.* 2, 314–324. doi: 10.1002/hbe2.195

Akhavan, M. (2021). "Third places for work: a multidisciplinary review of the literature on coworking spaces and maker spaces," in *New Workplaces—Location Patterns, Urban Effects and Development Trajectories*, eds I. Mariotti, S. Di Vita, and M. Akhavan [Cham: Springer International Publishing (Research for Development)], 13–32. Available online at: https://doi.org/10.1007/978-3-030-63443-8_2 (accessed October 25, 2022).

Appel-Meulenbroek, R., Weijs-Perrée, M., Orel, M., Gauger, F., and Pfnür, A. (2021). User preferences for coworking spaces; a comparison between the Netherlands, Germany and the Czech Republic. *Rev. Manag. Sci.* 15, 2025–2048. doi: 10.1007/s11846-020-00414-z

Babic, A., Leclercq, C., Miesse, F., and Hansez, I. (2021). "Confinement lié à la crise sanitaire COVID-19: impact du télétravail contraint sur le bien-être et la performance," in *Les incidences psycho-sociales et socio-organisationnelles de la crise sanitaire COVID sur le travail et la santé des salariés*, eds M. E. Bobillier-Chaumon, B. Gangloff, P. Gilbert, A. M. Vonthron (Paris: L'Harmattan), 13–26.

Bailey, D. E., and Kurland, N. B. (2002). A review of telework research: findings, new directions, and lessons for the study of modern work. *J. Org. Behav.* 23, 383–400. doi: 10.1002/job.144

Bianchi, F., Casnici, N., and Squazzoni, F. (2018). Solidarity as a byproduct of professional collaboration: social support and trust in a coworking space. *Soc. Networks* 54, 61–72. doi: 10.1016/j.socnet.2017.12.002

Bobillier-Chaumon, M.-É., Gangloff, B., Gilbert, P., and Vonthron, A. M., (eds.) (2021). *Les incidences psycho-sociales et socio-organisationnelles de la crise sanitaire Covid sur le travail et la santé des salariés*. Paris: L'Harmattan (Psychologie du travail et ressources humaines).

Boboc, A., Bouchareb, K., Deruelle, V., and Metzger, J. L. (2014). Le coworking : un dispositif pour sortir de l'isolement? *SociologieS*. doi: 10.4000/sociologies.4873

Brangier, E., Hammes-Adelé, S., and Bastien, J.-M. C. (2010). Analyse critique des approches de l'acceptation des technologies: De l'utilisabilité à la

symbiose humain-technologie-organisation. *Eur. Rev. Appl. Psychol.* 60, 129–146. doi: 10.1016/j.erap.2009.11.002

Contreras, F., Baykal, E., and Abid, G. (2020). E-leadership and teleworking in times of COVID-19 and beyond: what we know and where do we go. *Front. Psychol.* 11, 590271. doi: 10.3389/fpsyg.2020.590271

Cooper, C. D., and Kurland, N. B. (2002). Telecommuting, professional isolation, and employee development in public and private organizations. *J. Org. Behav.* 23, 511–532. doi: 10.1002/job.145

DARES (2019). *Quels sont les salariés concernés par le télétravail?* Available online at: https://dares.travail-emploi.gouv.fr/sites/default/files/pdf/dares_analyses_salaries_teletravail.pdf (accessed October 10, 2022).

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quaterly* 13, 319–340. doi: 10.2307/249008

Deskmag (2019). *Global Coworking Survey 2019: Member Demographics*. Available online at: https://coworkingstatistics.com/coworkingstatistics/members-of-coworking-spaces (accessed October 10, 2022).

Fox, J., and Weisberg, S. (2020). *Car: Companion to Applied Regression [R package]*. Available online at: https://cran.r-project.org/package=car (accessed October 25, 2022).

Gajendran, R. S., and Harrison, D. A. (2007). The good, the bad, and the unknown about telecommuting: meta-analysis of psychological mediators and individual consequences. *J. Appl. Psychol.* 92, 1524–1541. doi: 10.1037/0021-9010.92.6.1524

Gallucci, M. (2020). *jAMM: jamovi Advanced Mediation Models*. Available online at: https://jamovi-amm.github.io/ (accessed October 25, 2022).

Garrett, R. K., and Danziger, J. N. (2007). Which telework? Defining and testing a taxonomy of technology-mediated work at a distance. *Soc. Sci. Comp. Rev.* 25, 27–47. doi: 10.1177/0894439306293819

Gatignon, H. (2010). "Confirmatory factor analysis," in *Statistical Analysis of Management Data*, eds H. Gatignon (New York, NY: Springer), 59–122.

Gerdenitsch, C., Scheel, T. E., Andorfer, J., and Korunka, C. (2016). Coworking spaces: a source of social support for independent professionals. *Front. Psychol.* 7, 581. doi: 10.3389/fpsyg.2016.00581

Hayes, A. F. (2022). *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*. New York, NY: Guilford Press.

Hu, L., and Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Struct. Eq. Model. Multidiscip. J.* 6, 1–55. doi: 10.1080/10705519909540118

King, W. R., and He, J. (2006). A meta-analysis of the technology acceptance model. *Infm. Manag.* 43, 740–755. doi: 10.1016/j.im.2006.05.003

Lashani, E., and Zacher, H. (2021). Do we have a match? Assessing the role of community in coworking spaces based on a person-environment fit framework. *Front. Psychol.* 12, 620794. doi: 10.3389/fpsyg.2021.620794

Legris, P., Ingham, J., and Collerette, P. (2003). Why do people use information technology? A critical review of the technology acceptance model. *Inform. Manag.* 40, 191–204. doi: 10.1016/S0378-7206(01)00143-4

Lenth, R. (2020). *emmeans: Estimated Marginal Means, aka Least-Squares Means [R package]*. Available online at: https://cran.r-project.org/package=emmeans (accessed October 25, 2022).

Lescarret, C., Lemercier, C., and Le Floch, V. (2022). Les espaces de coworking, une alternative crédible au domicile comme lieu de télétravail? Premiers éléments issus d'une enquête exploratoire par entretiens [Coworking spaces, a viable alternative to home as a place to telework? First elements from an exploratory interview survey]. *Psychol. Travail Org.* 28, 167–181. doi: 10.1016/j.pto.2022.06.001

Mann, S., and Holdsworth, L. (2003). The psychological impact of teleworking: stress, emotions and health. *New Technol. Work Empl.* 18, 196–211. doi: 10.1111/1468-005X.00121

Maruyama, T., Hopkinson, P. G., and James, P. W. (2009). A multivariate analysis of work-life balance outcomes from a large-scale telework programme. *New Technol. Work Empl.* 24, 76–88. doi: 10.1111/j.1468-005X.2008.00219.x

Metzger, J.-L., and Cléach, O. (2004). Le télétravail des cadres: entre suractivité et apprentissage de nouvelles temporalités. *Sociol. Travail* 46, 433–450. doi: 10.1016/j.soctra.2004.09.001

Müller, T., Schuberth, F., Bergsiek, M., and Henseler, J. (2022). How can the transition from office to telework be managed? The impact of tasks and workplace suitability on collaboration and work performance. *Front. Psychol.* 13, 987530. doi: 10.3389/fpsyg.2022.987530

Oldenburg, R. (1989). *The Great Good Place: Cafés, Coffee Shops, Community Centers, Beauty Parlors, General Stores, Bars, Hangouts, and How They Get You Through the Day*. New York, NY: Paragon House Publishers.

Orel, M. (2019). Supporting work–life balance with the use of coworking spaces. *Equal. Diver. Inclus. Int. J.* 39, 549–565. doi: 10.1108/EDI-01-2019-0038

Orel, M., and Bennis, W.M. (2021). Classifying changes. A taxonomy of contemporary coworking spaces. *J. Corp. Real Estate.* 23, 278–296. doi: 10.1108/JCRE-12-2020-0061

Rådman, E., Johansson, E., Bosch-Sijtsema, P., and Raharjo, H. (2022). In search of member needs in coworking spaces. *Rev. Manag. Sci.* [Preprint]. doi: 10.1007/s11846-022-00546-4

Rese, A., Kopplin, C. S., and Nielebock, C. (2020). 'Factors influencing members' knowledge sharing and creative performance in coworking spaces. *J. Knowled. Manag.* 24, 2327–2354. doi: 10.1108/JKM-04-2020-0243

Revelle, W. (2019). *psych: Procedures for Psychological, Psychometric, and Personality Research [R package]*. Available online at: https://cran.r-project.org/package=psych (accessed October 25, 2022).

Robelski, S., de Jong, J., Harth, V., and Mache, S. (2021). Analyse ergonomischer Arbeitsplatzmerkmale in Coworking Spaces. *Prävent. Gesundheitsförderung.* 17, 171–177. doi: 10.1007/s11553-021-00848-7

Robelski, S., Keller, H., Harth, V., and Mache, S. (2019). Coworking spaces: the better home office? A psychosocial and health-related perspective on an emerging work environment. *Int. J. Environ. Res. Public Health* 16, 2379. doi: 10.3390/ijerph16132379

Rosseel, Y. (2019). lavaan: an R package for structural equation modeling. *J. Stat. Soft.* 48, 1–36. doi: 10.18637/jss.v048.i02

Rosseel, Y., Oberski, D. L., Byrnes, J., Vanbrabant, L., Savalei, V., Merkle, E., et al. (2018). *'avaan: Latent Variable Analysis [R package]*. Available online at: https://cran.r-project.org/package=lavaan (accessed October 25, 2022).

Scaillerez, A., and Tremblay, D.-G. (2017). Coworking, fab labs et living labs: État des connaissances sur les tiers lieux. *Territ. Mouv.* 34, 4200. doi: 10.4000/tem.4200

Schriesheim, C. A., and Hill, K. D. (1981). Controlling acquiescence response bias by item reversals: the effect on questionnaire validity. *Educ. Psychol. Meas.* 41, 1101–1114. doi: 10.1177/001316448104100420

Sheather, S. (2009). *A Modern Approach to Regression with R*. New York, NY: Springer.

Spinuzzi, C. (2012). Working alone together: coworking as emergent collaborative activity. *J. Bus. Tech. Commun.* 26, 399–441. doi: 10.1177/1050651912444070

Spinuzzi, C., BodroŽić, Z., Scaratti, G., and Ivaldi, S. (2019). "Coworking is about community": but what is "community" in coworking? *J. Bus. Tech. Commun.* 33, 112–140. doi: 10.1177/1050651918816357

Statista (2022a). *Number of People Working in Coworking Spaces Worldwide From 2018 to 2020 With a Forecast to 2024*. Available online at: https://www.statista.com/statistics/554315/number-of-people-working-in-coworking-spaces-worldwide/ (accessed October 10, 2022).

Statista (2022b). *Number of Coworking Spaces Worldwide From 2018 to 2020 With a Forecast to 2024*. Available online at: https://www.statista.com/statistics/554273/number-of-coworking-spaces-worldwide/ (accessed October 10, 2022).

The Jamovi Project (2021). *jamovi (Version 2.2) [Computer Software]*. Available online at: https://www.jamovi.org (accessed October 25, 2022).

Vacherand-Revel, J., Ianeva, M., Guibourdenche, J., and Carlotti, J. F. (2016). Les pratiques du télétravail pendulaire de cadres: reconfiguration des écosystèmes relationnels et d'activités. *Psychol. Travail Org.* 22, 54–73. doi: 10.1016/j.pto.2015.12.003

Vayre, E. (2019). Les incidences du télétravail sur le travailleur dans les domaines professionnel, familial et social. *Le travail Hum.* 42, 1–39. doi: 10.3917/th.821.0001

Vayre, E., and Pignault, A. (2014). A systemic approach to interpersonal relationships and activities among French teleworkers: French teleworkers relationships and activities. *New Technol. Work Empl.* 29, 177–192. doi: 10.1111/ntwe.12032

Venkatesh, V., Morris, M. G., Davis, G. B., and Davis, F. D. (2003). User acceptance of information technology: toward a unified view. *MIS Quarterly* 27, 425–478. doi: 10.2307/30036540

Wang, B., Liu, Y., Qian, J., and Parker, S. K. (2021). Achieving effective remote working during the COVID-19 pandemic: a work design perspective. *Appl. Psychol.* 70, 16–59. doi: 10.1111/apps.12290

Wright, A., Marsh, D., and Wibberley, G. (2022). Favours within "the tribe": social support in coworking spaces. *New Technol. Work Empl.* 37, 59–78. doi: 10.1111/ntwe.12214

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Wellbeing in line managers during mandatory working from home: How work and personal factors combine

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The pandemic, particularly the aspect of forced working from home, has had a major impact on the workforce. Previous studies show that line managers have also experienced severe mental strain during this period. Since it is expected that hybrid working will be more the new normal than the exception in future, this study further examined line managers' work-related wellbeing in terms of engagement and exhaustion. Following the job characteristics model (JCM), we explore the mediating role of meaningful work between workplace innovation before the pandemic and line managers' work-related wellbeing during forced working from home. The underlying idea is that organizations that already adopted workplace innovation practices before the pandemic, give teams and employees more control, thus allowing a more meaningful role for line managers, which positively impacts line managers' work-related wellbeing during the pandemic. In addition, building upon Job Demands-Resources (JD-R) Theory and the role of personal resources therein, we explore digital leadership skills and work–life segmentation preference as moderators between meaningful work and work-related wellbeing. Our findings show that workplace innovation is positively associated with engagement *via* its effect on meaningful work, but not associated with exhaustion. Second, we found that work–life segmentation preference amplifies the relation between meaningful work and engagement (positive link) as well as exhaustion (negative link). This indicates that line managers with a high work–life segmentation preference who have a low score on meaningful work, experience less engagement and more exhaustion than line managers with a high score on meaningful work when working from home. No support was found for the moderation of digital leadership skills in the relationship between meaningful work, engagement, and exhaustion. Based on these results, we discuss implications for research and we provide practice recommendations.

KEYWORDS

line manager, work related wellbeing, mandatory working from home, COVID-19, workplace innovation

Introduction

Before COVID-19, working from home was most common among knowledge workers (read: highly educated professionals) and managers whose tasks consist largely of acquiring, disseminating, and/or creating knowledge and information, and for most of them, it pertained only to a small part of their working hours (Parent-Thirion et al., 2017). However, the COVID-19 pandemic created a unique situation in the first half of 2020. In the interest of health, unprecedented measures to stop the spread of the virus (lockdown), including urgent advice/obligations to work at home, have been implemented worldwide. As a result, in 2020, many knowledge workers and managers in the Netherlands were forced to work from home full time. Later in the year, this was temporarily scaled back. However, lockdown and gradual scaling down were repeated during 2021 and 2022 (Ministerie van Algemene Zaken, 2022).

The situation during the lockdowns can be seen as a unique social experiment with compulsory working from home, and this has generated quite a bit of curiosity among psychological researchers (Kniffin et al., 2021). By now, a stream of research has appeared on the impact of forced homeworking on employees' wellbeing and functioning (see Van Veldhoven and Van Gelder, 2020; Ipsen et al., 2021b). However, relatively little attention has hitherto been paid to line managers. Few studies have focused explicitly on this target group (Waizenegger et al., 2020; Kirchner et al., 2021; Teodorovicz et al., 2021; Rodrigues et al., 2022). Waizenegger et al., 2020) investigated how the responsible role of line managers during the mandatory lockdown impacts their wellbeing. These authors found that among this group, mental disorders such as stress and anxiety increased. In a recent study, Rodrigues et al. (2022) reported on the difficulties line managers face in coordinating home-based teams during the pandemic. The main perceived difficulties are (1) performing both personal and professional tasks in the same location; (2) motivating employees in a period when social isolation affects employees' mental health, and (3) keeping team members integrated and within a range of activities in a virtual environment. It is easy to see how such coordination issues may translate into wellbeing issues for line managers themselves.

More research among line managers in the context of forced working from home is important for several reasons. First, like all other employees, they had to adapt their work to the situation, and the question can be asked how they adapted and what impact it had on their functioning and wellbeing. Second, they were responsible for the continuity of work during the mandatory lockdown, with all the complexities attached. Third, they also had a supporting role toward the employees. This often concerned not only a substantive supporting role but also an emotional and mental supporting role. Finally, fourth, after the mandatory lockdown, line managers have an important and even crucial role when it comes to converting the experiences gained during the lockdown into longer term adjustments in the way of working within organizations (Cunningham and Hyman, 1995; Ipsen et al., 2021a; Forbes et al., 2020; Parry et al., 2021).

The above amplifies that research is needed on the health and wellbeing of line managers, particularly during the forced lockdown. For this reason, this study starts from the degree of pre-pandemic workplace innovation, which is the interplay between workplace practices and the participative process and its dual aim of increasing both productivity and quality of working life. The underlying idea is that if organizations have given teams and employees more control in the work context, such organizations would be better able to adapt to changing circumstances (like working from home during lockdowns), which positively impacts line managers' work experiences (i.e., meaningfulness at work) as well as work-related wellbeing (i.e., engagement and exhaustion). Following the job characteristics model, we explore the mediating role of meaningful work between workplace innovation before the pandemic and line managers' work-related wellbeing. Furthermore, building upon Job Demands-Resources Theory and the role of personal resources therein, we explore digital leadership skills and work–life segmentation preference as moderators in the linkage between meaningful work and work-related wellbeing.

Theory

Workplace innovation

A growing number of European countries have been developing policy interventions and programs to support companies and their employees in transforming traditional work practices through workplace innovation, typically seeking to achieve a convergence between enhanced business performance and quality of working life (Totterdill, 2015). Workplace innovation is "strategically induced and participatory adopted changes in an organization's practice of managing, organizing and deploying human and non-human resources that lead to simultaneously improved organizational performance and improved quality of working life" (Eeckelaert et al., 2012; p. 6). The basic idea behind workplace-innovation is that neither competitive performance goals on the one hand, nor workplace health and wellbeing on the other hand, can be fully achieved by traditional policy levers such as macro-economic manipulation, skills supply, or health and safety regulations (UKCES, 2009). Workplace innovation is not an end-state, but a dynamic, reflective process where all stakeholders are involved to reflect, learn, and transform work processes and employment processes both to internal and external drivers (Dhondt et al., 2012; p. 2–3).

Four different practices are distinguished within workplace innovation (Oeij et al., 2017; p. 66). (1) *Jobs and teams*. Developing a working environment where employees can develop and deploy competences starts with job design, which assumes that an empowered and self-managed team delivers

better performance (Totterdill et al., 2002; Ramstad, 2009; Oeij et al., 2012, 2017). Yet convergence depends on the degree to which structures, systems, industrial relations, and leadership are fully aligned with the empowerment of employees in their day-to-day jobs (Buchanan and Preston, 1992; Boxall, 2003). These interdependencies are explored further in the other three elements. (2) *Organizational structures, management, and procedures*. Jobs and teams should be supported and demonstrate a consistent approach and alignment with the commitment to empowerment and trust (3) *Employee-driven improvement and innovation*. Organizations, where employees have sufficient autonomy to control their work demands, create discretionary room for learning (4) *Co-created leadership and employee voice*. Trust and openness are fundaments in successful collaboration and if expanded between managers, employees lead to information sharing and reduced resistance to change.

The interplay between workplace practices and the participative process is central for workplace innovation and its dual aim of promoting productivity and quality of working life and making an organization more resilient toward change and challenges like the forced lockdown.

Work-related wellbeing

Work-related wellbeing is one of the aims of workplace innovation. Wellbeing is a term that reflects not only health but also satisfaction with work and life. Wellbeing is a summative concept that characterizes the quality of working life, including aspects of occupational safety and health, and it can be an important determinant of productivity at the individual, firm, and societal levels (Schulte and Vainio, 2010). Different studies on applying workplace innovation practices—composed of the structural and cultural orientation—present evidence on how job autonomy, job flexibility, and participation in organizational life influence the quality of working life and organizational performance (Oeij et al., 2017). Workplace innovation was also connected to "wellbeing at work" in the policy to extend occupational safety and health to "wellbeing at work" [European Agency for Safety Health at Work (EU-OSHA), 2013]. Regarding working from home, in the workplace innovation literature, the home–work interface was already seen as a key working environment determinant of wellbeing at work pre-pandemic (Oeij et al., 2017; p. 114). During the COVID-19 pandemic, several studies were conducted on the wellbeing of employees (Zacher and Rudolph, 2021; Jefferson et al., 2022). These studies have shown an impact on psychological wellbeing, with some respondents experiencing stress, burnout, anxiety, depression, fear of COVID-19, lower job satisfaction, and physical symptoms. This also applies to line managers. Ipsen et al. (2022) states that managers found their work as remote managers more demanding because they worked more hours. Workplace innovation, as implemented in organizations before the pandemic, can be expected to act as a contextual factor enabling line managers to maintain their wellbeing, as control and responsibility are shared on a wider basis within the organization. The pandemic, which one of the external drivers' stakeholders had to deal with, had an impact on the status quo of the way of working. Moving from in-person collaboration and work patterns toward working virtual *via* the work–home interface with a physical disconnect balancing both productivity and work-related wellbeing.

There are many ways to conceptualize wellbeing at work (Taris and Schaufeli, 2014). In this article, we want to investigate a more health-related indicator (emotional exhaustion) and an indicator related to the motivational side of wellbeing (engagement). Emotional exhaustion refers to "feelings of being overburdened and exhausted by the emotional demands of one's job" (Demerouti et al., 2001; p. 2). The degree of engagement can be defined as "a positive, satisfying, work-related state of mind characterized by the dimensions of vitality, dedication, and absorption" (Schaufeli and Bakker, 2004, p. 295).

The mediating role of meaningful work

In the past, it has been argued in the literature that the experienced meaningfulness of work acts as a crucial mediating factor in translating the impact of workplace innovation antecedents into wellbeing. This is most explicitly found in the job characteristics model (JCM) by Hackman and Oldham (1975).

The job characteristics model (JCM) was developed as a model for job redesign and facilitates workplace intervention, allowing firms to optimize the fit between employees and their jobs (Hackman and Oldham, 1976; Hackman, 1978). Hackman and Oldham (1976) specify five core job characteristics as determinants of various work-related outcomes (skill variation, task identity, task significance, autonomy, and feedback). In the JCM, the effects of task characteristics on work outcomes are mediated by three critical psychological states: (1) perceived meaningfulness, (2) perceived responsibility for outcomes, and (3) knowledge of actual work outcomes. In this study, we only consider the first of these critical psychological states. Reviews of the JCM literature reported some evidence that critical psychological states (like meaningfulness), indeed, mediate between job characteristics and personal outcomes (Fried and Ferris, 1987), but more research is needed.

More recent research points in the direction of a positive influence of the experience of meaningful work on worker wellbeing (Steger, 2012), especially when challenged (like was the case during the pandemic). People who say their work is meaningful and/or serves a social good report better psychological adjustment. People who feel their work is meaningful report greater wellbeing (Arnold et al., 2007). People who feel their work serves a higher purpose also report greater

job satisfaction and cohesion in the teams in which they work (Sparks and Schenk, 2001).

In line with the JCM model and recent research on meaningful work, in this study, we, therefore, expect that perceived meaningfulness of work (which we here interpret as a critical psychological state) acts as a mediating variable between workplace innovation before the pandemic and line managers' work-related wellbeing during forced working from home, e.g., high workplace innovation will be associated with high wellbeing *via* high meaningfulness (Hypothesis 1).

The moderating role of personal resources

Earlier we have argued for the central role of meaningfulness in the link between workplace innovation and wellbeing, using the somewhat older JCM as a starting point. In recent theorizing in work psychology, it is more common to view meaningfulness at work not as a critical psychological state, however, but as a job resource, following Job Demands-Resources (JD-R) Theory (Bakker and Demerouti, 2017). For example, meaningfulness is a job resource that, like other job resources, and positively affects wellbeing.

The Job Demands-Resources model (JD-R) (Demerouti et al., 2001; Bakker and Demerouti, 2014) assumes that employee wellbeing (work engagement and exhaustion) is explained by job demands (workload, time constraints) and job resources (autonomy, social support). Research using JD-R theory has provided evidence for the existence of two simultaneous processes: the health process and the motivational process. High job demands exhaust employees' mental and physical resources and therefore lead to the depletion of energy and to health problems. In contrast, job resources foster employee engagement and extra-role performance. Several studies have shown that job resources may buffer the impact of job demands on stress reactions (Bakker and Demerouti, 2017).

Workplace innovation initiatives entail more control and participatory management methods for teams and employees, and for the line managers, this implies that their work is less characterized by exercising control but rather by managing work based on commitment (Oeij et al., 2017). The management task in such an innovated context is described to be a more meaningful one, more focused on what the organization wants to achieve and/or contribute to society and interacting with employees and teams more equal when compared to a more control-based approach. And such a line management job, rich in the job resource of meaningfulness, is expected to translate into wellbeing at work for line managers. How is such meaningful work and wellbeing maintained during forced working from home, and how might it depend on the person of the line manager?

In the beginning, JD-R studies were mostly restricted to studying how work characteristics interacted toward health and wellbeing, but more recently it has been acknowledged that employees' personal resources can also be important determinants regarding their adaption to work environments (Xanthopoulou et al., 2007). We chose to focus on two person-related characteristics that we think are particularly relevant to investigate in the context of forced working from home. First, we will study the role of work–life segmentation preferences, and second, the role of digital leadership skills.

Preference for the segmentation of work and private life

Numerous researchers and professionals have addressed how employees face inter-role conflict, as they are constantly faced with the challenge of juggling their work and private lives (Nippert-Eng, 1996; Ashforth et al., 2000). The theory of boundary management was originally introduced by Christena Nippert-Eng (1996), who states that individuals differ in their preference for setting boundaries between their work and private lives. These boundaries can be seen as a continuum where employees have preferences for either strong and clear or more permeable barriers (Mellner et al., 2014). Nippert-Eng (1996) highlighted two types of preferences among individuals: segmentation and integration. Individuals, who prefer to keep their work and private life separate, thus create two separate segments. These people may, for example, have separate e-mail accounts for work and personal use, avoid using their personal mobile phones for work and engage in work-related phone calls after their working day (Kreiner, 2006; Kreiner et al., 2009). They represent the preference for segmentation.

Forced working from home during the lockdowns represents a situation where those who prefer to keep work and private life apart are challenged more than those who do not have such a preference (Caligiuri and De Cieri, 2021; Fukumura et al., 2021). Furthermore, we argue that this is likely to interact with the level of meaningfulness of the job as experienced by the line managers. When a line manager prefers segmentation, it is easier to see how a line manager accommodates forced working from home when experiencing the line management role as meaningful. We, therefore, expect the positive impact of meaningful work on engagement and its negative impact on exhaustion (that we argued above) to be especially relevant for those line managers who have a segmentation preference. Based on the above, we hypothesize the linkage between meaningfulness as a job resource and wellbeing to be influenced by segmentation preference in such a way that this linkage is stronger in line managers that are high on segmentation preference (Hypothesis 2a).

Digital leadership skills

Another personal characteristic that seems highly relevant during the lockdown concerns the degree of digital leadership skills (Zeike et al., 2019). Larjovuori et al. (2016) defined digital leadership as the leaders' ability to create a clear and meaningful vision for the digitization process and the ability to implement strategies to actualize it. To be a successful digital leader, two dimensions of competencies can be distinguished according to Westerman et al. (2012): (1) attitudes, competencies, and behaviors that managers need in the digital age (e.g., digital literacy/competencies) and (2) competencies that help drive digital transformation (e.g., strong leadership skills).

It can be argued that line managers who are high on digital leadership skills find it easier to adapt to their new work context, both in their own working from home experience and in their role as a remote manager toward their team. Meaningfulness at work is thus more easily preserved when the line manager can easily deal with the remote work setting, and this is expected to be easier when digital leadership skills are high. We thus hypothesize that the link between meaningfulness and wellbeing (again, positive for engagement, and negative for exhaustion) is stronger for line managers with high digital leadership skills (Hypothesis 2b).

Methods

Procedure of data collection

Convenience sampling was used through the students' and Ph.D. students' networks. Qualtrics was used for the online data collection. An untraceable link was provided per invitee to access the questionnaire and to ensure confidentiality. The questionnaire and cover letter were available in Dutch and English. Data collection took place in April/May 2021. Four inclusion criteria were used. These were determined by four threshold questions in the questionnaire. These threshold questions are: (1) You have worked for this organization for the past 2 years, (2) over the past 2 years, I have had responsibility for at least two direct subordinates, (3) I am a direct subordinate to another manager, and (4) before the COVID-19 pandemic, mainly worked from fixed office locations, and since the COVID-19 pandemic, mainly worked from home.

Sample

A total of 275 people were approached of whom 52% completed the questionnaire, resulting in 144 respondents. However, some of the respondents indicated that they work less than 4 days per week from home. We decided to, therefore, use as an additional inclusion criterion *post-hoc* that the line managers had to be working from home 4 or 5 days a week at the time of completing the questionnaire. There had to be a forced working from home situation. This brings the final sample to 102.

Within this final sample, 59% identified themselves as male and 40% were female. In total 34% of respondents were between 36 and 45 years old and 34% were between 46 and 55 years old, which is 74% of the total. In total 95% of the respondents indicated that they had completed their higher education (HBO or their master's (WO). In total 30% of the respondents had between 2 and 5 years of service, 31% had between 6 and 10 years of service, and 19% had between 11 and 15 years of service. In total 20% of the sample had more than 15 years of service.

We have compared our sample with national information to assess the representativeness of our sample. According to Statistics Netherlands (CBS Centraal Bureau voor de Statistiek, 2019), 74.6% of managers in the Netherlands are male, which is the majority. In our dataset, there are relatively more female respondents. According to ISBW (ISBW, 2019), 32% of line managers fall into the age group between 36 and 45 years old, and 34% of LM are in the age group between 45 and 55 years old. In our dataset, 34% of line managers fall into the age group between 36 and 45 years old, and 39% of LM are in the age group between 45 and 55 years old which is very much in line with the reference.

Instruments

Exhaustion was measured using nine items of the QEEW2.0, in need for recovery and detachment from work, with a total of nine items (Van Veldhoven and Meijman, 1994). An example item is "I find it difficult to relax at the end of a working day," and respondents were asked to "Answer these questions focusing on their current situation." Respondents could answer using a four-point Likert scale from 1 (never) to 4 (always). Thus, a high score indicates a high degree of exhaustion. The reliability analysis showed good internal consistency ($\alpha = 0.90$).

Engagement was measured using the ultra-short three-item work engagement scale (UWES-3) reported by Schaufeli and Bakker (2001). A sample item is "At work I burst with energy," and respondents were asked to answer these questions focusing on their current situation. Respondents could answer on a seven-point Likert scale from 1 (never) to 7 (always). Thus, a high score indicates a high level of engagement. Reliability analysis showed good internal consistency ($\alpha = 0.90$).

Workplace innovation was measured before the pandemic using the scale developed by Kibowski et al. (2019). The scale consists of a total of 19 items ($\alpha = 0.822$) and represents all the four domains of workplace innovation that were mentioned earlier in the introduction (e.g., jobs and teams; organizational structures, management, and procedures; employee-driven improvement and innovation; and co-created

leadership and employee voice). An example item is: "Before COVID-19, it was highly supported in my department that employees showed personal initiative." The items were measured by a five-point Likert scale from 1 (strong disagree) to 5 (strong agree). A high score indicates a high level of workplace innovation.

Segmentation preference in relation to work and private life was measured using the scale developed by Kreiner (2006). It has four items. An example item is: "I don't like to think about work while I am home." The items were measured by a seven-point Likert scale of 1 (strongly disagree) to 7 (strongly agree). A high score indicates a high preference for segmentation. Cronbach's Alpha for the scale is 0.89.

Digital leadership skills were measured using a six-item scale by Zeike et al. (2019). A sample item is "I think using digital tools is fun," and respondents were asked to answer these questions focusing on their present situation. Respondents could answer using a four-point Likert scale of 1 (completely disagree) to 4 (completely agree). A high score indicates a high level of digital skills. Reliability analysis showed a low, only just acceptable level of internal consistency ($\alpha = 0.61$). Meaningful work was measured by the Work as Meaning Inventory (WAMI) constructed by Steger (2012). The scale contains 10 items. An example item is "I have found a meaningful career." A high score means a high level of meaningfulness. Cronbach's Alpha for the scale is $\alpha = 0.88$.

Analyses

We first performed a CFA to verify the factor structure of the set of observed variables. Second, we report the means and standard deviations for the scales in the study, and the correlations between the scales. Lastly, the mediation and moderation analyses are presented. The calculations are made in SPSS version 27, AMOS version 27, and Hayes process macro version 4.2. For the mediation, we used Hayes process macro model 4 and for moderation Hayes process macro model 1.

Results

We have performed a CFA based on the six factors that comprise all the constructs included in the study. For the six-factor model, chi-square = 2,002,800 with degrees of freedom = 1,209. For the one-factor model, chi-square = 3,100,269 with degrees of freedom = 1,224. The results of the six-factor model imply a substantial increase in fit compared to the one-factor model. The chi-square difference is 1,097,469 with 15 degrees of freedom which is highly significant ($p < 0.001$). Based on the reported CFA, we, therefore, conclude that the current study is not overly harmed by common methods bias (e.g., all results boil down to a single method factor because the data all derive from surveys), and that using the six separate scale scores is an adequate approach of processing and interpreting the current data.

Table 1 shows the means, standard deviations, and Pearson correlations (r) between all scales in the study. As expected, the correlation between workplace innovation and meaningful work is significant. The table shows that the relationship between meaningful work and exhaustion is not significant, but the link between meaningful work and engagement is significant. Both personal characteristics, e.g., segmentation preference and digital leadership skills, appear to be unrelated to workplace innovation pre-pandemic and experienced meaningfulness of work, but both appear to be related to the wellbeing measures.

To determine the mediation effect of meaningful work between workplace innovation and the work-related wellbeing outcomes, we performed two separate mediation analyses using Hayes' process macro number 4, one with engagement and one with exhaustion as the outcome variable.

Table 2A shows that workplace innovation practices are positively associated with meaningful work (B = 0.436, SE = 0.136, p-value = 0.002), and meaningful work is positively associated with engagement (B = 0.749, SE = 0.180, p-value = 0.000). There is also an indirect effect between workplace innovation and engagement (B = 0.512, SE = 0.257, p-value = 0.049).

Table 2B shows that workplace innovation practices are positively associated with meaningful work (B = 0.436, SE = 0.136, p-value = 0.002) but meaningful work is not associated with exhaustion (B = −0.116, SE = 0.109, p-value = 0.290). There is no indirect effect between workplace innovation and exhaustion (B = −0.173, SE = 0.155, p-value = 0.266).

To determine the moderation effect of work–life segmentation preference and digital leadership skills in the relationship between meaningful work and work-related wellbeing outcomes (engagement and exhaustion), we performed four moderation analyses using Hayes' process macro number 1, one for each combination of moderator and outcome.

As shown in Table 3, work–life segmentation preferences strengthen the positive relationship between meaningful work and engagement (B = 0.3135, SE = 0.0843, p-value = 0.0003) and become significant with a work–life segmentation preference value of 2.8 and higher. Digital leadership skills fall just short of moderating the relation between meaningfulness and engagement (B = 0.7728, SE = 0.4071, p-value = 0.0606). Work–life segmentation preference strengthens the negative relationship between meaningful work and exhaustion (B = −0.1662, SE = 0.0494, p-value = 0.0011) and becomes significant with a work–life segmentation preference value of 4.9 and higher. Digital leadership skills do not moderate the relation between meaningful work and exhaustion (B = 0.0005, SE = 0.2491, p-value = 0.9984).

TABLE 1 Descriptive statistics and correlations.

		M	SD	MIN	MAX	1	2	3	4	5	6
1	Workplace innovation	3.85	0.40	2.56	4.85	-					
2	Work-life segmentation preference	4.04	1.60	1.50	7.00	−0.04	–				
3	Digital leadership skills	2.91	0.48	2.00	4.00	0.04	−0.21*	-			
4	Meaninful work	3.85	0.56	1.80	5.00	0.31**	−0.13	0.11	-		
5	Exhaustion	2.16	0.59	1.00	4.00	−0.15	0.36**	−0.13	−0.15	-	
6	Engagement	4.83	1.09	1.00	7.00	0.30**	−0.29**	0.20*	0.44**	−0.46**	-

This table shows the means (M), standard deviations (SD), and Pearson correlations (r). Correlation is significant at the 0.05 level (two-tailed). **Correlation is significant at the 0.01 level (two-tailed). *$N = 102$.

TABLE 2A Mediation results for engagement.

Variable	Meaningful work					Engagement				
	B	SE	*p*	LLCI	ULCI	B	SE	*p*	LLCI	ULCI
Workplace innovation	0.436	0.136	0.002	0.167	0.705	0.512	0.257	0.049	0.003	1.021
Meaningful work	-	-	-	-	-	0.749	0.180	0.000	0.391	1.107

Significant indirect effect with B = 0.326, BootLLCI = 0.014, and BootULCI = 1.021.

TABLE 2B Mediation results for exhaustion.

Variable	Meaningful work					Exhaustion				
	B	SE	*p*	LLCI	ULCI	B	SE	*p*	LLCI	ULCI
Workplace innovation	0.436	0.136	0.002	0.167	0.705	−0.173	0.155	0.266	−0.481	0.134
Meaningful work	-	-	-	-	-	−0.116	0.109	0.290	−0.331	0.100

Insignificant indirect effect with B = −0.050, BootLLCI = −0.262, and BootULCI = 0.134.

Discussion

First, following the job characteristics model (JCM), we explored the mediating role of meaningful work between workplace innovation before the pandemic and line managers' work-related wellbeing. Our results show that workplace innovation practices are positively associated with meaningful work, and meaningful work is positively associated with engagement. There is also an indirect effect between workplace innovation and engagement. Hence, Hypothesis 1 is confirmed for engagement. These findings are in line with wellbeing as one of the main aims of workplace innovation and recent research that points in the direction of a positive influence of the experience of meaningful work on worker wellbeing (Steger, 2012) especially when challenged (as was the case during the pandemic). On the other hand, our results show that, although workplace innovation practices are positively associated with meaningful work, they are not associated with exhaustion in an indirect way. Hypothesis 1 is, therefore, not confirmed for exhaustion. Several reasons can be given for this lack of confirmation of exhaustion. One of the reasons could be timing. The data collection took place at the relative beginning of the pandemic lockdown. In that period, line managers were maybe too much focused on the business and on keeping the business going and as a consequence their personal wellbeing and exhaustion were not the biggest topic for them at the time. Another explanation could be that the impact of meaningful work on exhaustion depends on personal preferences, and this indeed is what we have tested in the following hypotheses 2a/b.

Second, building upon the Job Demands-Resources (JD-R) Theory and the role of personal resources in JD-R Theory, we explored digital leadership skills and work–life segmentation preference as moderators in the link between meaningful work and work-related wellbeing. We expected that the relation between meaningful work and work-related wellbeing would be amplified for those with a high segmentation preference, and this was confirmed for both engagement and exhaustion (Hypothesis 2a). Our results show that work–life segmentation preferences strengthen the relationship between meaningful work and engagement. Work–life segmentation preference also strengthens the negative relationship between meaningful work and exhaustion. When we interpret these findings in

TABLE 3 Moderation results.

Variable	B	SE	*t*	*p*	LLCI	ULCI
Meaningful work > Engagement with Moderator WLSP						
Constant	7.4560	1.5200	4.9053	0.0000	4.4396	10.4724
Meaningful work	−0.5088	0.3866	−1.3159	0.1913	−1.2760	0.2585
Work-life segmentation preference	−1.3620	0.3272	−4.1630	0.0001	−2.0113	−0.7128
Meaningful work × work–life segmentation preference	0.3135	0.0843	3.7166	0.0003	0.1461	0.4809
Meaningful work > Engagement with Moderator DLS						
Constant	9.7890	4.8991	1.9981	0.0485	0.0668	19.5112
Meaningful work	−1.5028	1.2391	−1.2128	0.2281	−3.9618	0.9562
Digital leadership skills	−2.6973	1.6191	−1.6659	0.0989	−5.9103	0.5158
Meaningful work × digital leadership skills	0.7728	0.4071	1.8980	0.0606	−0.0352	1.5807
Meaningful work > Exhaustion with Moderator WLSP						
Constant	−0.6246	0.8896	−0.7021	0.4843	−2.3900	1.1409
Meaningful work	0.5872	0.2263	2.5949	0.0109	0.1381	1.0363
Work-life segmentation preference	0.7635	0.1915	3.9874	0.0001	0.3835	1.1435
Meaningful work × work–life segmentation preference	−0.1662	0.0494	−3.3661	0.0011	−0.2641	−0.0682
Meaningful work > Exhaustion with Moderator DLS						
Constant	3.0943	2.9974	1.0323	0.3045	−2.8540	9.0426
Meaningful work	−0.1420	0.7581	−0.1873	0.8518	−1.6465	1.3625
Digital leadership skills	−0.1366	0.9906	−0.1379	0.8906	−2.1024	1.8292
Meaningful work × digital leadership skills	0.0005	0.2491	0.0020	0.9984	−0.4938	0.4948

combination, we see that—as expected—for line managers with high work–life segmentation preference, work meaningfulness matters in terms of their wellbeing. Earlier we argued and found that workplace innovation is important in creating a management role that can be experienced by managers as meaningful, and now we see how such meaningfulness might translate into wellbeing, depending on the line managers' preferences. Figures 1, 2 further illustrate how work–life segmentation acts as a strong moderator in the link between meaningful work and wellbeing. We can see in the graphs how especially on the low end of meaningfulness scores on wellbeing tend to be unfavorable for high segmentation preference line managers in particular.

We expected that the link between meaningfulness and work-related wellbeing is more easily preserved when the line manager can easily deal with the remote work setting, e.g., when digital leadership skills are high (Hypothesis 2b). Our results, however, do not point toward digital leadership skills being an important moderator in the relation between meaningful work and wellbeing. Hypothesis 2b is, therefore, not confirmed by this study. Several reasons can be given for why we have not found any confirmation for such a role in digital leadership skills. For example, it may be that the IT technology used during the pandemic was not necessarily very different from the technology used and known before; or, the overuse of technology during the pandemic may have changed the response to questions such as "I like using technology," now being answered to more negatively; finally, it may just be the case that technology as such was a less important position in the work experience of line managers during the pandemic than expected.

Limitations and strengths, and some recommendations for future research

In this study, we worked with a relatively small sample size ($n = 102$), but relevant to the research question and carefully selected based on several important inclusion criteria. The invitation was performed *via* a snowball sample of the students involved, but we monitored the response rate and relied on known contacts to improve motivation to participate. We checked for the representativeness of our sample for Dutch managers and found that such representativeness is acceptable. The dataset is somewhat skewed in that there are more female respondents than in the national benchmark.

The digital leadership scale is only marginally reliable, and this may have prohibited us from finding the hypothesized moderation for this variable. As the results were close to the significance, it would be important to replicate the current study with a better digital leadership scale. For attrition, we may need to start earlier with more established antecedents such as workload and work–life segmentation preference so that we can better evaluate the (additional)

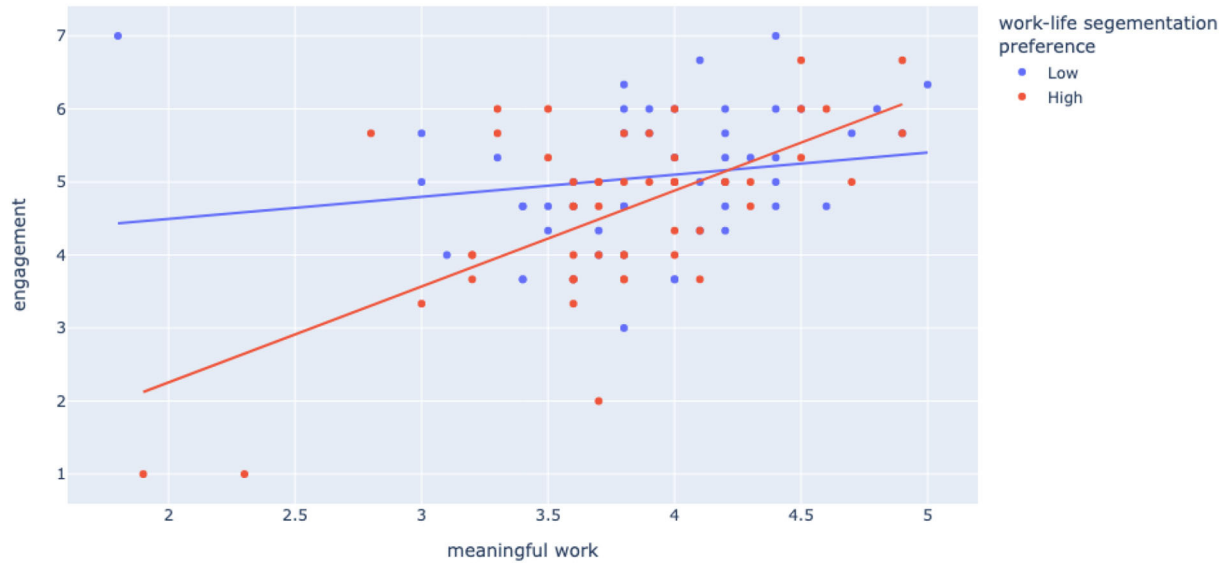

FIGURE 1
Moderation meaningful work × engagement by work–life segmentation preference.

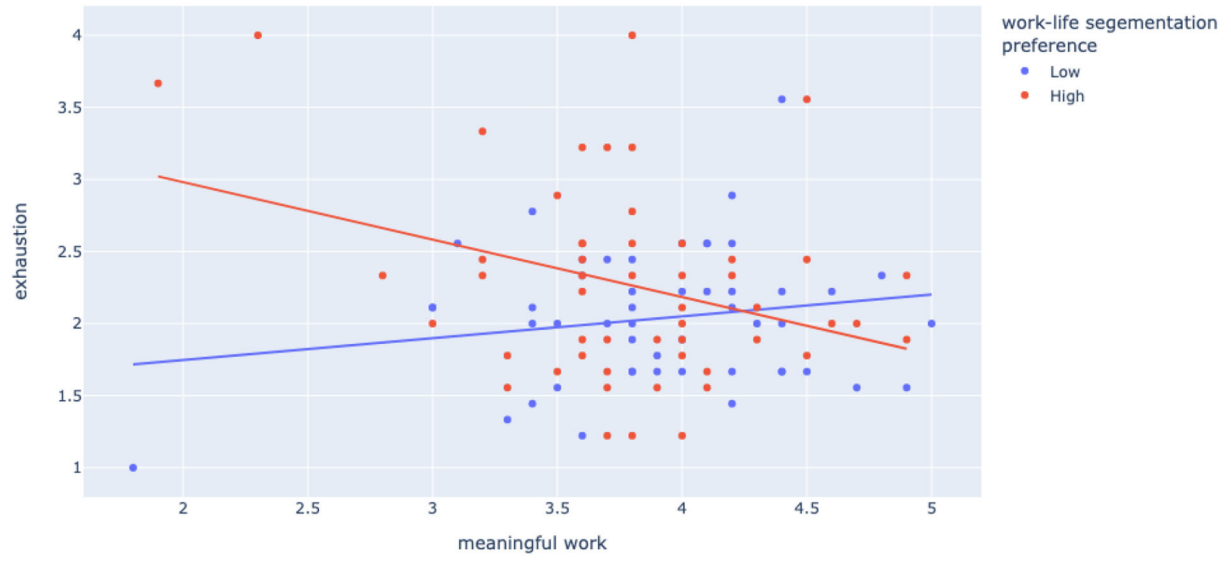

FIGURE 2
Moderation meaningful work × exhaustion by work–life segmentation preference.

role of workplace innovation. Measuring workplace innovation practices at the individual level has inherent limitations. For our workplace innovation measure, this may imply that it does not capture the complex concept and organizational process of workplace innovation.

Remarkably, we found no direct or indirect effect between workplace innovation and exhaustion and no mediation by meaningfulness in this linkage either, but we found moderation. Personal job resources appear to matter a great deal here, especially segmentation preference. It would be important to study the link between workplace innovation, meaningful work, and exhaustion in further detail with future research.

Finally, we would want to investigate the interactions involved in this study in a different way (e.g., workplace innovation × job demands/resources) by analyzing the possibility of the existence of multiple configurations of

antecedents that may cause exhaustion and/or engagement, e.g., by using a configurational analysis method like fsQCA (Ragin, 2000).

Practice recommendations

Based on this study we claim that line managers who work in an environment with a high degree of workplace innovation established before the pandemic experienced their work as more meaningful during the pandemic and were more engaged and less exhausted. Moving forward, we see that hybrid working is becoming more and more the new normal, and we expect line managers to play an important role in the success of such hybrid working. It is, therefore, advisable for organizations to invest more in workplace innovation to ensure meaningful work and wellbeing in line managers as core players in the transition toward hybrid work.

Hybrid working implies that work will take place more independently of time and place and this may be at odds with line managers' preferences as to work–life segmentation. The underlying risk is that work and private time are increasingly mixed causing a negative effect on line managers wellbeing for those who like to keep things separated. In this research, we have seen that the degree of work–life segmentation preference, indeed, strengthens the link between meaningful work on engagement (positive) as well as exhaustion (negative). It is, therefore, recommended that organizations pay attention to work–life segmentation preferences among line managers especially when workplace innovation in the organization is not yet so advanced and/or a line management role that is experienced as meaningful is not yet possible. In such circumstances, line managers that prefer segmentation are experiencing low engagement and high exhaustion. Investing in workplace innovation practices is a direction for moving forward in such settings as elsewhere, but until then it is important to understand that a more control-oriented leadership role is difficult to achieve from a distance, especially if you prefer work to be work and home to be home.

Conclusion

We can conclude that line managers who reported that their organization was already practicing workplace innovation before the pandemic reported higher experienced meaningfulness in their work currently, as well as higher work engagement in connection with this. Workplace innovation should, therefore, be encouraged, also as a strategy for enabling line managers in their work. Furthermore, the degree of work–life segmentation preference strengthens the positive effect of meaningful work on engagement and strengthens the negative effect on exhaustion and deserves more attention in this important organizational group when considering the transition to hybrid working as the new normal.

Author's note

This cross-sectional questionnaire study was performed as part of a larger research project in which three master students (Rinne van Krieken, Nick van de Kerkhof, and Justyna Michalik) and Ph.D. student Marco van Gelder from Tilburg University collaborated under the supervision of Marc van Veldhoven. Special thanks to Rinne, Nick and Justyna for their efforts. A special thanks also to Franciscus Martinus "Rob" Middendorp (Veldhoen + Company) for his contribution to data processing and analysis.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation to any qualified researcher.

Author contributions

MvG, MvV, and KvdV contributed to the conceptualization, design, and conduct of the study. All authors contributed to writing the manuscript and doing the analyses.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

References

Arnold, K. A., Turner, N., Barling, J., Kelloway, E. K., and McKee, M. C. (2007). Transformational leadership and psychological well-being: the mediating role of meaningful work. *J. Occupat. Health Psychol.* 12, 193. doi: 10.1037/1076-8998.12.3.193

Ashforth, B. E., Kreiner, G. E., and Fugate, M. (2000). All in a day's work: Boundaries and micro role transitions. *Acad. Manage. Rev.* 25, 472491. doi: 10.5465/amr.2000.3363315

Bakker, A. B., and Demerouti, E. (2014). "Job demands—Resources theory," in *Work and wellbeing: A complete reference guide,* eds. P. Y. Chen and C. L. Cooper, (Chichester: Wiley) 1–28. doi: 10.1002/9781118539415.wbwell019

Bakker, A. B., and Demerouti, E. (2017). Job demands-resources theory: taking stock and looking forward. *J. Occup. Health Psychol.* 22, 273. doi: 10.1037/ocp0000056

Boxall, P. (2003). HR strategy and competitive advantage in the service sector. *Human Resource Manag. J.* 13: 5–20. doi: 10.1111/j.1748-8583.2003.tb00095.x

Buchanan, D., and Preston, D. (1992). Life in the cell: supervision and teamwork in a 'manufacturing systems engineering'environment. *Human Resour. Manag. J.* 2, 55–76. doi: 10.1111/j.1748-8583.1992.tb00266.x

Caligiuri, P. M., and De Cieri, H. (2021). Predictors of employees' preference for working from home post-pandemic. *Busi. Econ. Res.* 11, 1–9. doi: 10.5296/ber.v11i2.18411

CBS Centraal Bureau voor de Statistiek (2019). *Sociaaleconomische trends*. Available online at: https://www.cbs.nl/nl-nl/reeksen/sociaaleconomische-trends (accessed October 30, 2019)

Cunningham, I., and Hyman, J. (1995). Transforming the HRM vision into reality: the role of line managers and supervisors in implementing change. *Employee Relat.* 17, 5–20. doi: 10.1108/01425459510103451

Demerouti, E., Bakker, A. B., Nachreiner, F., and Schaufeli, W. B. (2001). The job demands resources model of burnout. *J. Appl. Psychol.* 86, 499–512. doi: 10.1037/0021-9010.86.3.499

Dhondt, S., Gramberen, M. V., and Vlierberge, E. V. (2012). *Workplace innovation as social innovation.* Position paper.

Eeckelaert, L., Dhondt, S., Oeij, P., Pot, F. D., Nicolescu, G. I., Webster, J., et al. (2012). *Review of Workplace Innovation and its Relation With Occupational Safety and Health*. Bilbao: European Agency for Safety and Health at Work.

European Agency for Safety and Health at Work (EU-OSHA). (2013). *Wellbeing at Work— Creating a Positive Work Environment.* Bilbao: EU OSHA.

Forbes, S., Birkett, H., Evans, L., Chung, H., and Whiteman, J. (2020). *Managing employees during the COVID-19 pandemic: Flexible working and the future of work.*

Fried, Y., and Ferris, G. R. (1987). The validity of the job characteristics model: a review and meta-analysis. *Pers. Psychol.* 40, 287322.

Fukumura, Y. E., Schott, J. M., Lucas, G. M., Becerik-Gerber, B., and Roll, S. C. (2021). Negotiating time and space when working from home: experiences during COVID-19. *OTJR.* 41, 223–231. doi: 10.1177/15394492211033830

Hackman, J. R. (1978). The design of work in the 1980s. *Organ. Dyn.* 7, 317.

Hackman, J. R., and Oldham, G. R. (1975). Development of the job diagnostic survey. *J. App. Psychol.* 60, 159–170. doi: 10.1037/h0076546

Hackman, J. R., and Oldham, G. R. (1976). Motivation through the design of work: Test of a theory. *Organizat. Behav. Human Perform.* 16, 250–279. doi: 10.1016/0030-5073(76)90016-7

Ipsen, C., Edwards, K., Nardelli, G., and Vendramin, N. (2021a). "Managers' first experience of the transition to distance management during COVID-19," in *Congress of the International Ergonomics Association* (Springer, Cham) 600–606. doi: 10.1007/978-3-030-74611-7_81

Ipsen, C., Kirchner, K., Andersone, N., and Karanika-Murray, M. (2022). Becoming a distance manager: managerial experiences, perceived organizational support, and job satisfaction during the COVID-19 pandemic. *Front. Psychol.* 13, 916234. doi: 10.3389/fpsyg.2022.916234

Ipsen, C., van Veldhoven, M., Kirchner, K., and Hansen, J. P. (2021b). Six key advantages and disadvantages of working from home in Europe during COVID-19. *International J. Environ. Res. Public Health* 18, 1826. doi: 10.3390/ijerph18041826

ISBW (2019). Het Nationale Management Onderzoek. ISBW, Available online at: https://www.isbw.nl/het-nationale-management-onderzoek.htm (accessed September 7, 2022).

Jefferson, L., Golder, S., Heathcote, C., Avila, A. C., Dale, V., Essex, H., et al. (2022). GP wellbeing during the COVID-19 pandemic: a systematic review. *Br. J. General Pract.* 72, e325–e333. doi: 10.3399/BJGP.2021.0680

Kibowski, F., Baguley, T., Totterdill, P., and Karanika-Murray, M. (2019). A new measure of workplace innovation. *European J. Workplace Innov.* 5, 557. doi: 10.46364/ejwi.v5i1.557

Kirchner, K., Ipsen, C., and Hansen, J. P. (2021). COVID-19 leadership challenges in knowledge work. *Knowl. Manage. Res. Pract.* 19, 493–500. doi: 10.1080/14778238.2021.1877579

Kniffin, K. M., Narayanan, J., Anseel, F., Antonakis, J., Ashford, S. P., Bakker, A. B., et al. (2021). COVID-19 and the workplace: Implications, issues, and insights for future research and action. *Am. Psychol.* 76, 63. doi: 10.1037/amp0000716

Kreiner, G. E. (2006). Consequences of work-home segmentation or integration: A person-environment fit perspective. *J. Organiz. Behav.* 27, 485–507. doi: 10.1002/job.386

Kreiner, G. E., Hollensbe, E. C., and Sheep, M. L. (2009). Balancing borders and bridges: Negotiating the work-home interface via boundary work tactics. *Acad. Manag. J.* 52, 704–730. doi: 10.5465/amj.2009.43669916

Larjovuori, R-L., Bordi, L., Mäkiniemi, J.-P., and Heikkilä-Tammi, K (2016). "The role of leadership and employee well-being in organizational digitalization," in *Annual RESER Conference*, eds T. Russo-Spena and C. Mele (Napoli: B3 Article in Conference Proceedings), 1159.

Mellner, C., Aronsson, G., and Kecklund, G. (2014). Boundary management preferences, boundary control, and work-life balance among full-time employed professionals in knowledge-intensive, flexible work. *Nordic J. Working Life Stud.* 4, 4705. doi: 10.19154/njwls.v4i4.4705

Ministerie van Algemene Zaken (2022). Coronavirus tijdlijn. Rijksoverheid.nl. Geraadpleegd op. van Available online at: https://www.rijksoverheid.nl/onderwerpen/coronavirus-tijdlijn (accessed September 7, 2022).

Nippert-Eng, C. (1996). *Calendars and Keys: The Classification of Home and Work. Sociological Forum.* Kluwer Academic Publishers-Plenum Publishers. doi: 10.1007/BF02408393

Oeij, P., Dhondt, S., Kraan, K., Vergeer, R., and Pot, F. D. (2012). *Workplace Innovation and its Relations with Organisational Performance and Employee.* Commitment-www-publicatie.

Oeij, P., Rus, D., and Pot, F. D. (2017). *Workplace Innovation: Theory, Research, and Practice*. Springer. doi: 10.1007/978-3-319-56333-6

Parent-Thirion, A., Vermeylen, G., Wilkens, M., Biletta, I., and Pot, F. D. (2017). Towards the high road of workplace innovation in Europe? An illustration of the usefulness of the dataset of the European Working Conditions Survey. in *Workplace Innovation* (Springer, Cham) p. 261–277. doi: 10.1007/978-3-319-56333-6_16

Parry, J., Young, Z., Bevan, S., Veliziotis, M., Baruch, Y., Beigi, M., et al. (2021). *Working from Home under COVID-19 lockdown: Transitions and tensions.* (Discussion paper).

Ragin, C. C. (2000). *Fuzzy-Set Social Science.* University of Chicago Press.

Ramstad, E. (2009). "Promoting performance and the quality of working life simultaneously," in *International Journal of Productivity and Performance Management.* doi: 10.1108/17410400910965706

Rodrigues, E. A., Rampasso, I. S., Serafim, M. P., Leal Filho, W., and Anholon, R. (2022). Difficulties experienced by managers in coordinating teams working from home: an exploratory study considering the COVID-19 pandemic. *Inf. Technol. People.* (ahead-of-print). doi: 10.1108/ITP-01-2021-0034

Schaufeli, W. B., and Bakker, A. B. (2001). Work and wellbeing: towards a positive approach in work and health psychology. *Behav. Organis.* 14, 229–253.

Schaufeli, W. B., and Bakker, A. B. (2004). Job demands, job resources, and their relationship with burnout and engagement: a multi-sample study. *J. Organ. Behav.* 25, 293315. doi: 10.1002/job.248

Schulte, P., and Vainio, H. (2010). Wellbeing at work - overview and perspective. *Scand J. Work Environ. Health.* 36, 422–429. doi: 10.5271/sjweh.3076

Sparks, J. R., and Schenk, J. A. (2001). Explaining the effects of transformational leadership: an investigation of the effects of higher-order motives in multilevel marketing organizations. *J. Organiz. Behav.* 22, 849–869. doi: 10.1002/job.116

Steger, M. F. (2012). Making meaning in life. *Psychol. Inquiry* 23, 381–385. doi: 10.1080/1047840X.2012.720832

Taris, T. W., and Schaufeli, W. B. (2014). "Individual wellbeing and performance at work: A conceptual and theoretical overview," *Wellbeing and Performance at Work.* 15–34.

Teodorovicz, T., Sadun, R., Kun, A. L., and Shaer, O. (2021). How does working from home during COVID-19 affect what managers do? Evidence from time-Use studies. *Human-Comput. Interact.* 24, 1–26. doi: 10.1080/07370024.2021.1987908

Totterdill, P. (2015). Closing the gap: The fifth element and workplace innovation. *Eur. J. Workpl. Innov.* 1, 166. doi: 10.46364/ejwi.v1i1.166

Totterdill, P., Dhondt, S., and Milsome, S. (2002). *Partners at work? A report to Europe's policy makers and social partners.*

UKCES (2009). UK Commission for Employment and Skills. *The Employability Challenge: Full Report.*

Van Veldhoven, M., and Meijman, T. F. (1994). *Measuring Psycho-Social Workpressure and Workstress with a Questionnaire: The Questionnaire on the Experience and Evaluation of Work (QEEW).* Amsterdam, The Netherlands: Nederlands Instituut voor Arbeidsomstandigheden.

Van Veldhoven, M., and Van Gelder, M. (2020). *Ervaringen met thuiswerken tijdens COVID-19: Europees Vragenlijstonderzoek onder 5000 kenniswerkers Gedurende de Eerste Weken van de Lockdown.* Tilburg: Rapportage Nederland, Universiteit Tilburg.

Waizenegger, L., McKenna, B., Cai, W., and Bendz, T. (2020). An affordance perspective of team collaboration and enforced working from home during COVID-19. *Eur. J. Inf. Syst.* 29, 429–442. doi: 10.1080/0960085X.2020.1800417

Westerman, G., Tannou, M., Bonnet, D., Ferraris, P., and McAfee, A. (2012). The Digital Advantage: How digital leaders outperform their peers in every industry. *MITSloan Manage. Capge. Consul. MA* 2, 2–23.

Xanthopoulou, D., Bakker, A. B., Demerouti, E., and Schaufeli, W. B. (2007). The role of personal resources in the job demands-resources model. *Int. J. Stress Manage.* 14, 121. doi: 10.1037/1072-5245.14.2.121

Zacher, H., and Rudolph, C. W. (2021). Individual differences and changes in subjective wellbeing during the early stages of the COVID-19 pandemic. *Am. Psychol.* 76, 50. doi: 10.1037/amp0000702

Zeike, S., Bradbury, K., Lindert, L., and Pfaff, H. (2019). Digital leadership skills and associations with psychological well-being. *Int. J. Environ. Res. Public Health.* 16, 2628. doi: 10.3390/ijerph16142628

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The spillover effect of work connectivity behaviors on employees' family: Based on the perspective of work-home resource model

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With the rapid development of mobile communication technology, work connectivity behaviors are becoming increasingly pervasive, which has gradually attracted extensive attention from scholars and practitioners. According to the work-home resource model, we propose a theoretical model that proactive/passive work connectivity behaviors induce family harmony through self-efficacy and ego depletion, and we explore the moderating role of family support in this relationship. Based on survey data collected from 364 questionnaires using a three-wave time-lagged design, the results show that: (1) Proactive work connection behaviors have a negative effect on family harmony; Passive work connection behaviors have a negative effect on family harmony. (2) Self-efficacy plays a suppressing role in the relationship between proactive work connection behaviors and family harmony. (3) Ego depletion plays a mediating role in the relationship between passive work connectivity behaviors and family harmony; (4) Family support not only positively moderates the relationship between proactive work connectivity behaviors and self-efficacy, but also moderates the suppressing effect of proactive work connectivity behaviors on family harmony through self-efficacy; (5) Family support not only negatively moderates the relationship between passive work connectivity behaviors and ego depletion, but also moderates the mediating effect of passive work connectivity behaviors on family harmony through ego depletion. The above results can broaden our understanding of the effect of work connectivity behaviors and provide some inspiration for how to optimize the management strategy of employees' work connectivity behaviors.

KEYWORDS

proactive work connectivity behaviors, passive work connectivity behaviors, self-efficacy, ego depletion, family support, family harmony

Introduction

With the development and popularity of communication technologies such as smartphones, mobile office computers, and wireless networks, it is becoming more pervasive for employees to use electronic communication tools to deal with work during non-working hours (Reinke and Ohly, 2021). In this context, work connectivity behaviors emerged, which is a new type of interaction between the individual, team, and organizational work (Khalid et al., 2021). The generation of work connectivity behavior relies on information technology innovation, which refers to the behavior of individuals to handle work or participate in workplace social interaction through communication devices and technologies during non-working hours (Richardson and Benbunan-Fich, 2011; Huo et al., 2022). Since the concept was proposed, scholars have

successively explored the impact of work connectivity behaviors on employees' family outcomes. Throughout the current research situation, scholars have proposed two schools of view. Research on positive effects shows that the attribute of work connectivity behaviors is similar to job resources, enabling individuals to simultaneously address the dual needs of family and work, which is conducive to promoting work-family enrichment (Derks et al., 2016; Ma et al., 2016; Carvalho et al., 2021). Compared with the limited positive effects, more studies show that work connectivity behaviors generate a negative impact on families of individuals. Studies on negative effects show that the attribute of work connectivity behaviors is similar to job demands, which objectively increase employees' working hours and work intensity, and will occupy individuals' time and energy that should have been used for family life, thus leading to work-family conflict (Richardson and Thompson, 2012; Ragsdale and Hoover, 2016; Khalid et al., 2021).

Most of the previous studies have explored the effect and mechanism of work connectivity behaviors from a single perspective (i.e., positive or negative), and the outcome variables of its effect focused predominantly on work-family enrichment or work-family conflict, rather than specific outcome variables in the family domain. Therefore, the influence of work connectivity behaviors on specific outcomes in the family domain needs to be further explored. Family harmony is considered to be the sweet existence in family relations, emphasizing the closeness, harmony, cooperation, and interdependence among family members (Kavikondala et al., 2016), which is crucial to individuals' mental health and wellbeing (Ip, 2014). Therefore, in the context of "round-the-clock availability" (Ren et al., 2021), it is worth discussing how work connectivity behaviors affect family harmony. Moreover, on the basis of the paradox perspective, previous studies conducted a priori classification of work connectivity behaviors defined as job resources or job demands, and investigated it's positive or negative effects (Richardson and Thompson, 2012; Ter Hoeven et al., 2016). This classification oversimplifies the attribute of work connectivity behaviors and ignores the subjective motivation of employees. Relevant studies have pointed out that the way employees treat work will affect the impact of work on individuals (Schulte-Braucks et al., 2019). Therefore, as a typical boundary crossing behavior between work and non-work, how work connectivity behaviors will affect employees and their families depends on how employees treat such behavior (Huo et al., 2022). Based on previous studies, we consider the willingness of employees to participate in work connectivity behaviors and further divide work connectivity behaviors into proactive connectivity behaviors and passive connectivity behaviors from the perspective of subjective motivation (Huo et al., 2022). Furthermore, the impact of different types of work connectivity behaviors on employees' family outcomes have been insufficiently explored.

To solve the above questions, based on the Work-home Resources Model (W-HR), we explore the mechanism and boundary condition of proactive work connectivity behaviors and passive work connectivity behaviors on employees' family harmony. The W-HR model stresses personal resources as a link to connect the demands and resources in one domain with the outcomes in another domain, and systematically explains the causal logic and boundary conditions behind the work-family relationship (ten Brummelhuis and Bakker, 2012). The model indicates that in resource-based experiences, personal resources will gain and produce positive family outcomes. Conversely, in a demanding experience, personal resources will be depleted, resulting in negative family outcomes. According to the theoretical relevance and the suggestions of previous studies (Richardson and Benbunan-Fich, 2011; Schaufeli and Taris, 2014; Kang and Peng, 2019), we choose self-efficacy to represent the resource gain mechanism, and ego depletion to represent the resource loss mechanism, to fully reveal the "black box" of the impact of work connectivity behaviors on family harmony. In addition, the W-HR model also points out that under different situational resource conditions, there are differences in the degree of resources gained or depleted by employee behaviors, which in turn have different effects on family relationships (ten Brummelhuis and Bakker, 2012). Yet, the current work-family research has mostly focused on work support, such as leadership support and organizational support (Hammer et al., 2016; Kang and Peng, 2019), largely overlooking the role of family support in the realization of positive work-family relationships. Therefore, we intend to introduce family support, a key family situational resource, to investigate its moderating effect on the resource gain and loss mechanism of work connectivity behaviors.

Overall, we constructed a model to test how and when proactive work connectivity behaviors and passive work connectivity behaviors affect employee family harmony. This study makes three theory contributions. First, this study not only enriches the research on the attributes of working connectivity behaviors, but also explores the relationship between work connectivity behaviors and family harmony from the perspective of employees' subjective motivation. Second, this study examines the suppressing effect of self-efficacy and the mediating effect of ego depletion, that is, proactive work connectivity behaviors indirectly relate to family harmony through self-efficacy and passive work connectivity behaviors indirectly relate to family harmony through ego depletion. Third, this study reveals the contextual conditions under which work connectivity behaviors generate resource gains or losses, namely the moderating effect of family support.

Theory and hypotheses

Proactive/passive work connectivity behaviors and family harmony

Work connectivity behaviors refer to the behaviors that employees use mobile communication devices (cell phones, computers, etc.) to participate in work or contact with colleagues during non-working hours (Reinke and Ohly, 2021; Ren et al., 2021). Previous studies have classified work connectivity behaviors a priori, from the perspective of job characteristics and considered that work connectivity behaviors are either a kind of incentive job resources or a kind of stressful job demands, which may have a "double-edged sword" effect on employees' personal life and work (Ter Hoeven et al., 2016; Wan et al., 2019; Ren et al., 2021). Recent studies have pointed out that the way employees treat work will affect the impact of work on individuals (Schulte-Braucks et al., 2019). Therefore, as a typical boundary crossing behavior between work and non-work, how work connectivity behaviors will affect employees and their families depends on how employees treat such behavior (Huo et al., 2022). Based on previous studies, we consider the willingness of employees to participate in work connectivity behaviors and further divide work connectivity behaviors into proactive connectivity behaviors and passive connectivity behaviors from the perspective

of subjective motivation (Huo et al., 2022). Among them, proactive connectivity behaviors refer to employees' subjective recognition and voluntary acceptance of handling work-related matters during non-working hours, while passive connectivity behaviors refer to that employees are required by the organization (such as leaders) to deal with work-related matters during non-working hours, which means employee involuntary and controlled behavior responding to leaders or colleagues during non-work hours (Piazza, 2007; Ohly and Latour, 2014; Huo et al., 2022). Therefore, whether work connectivity behaviors can play a positive role depends on the employees' work connectivity willingness, which may have a differential impact on the gain and loss of employees' resources.

On the one hand, proactive connectivity behaviors can be used as the job resource to effectively promote the accumulation of individual resources in the work field, and guide the infiltration and transfer of job resources to the family field to promote the performance of individual family roles, so as to achieve family harmony (Mazmanian et al., 2013; Derks et al., 2016; Ma et al., 2016; Carvalho et al., 2021; Reinke and Ohly, 2021). Specifically, employees will actively participate in work connectivity behaviors under the motivation of autonomy, and hope to meet their needs in autonomy, competence and relatedness (Ohly and Latour, 2014). The resources generated in the process of meeting needs can effectively spill over to the family field, thus promoting family harmony. First of all, work connectivity behavior is a specific behavior formed with the development of communication technology, which can be seen as a product of a special new work situation pattern. It breaks the time and space constraints of work, which can make the office space not limited to office buildings, and the working hours no longer limited to fixed working hours (Schlachter et al., 2018). When employees voluntarily choose to use mobile communication devices to work in non-working hours, mobile communication devices can give employees more flexibility and autonomy in work, provide them with more space to design the content and process of work tasks independently, improve their sense of freedom and control of work to meet their own needs for autonomy (Fujimoto et al., 2016). Secondly, proactive connectivity behaviors reflect employees' active self-dedication and extra efforts at work, which can help employees accumulate knowledge and skills at work, ultimately achieve their work goals and improve their work ability to meet their self-worth realization and competence needs (Carvalho et al., 2021). Finally, employees' active participation in work connectivity behaviors can bring them closer to their colleagues and organizations and achieve relational interaction with others, thus meeting their relatedness needs (Ohly and Latour, 2014). The above activities can effectively meet the employees' three basic psychological needs of autonomy, competence and relatedness, so as to obtain positive emotions, personal efficacy, happiness and other positive psychological states, which will help employees handle family affairs with a more optimistic attitude. Furthermore, positive emotions can be transmitted and shared among family members through empathy mechanism, which enhances the affection among family members and is conducive to family harmony (Reinke and Ohly, 2021).

On the other hand, proactive work connectivity behaviors and passive work connectivity behaviors can also be seen as job demands, which urge employees to deal with work-related issues at home. These behaviors objectively increase the working hours and workload of employees, consume the time and energy that employees would have invested in their families, hinder them from fulfilling their family responsibilities, and ultimately lead to complaints and dissatisfaction from other family members, which is detrimental to family harmony (Boswell and Olson-Buchanan, 2007). In addition, we further propose that compared with proactive work connectivity behaviors, passive work connectivity behaviors have a stronger negative impact on family harmony. One qualitative study showed that employees who were forced to engage in work connectivity behaviors after work reported more bad experiences than those who volunteered to do so (Khalid et al., 2021). When employees voluntarily choose to work with mobile communication devices after hours, their sense of control over work will promote employees to handle work more efficiently, which is conducive to achieving their work goals, thus ensuring a normal psychological detachment process, making them easier to recover from work and reducing the occupation of time and resources in the family field (Ohly and Latour, 2014; Reinke and Ohly, 2021). On the contrary, if employees are forced to participate in work connectivity behaviors due to external pressure, they are always under pressure, which makes it more difficult to recover from their work state and leads to continuous depletion of their personal resources (Lee et al., 2021). In this case, employees are unable to engage in family affairs due to extreme physical and mental exhaustion. Furthermore, employees are more likely to have negative emotions such as anxiety and irritability, which will be conveyed to other family members through mutual empathy in the family field, thus causing greater harm to family harmony (Sonnentag, 2018).

In conclusion, proactive work connectivity behaviors may have both positive and negative effects on family harmony. From the perspective of job resource spillover, proactive work connectivity behaviors have a positive impact on family harmony. From the perspective of job demands, proactive work connectivity behaviors have a negative impact on family harmony. Due to the positive and negative relationship between them, we do not propose a one-way impact hypothesis. Passive work connectivity behaviors have only a negative effect on family harmony. Therefore, the following hypotheses are proposed.

H1: Proactive work connectivity behaviors will have a significant impact on family harmony.
H2a: Passive work connectivity behaviors will have a negative impact on family harmony.
H2b: Compared with proactive work connectivity behaviors, passive work connectivity behaviors will have a stronger negative impact on family harmony.

The mediating role of self-efficacy

Proactive work connectivity behaviors can improve employees' self-efficacy through resource generation functions. Self-efficacy is a degree of confidence in one's ability, which is expressed in the extent to which an individual believes that he or she can successfully perform tasks and achieve expected results (Bandura, 1986). For employees, self-efficacy is an important personal resource (Carvalho et al., 2021). Moreover, rich job resources are an important way to generate personal resources. When employees voluntarily deal with work affairs during non-working hours, they can obtain great work autonomy (job resources), such as free choice of working time

and workplace, thus enhancing their sense of control over work (Richardson and Benbunan-Fich, 2011). Work efficiency will also be improved to a certain extent, which will help employees achieve their work goals. In this process, employees will gain more self-efficacy (personal resources) at work (Carvalho et al., 2021; Huo et al., 2022).

According to the W-HR model, positive family outcomes will occur when resources in the work domain increase personal resources and are used to improve family life (ten Brummelhuis and Bakker, 2012). Thus, the self-efficacy (personal resources) obtained by employees at work can produce positive spillover effects on family harmony (Carvalho et al., 2021). Family harmony refers to forbearance, effective communication, conflict resolution, family identity, and quality time with family. It is often expressed as a relationship of intimacy, harmony, happiness, cooperation, and mutual identity, and is considered to be the source of family happiness (Kavikondala et al., 2016). The personal resources accumulated in the positive work experience of employees can help them better perform their family duties, which is conducive to family harmony (Greenhaus and Powell, 2006). First of all, as a positive psychological resource, self-efficacy can stimulate employees' work motivation, enable them to obtain positive emotions at work, and maintain a high energy level (Judge and Bono, 2001). When employees have positive emotions, it can promote their initiative to stay close to family members, more likely to notice the various needs of family members, and consciously perform family-related roles and responsibilities, which is conducive to effective communication between family members as well as the establishment of friendly and interactive relationships (Watson et al., 1999), and thus promote family harmony. Secondly, self-efficacy can help employees adjust their cognition and actions, such as being confident in the face of family problems, believing that they can overcome the problems, and being willing to work hard for them (McNatt and Judge, 2008). Moreover, it can also encourage employees to come up with more ways to solve contradictions and conflicts when faced with complicated family matters, leading them to experience family harmony. In conclusion, proactive work connectivity behaviors can increase employees' self-efficacy, thereby promoting family harmony. Therefore, the following hypothesis is proposed.

Hypothesis 3: Self-efficacy will mediate the relationship between proactive work connectivity behaviors and family harmony.

The mediation role of ego depletion

Passive work connectivity behaviors lead to employee ego depletion through a resource loss mechanism. Ego depletion refers to the state in which employees' psychological resources are exhausted after a period of self-regulation activities (Hagger et al., 2010). When employees are forced to participate in work connectivity behaviors, it means that employees are coerced to stay on call anytime and anywhere, which implies higher expectations of the organization for employees' working hours and intensity, thus increasing the perceived work pressure and role load (job demands) of employees (Huo et al., 2022). Under high work pressure, employees will put more effort and invest more time, energy, and emotional resources than under non-high work pressure, which will accelerate the loss of emotional, cognitive, and other psychological resources, and easily lead to ego depletion (Kang and Peng, 2019).

Based on the W-HR model, when the requirements of the work field consume personal resources and prevent individuals from contributing to the family field, it will lead to negative family outcomes (ten Brummelhuis and Bakker, 2012). As a result, employees suffer from ego depletion at work, which leads to negative spillover effects and adverse effects on family harmony. To be specific, when employees are forced to participate in work connectivity behaviors and suffer from ego depletion, they will lack sufficient resources to fulfill their family responsibilities, which harms family harmony. Firstly, the psychological resources possessed by individuals are limited, and the depletion of self-regulation activities in the work field will reduce the available resources for self-regulation activities in the family field (Tangney et al., 2004; Lee et al., 2021). In the case of ego depletion, employees lack enough time and energy to accompany their families and pay attention to the needs of family members, which is more likely to create family conflicts and is not conducive to family harmony. At the same time, employees who suffer from ego depletion will feel exhausted, and it is difficult to obtain a good work experience and experience the positive spillover effect between work and family (Greenhaus and Powell, 2006; Wan et al., 2019). Secondly, when employees lose resources due to work, they may bring the bad state at work into the family field, such as anger, depression, anxiety, and other bad emotions generated at work, which are easy to cause interpersonal harm to the family (Tang et al., 2014; Xie et al., 2018). In addition, in a bad state of ego depletion, employees will reduce their willingness and motivation to participate in family activities and perform family duties, which is also harmful to family harmony (Greenhaus and Powell, 2006). To sum up, passive connectivity behaviors can lead to employee ego depletion, and then reduce family harmony. Therefore, the following hypothesis is proposed.

Hypothesis 4: Ego depletion will mediate the relationship between passive work connectivity behaviors and family harmony.

The moderating role of family support

Based on the W-HR model, situational resources are regarded as resource investments, which can effectively enhance the positive impact of job resources on individuals and alleviate the negative impact of job demands on personal resources (ten Brummelhuis and Bakker, 2012). Therefore, this study suggests that family support, as a situational resource, can not only enhance the relationship between proactive work connectivity behaviors and self-efficacy but also weaken the relationship between passive work connectivity behaviors and ego depletion. Family support refers to the care and helps that employees receive from family members (parents, partners, children) who help individuals better achieve work goals by providing instrumental advice and emotional resources (Siu et al., 2010). As a key resource, family support can not only be used as an initial resource to reduce resource loss but also as a new resource to generate greater resource increment (ten Brummelhuis and Bakker, 2012). On the one hand, family support can effectively promote the resource gain spiral. Specifically, with high-level family support, employees can get more emotional and instrumental support from their families. For example, family members can encourage employees to increase their confidence, listen patiently and give emotional care to employees when they are depressed, etc. (Chen and Ellis, 2021).

This positive and pleasant family experience tends to bring pleasure and happiness to employees, and positive emotion can enhance the identification of individual's self-ability and the belief of producing more beneficial results (Lee and Shin, 2017), as well as increase their self-efficacy level at work. At this time, employees are more likely to focus on resource acquisition and pursue opportunities to acquire resources (Halbesleben et al., 2014). In other words, employees will regard proactive connectivity behaviors as an opportunity to obtain resources, which makes it easier to accumulate self-efficacy in their work. In addition, family members help employees to perform part of their family responsibilities so that employees can invest more time and energy to complete their work goals and overcome their work difficulties, which is also conducive to the accumulation of employees' self-efficacy. On the other hand, family support can effectively restrain the resource depletion spiral. A high level of family support provides resources for employees in the process of work connectivity behaviors, thereby alleviating or even avoiding ego depletion caused by passive connectivity behaviors. However, under the low level of family support, individuals are faced with limited resources and are prone to fall into the spiral of resource depletion. At this time, employees are more sensitive to resource loss and thus amplify their perception of ego depletion (Halbesleben et al., 2014). Therefore, the following hypothesis is proposed.

Hypothesis 5: Family support will moderate the relationship between proactive work connectivity behaviors and self-efficacy, such that proactive work connectivity behaviors will affect self-efficacy more positively with higher rather than lower levels of family support.

Hypothesis 6: Family support will moderate the relationship between passive work connectivity behaviors and ego depletion, passive work connectivity behaviors will affect ego depletion more positively with lower rather than higher levels of family support.

The moderated mediating role of family support

Based on the W-HR model, situational resources can help employees effectively use work resources and cope with job demands, increase personal resources, and then benefit the outcome in the family domain (ten Brummelhuis and Bakker, 2012). Therefore, this study further constructed a moderated mediating effect model, that is, the influence of proactive connectivity behaviors on family harmony through self-efficacy, and the influence of passive connectivity behaviors on family harmony through ego depletion would be moderated by family support. Under the high level of family support, employees will take the proactive connectivity behaviors as an opportunity to obtain resources, gain more self-efficacy, and then produce positive spillovers to the family field to promote family harmony. On the contrary, under the low level of family support, employees will see passive connectivity behaviors as a threat to resources, amplify their perception of ego depletion, and then produce negative spillovers to the family field, which is harmful to family harmony. Therefore, the following hypothesis is proposed.

Hypothesis 7: Family support will moderate the indirect effect of proactive work connectivity behaviors on family harmony through self-efficacy, such that the indirect effect will be more positive with a high level of family support.

Hypothesis 8: Family support will moderate the indirect effect of passive work connectivity behaviors on family harmony through ego depletion, such that the mediating effect will be less negative with a high level of family support.

The theoretical model of this study is shown in Figure 1.

Materials and methods

Sample and procedure

In this study, data were collected through an online questionnaire survey, involving the employees with fixed working hours in the Internet, e-commerce, finance, software, information technology and other industries in Wuhan, Changsha, and Shenzhen from China, because the use of mobile communication devices is typically important for them to carry out their job, making them more representative in terms of contemporary employees' work connectivity behaviors and work-family Interaction. To avoid common method bias, this study adopts a multi-time point data collection method. In the first wave, the human resources supervisor of each enterprise in the sample was contacted by the assistant investigator, and the link to the electronic questionnaire was sent to them and the procedure and purpose of the survey were explained. Then, the questionnaire was distributed to the employees of the enterprise. During the distribution, it is emphasized repeatedly that the required content is for academic research only and is completely anonymous to ensure that the participants can answer truthfully according to their circumstances. The first questionnaire included demographic variables such as gender, tenure, education level, marriage, and fertility status, as well as proactive work connectivity behaviors, passive work connectivity behaviors, and family support variables. Finally, we received 426 valid samples. A second survey was conducted 2 weeks later, the electronic link was also sent to the human resources supervisor who was contacted before, and then the human resources supervisor send the questionnaire link to the previous sample, including demographic variables as well as variables of self-efficacy, and ego depletion. Finally, we received 380 valid samples. A third survey was conducted 2 weeks later, the electronic link was also sent to the human resources supervisor who was contacted before, and then the human resources supervisor send the questionnaire link to the previous sample, including demographic variables as well as variables of family harmony. To match the data of the three surveys, the participants were asked to fill in the last four digits of their mobile phone numbers at the end of each questionnaire. After all the data collection, we ultimately obtained 364 valid questionnaires. The descriptive characteristics of the samples are shown in Table 1.

Measures

In order to ensure the reliability and validity of the questionnaire measurement, all variables in this study were measured by confirmed mature scale, and we strictly followed the standard translation and back-translation procedure. Furthermore, we invited six enterprise employees to form a focus group and test the content validity of

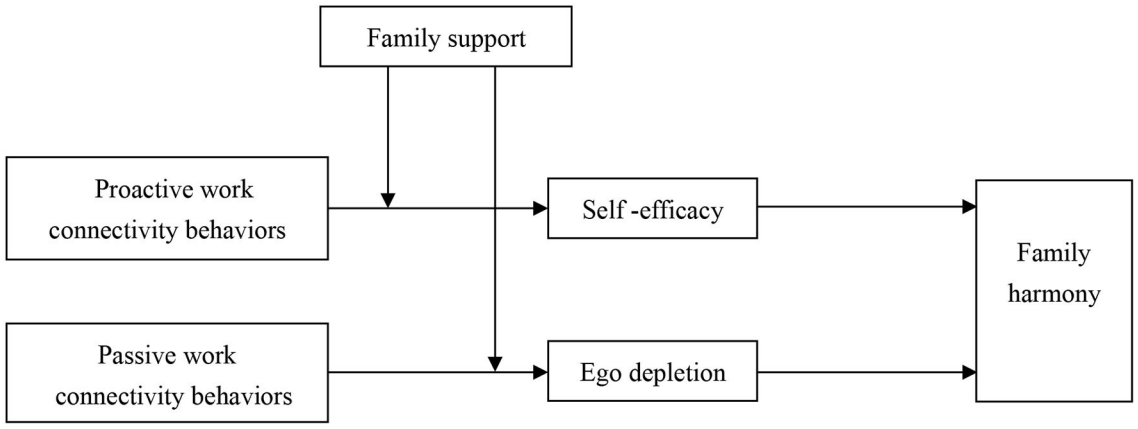

FIGURE 1
The theoretical model.

TABLE 1 Descriptive characteristics of samples ($n = 364$).

Characteristic	Category	Number	Percentage (%)
Gender	Male	194	53.3%
	Female	170	46.7%
Tenure	5 years or below	134	36.8%
	5–10 years	74	20.3%
	10 years or above	156	42.9%
Education	Junior college or below	73	20.1%
	Bachelor degree	240	65.9%
	Master degree	51	14%
Marriage	Married	224	61.5%
	Not married	140	38.5%
Fertility	At least one child	213	58.5%
	No children	151	41.5%

questionnaire items. 80% of employees can understand the meaning of the items, ensuring the requirements of content validity. All scale items in this study were measured using a 5-point Likert scale.

Proactive/passive work connectivity behaviors

Proactive/Passive work connectivity behaviors (PR-WCB/PA-WCB) were measured with the six-item scale developed by Fenner and Renn (2010). On the basis of the original question items, we applied it to different proactive and passive scenarios to reflect the proactively and passivity of work connectivity behaviors. And the clear definitions of proactive and passive connected behaviors were written at the beginning of the questionnaire to ensure that participants could accurately understand the meaning of the item. A sample item of Proactive work connectivity behaviors is "When I fall behind in my work during the day, I proactively work hard at home at night or on weekends to get caught up by using my cell phone" (1 = "never", 5 = "always"). The Cronbach's alpha for this scale was 0.852. A sample item of Passive work connectivity behaviors is "when I return home from work, I passively use my cell phone or computer for work-related tasks" (1 = "never", 5 = "always"). The Cronbach's alpha for this scale was 0.817.

Self-efficacy

Self-efficacy (SE) was measured with the ten-item scale developed by Schwarzer et al. (1997a,b). A sample is "I can always manage to solve difficult problems if I try hard enough" (1 = "completely disagree", 5 = "completely agree"). The Cronbach's alpha for this scale was 0.905.

Ego depletion

Ego depletion (ED) was measured with the five-item scale developed by Lin and Johnson (2015). A sample is "I feel like my willpower is gone" (1 = "completely disagree", 5 = "completely agree"). The Cronbach's alpha for this scale was 0.873.

Family support

Family support (FS) was measured with the ten-item scale developed by Chen and Ellis (2021). A sample is "how much the family members provide you with encouragement" (1 = "not at all", 5 = "a great deal"). The Cronbach's alpha for this scale was 0.917.

Family harmony

Family harmony (FH) was measured with the five-item scale developed by Schwarzer et al. (1997a,b). A sample is "My family is harmonious" (1 = "completely disagree", 5 = "completely agree"). The Cronbach's alpha for this scale was 0.869.

TABLE 2 Results for confirmatory factor analysis.

Model	χ^2	df	χ^2/df	RMSEA	CFI	TLI
Six factors: PR-WCB; PC-WCB SE; ED; FS; FH	1,332.474	804	1.657	0.042	0.929	0.924
Five factors: PR-WCB+PC-WCB; SE; ED; FS; FH	2,056.363	809	2.542	0.065	0.832	0.821
Four factors: PR-WCB+PC-WCB; SE; ED; FS+FH	2,956.724	813	3.637	0.085	0.711	0.694
Three factors: PR-WCB+PC-WCB; SE+ED; FS+FH	3,787.935	816	4.642	0.100	0.600	0.578
One factor: PR-WCB+PC-WCB +SE+ED+FS+FH	5,100.073	819	6.227	0.120	0.423	0.394

N = 364.

PR-WCB, proactive work connectivity behaviors; PC-WCB, passive work connectivity behaviors; SE, self-efficacy; ED, ego depletion; FS, family support; FH, family harmony.

TABLE 3 Composite reliability and convergent validity.

Variables	No. of items	Loadings range	AVE	CR
Proactive work connectivity behaviors	6	[0.694–0.724]	0.491	0.852
Passive work connectivity behaviors	6	[0.642–0.671]	0.427	0.817
Self-efficacy	10	[0.666–0.745]	0.488	0.905
Ego depletion	5	[0.743–0.786]	0.579	0.873
Family support	10	[0.694–0.756]	0.524	0.917
Family harmony	5	[0.681–0.935]	0.589	0.876

Control variables

To minimize the estimation bias caused by missing variables, we controlled the demographic variables of gender, tenure, education, marriage, and fertility status. In this study based on the previous literatures (Boswell and Olson-Buchanan, 2007; Richardson and Thompson, 2012; Dumas and Perry-Smith, 2018; Xie et al., 2018; Yang et al., 2022).

Analysis and results

Confirmatory factor analysis

To better verify the discriminant validity of each variable in the research model, we used Mplus8 to conduct confirmatory factor analysis (CFA). To be specific, constructed a six-factor model including proactive work connectivity behaviors, passive work connectivity behaviors, self-efficacy, ego depletion, family support, and family harmony. The results of confirmatory factor analysis (Table 2) showed that the fitting effect of the six-factor model (χ^2 = 1,332.474, df = 804, χ^2/df = 1.657, RMSEA = 0.042, CFI = 0.929, TLI = 0.924) was significantly better than that of other competitive models. It indicates that the variables in this study have good discriminative validity, which lays a foundation for subsequent analysis.

Table 3 shows factor loadings, average variance extracted (AVE) and the composite reliability (CR). According to Fornell and Larcker (1981), CR should exceed 0.6, and AVE should exceed 0.5 under ideal condition, while 0.36–0.5 are acceptable. Hence, all items for convergent validity were met.

Common method variance

To reduce the common method bias in the process of data collection, this study adopts a multi-time point method to obtain the research data. Harman single factor test was used to test the common method deviation. The results show that the first factor only explains 27.159% of the total variance, which is far less than the critical value of 40%. Therefore, the common method bias in this study is not serious and has little impact on the results. However, considering the insensitivity of the Harman single-factor test, we conducted a latent method factor based on the six-factor model to test CMV. The analysis results showed that the seven-factor model after the addition of the latent method factor (χ^2 = 1,328.559, df = 803, χ^2/df = 1.654, RMSEA = 0.042, CFI = 0.929, TLI = 0.924) was not significantly better than the six-factor model, indicating that our study does not have serious common method biases (Podsakoff et al., 2003).

Descriptive analysis and correlation analysis

Table 4 presents the means, standard deviations, and correlation coefficients of the main variables in this study. As shown in Table 4, proactive work connectivity behaviors were positively related to self-efficacy (r = 0.241, $p < 0.01$). Passive work connectivity behaviors were positively related to ego depletion (r = 0.484, $p < 0.01$). Self-efficacy was positively related to family harmony (r = 0.292, $p < 0.01$). Ego depletion was negatively related to family harmony (r = −0.436, $p < 0.01$), which provided a preliminary test of the study hypothesis.

Hypothesis testing

Research hypotheses were tested using hierarchical regression analysis and bootstrapping in SPSS 26.0, and the results were shown in Table 5.

Analysis of the main effects of proactive work connectivity behaviors and passive work connectivity behaviors on family harmony. In model 8, proactive work connectivity behaviors had a significant negative impact on family harmony (β = −0.276, $p < 0.001$). Thus, H1 was supported. In model 10, passive work connectivity behaviors had a significant negative impact on family harmony (β = −0.385, $p < 0.001$). Compared with proactive work connectivity behaviors (β = −0.276), passive work connectivity behaviors (β = −0.385) have a stronger negative impact on family harmony. Thus, H2a and H2b were supported.

TABLE 4 Means, standard deviations and correlations among variables.

Variables	1	2	3	4	5	6	7	8	9	10	11
1. Gender	1.000										
2. Tenure	0.070	1.000									
3. Education	−0.041	−0.237**	1.000								
4. Marriage	0.007	0.643**	−0.199**	1.000							
5. Children	−0.071	0.710**	−0.233**	0.830**	1.000						
6. PR-WCB	0.042	0.082	0.001	−0.011	0.008	1.000					
7. PA-WCB	0.073	−0.048	−0.008	0.020	−0.051	0.113*	1.000				
8. SE	0.006	0.075	−0.077	0.084	0.124*	0.241**	−0.352**	1.000			
9. ED	0.037	0.029	−0.034	−0.022	−0.043	0.256**	0.484**	−0.244**	1.000		
10.FH	−0.049	−0.081	0.015	−0.033	−0.085	−0.285**	−0.365**	0.292**	−0.436**	1.000	
11. FS	0.052	0.004	0.010	−0.047	−0.023	0.027	−0.490**	0.358**	−0.354**	0.264**	1.000
Mean	0.530	2.060	1.940	0.620	0.590	3.800	2.961	3.398	3.177	2.875	3.043
SD	0.500	0.892	0.581	0.487	0.493	0.700	0.690	0.727	0.794	0.766	0.756

N = 364.

*p < 0.05, **p < 0.01. Gender: male = 1, female = 0; Tenure: 5 years or below = 1, 5–10 years = 2, 10 years or above = 3; Education: junior college or below = 1, bachelor degree = 2, master degree = 3; Marriage: Married = 1, Not married = 0; Children: at least one child = 1, no children = 0.

PR-WCB, proactive work connectivity behaviors; PA-WCB, passive work connectivity behaviors; SE, self-efficacy; ED, ego depletion; FS, family support; FH, family harmony.

TABLE 5 Results for regression analysis.

Model	1	2	3	4	5	6	7	8	9	10	11
Variables	SE			ED			FH				
Gender	0.020	0.011	−0.025	0.020	−0.011	0.001	−0.067	−0.056	−0.060	−0.043	−0.046
Tenure	−0.044	−0.076	−0.061	0.106	0.131	0.080	−0.007	0.030	0.060	−0.027	0.017
Education	−0.052	−0.057	−0.071	−0.036	−0.026	−0.050	−0.014	−0.009	0.014	−0.023	−0.031
Marriage	−0.067	−0.034	0.023	0.006	−0.095	−0.087	0.192	0.154	0.167	0.271**	0.239**
Children	0.200	0.187	0.207	−0.122	−0.031	−0.102	−0.263*	−0.248*	−0.323*	−0.334**	−0.345**
PR-WCB		0.241***	0.274***					−0.276***	−0.373***		
PA-WCB					0.491***	0.472***				−0.385***	−0.221***
SE									0.404***		
ED											−0.334***
FS			0.339***			−0.191***					
FS*PR-WCB			0.182**								
FS*PA-WCB						−0.332***					
R^2	0.019	0.076	0.224	0.009	0.245	0.306	0.023	0.098	0.249	0.168	0.252
ΔR^2	0.019	0.057	0.022	0.009	0.236	0.043	0.023	0.075	0.150	0.145	0.084
F	1.420	4.927***	12.800***	0.623	19.299***	19.561***	1.690	6.479***	16.828***	12.029***	17.171***

N = 364.

*p < 0.05, **p < 0.01, ***p < 0.001.

PR-WCB, proactive work connectivity behaviors; PA-WCB, passive work connectivity behaviors; SE, self-efficacy; ED, ego depletion; FS, family support; FH, family harmony.

Analysis of the mediating effects of self-efficacy and ego depletion. Model 2 showed that proactive work connectivity behaviors had a significant positive impact on self-efficacy ($\beta = 0.241$, $p < 0.001$). According to model 9, when proactive work connectivity behaviors and self-efficacy are included in the regression equation at the same time to predict family harmony, the regression coefficient of proactive work connectivity behaviors and family harmony is still significant ($\beta = -0.373$, $p < 0.001$), at the same time, self-efficacy had a significant positive impact on family harmony ($\beta = 0.404$, $p < 0.001$). Thus, H3 was supported.

Model 5 showed that passive work connectivity behaviors had a significant positive impact on ego depletion ($\beta = 0.491$, $p < 0.001$). According to model 11, when passive work connectivity behaviors and ego-depletion are included in the regression equation at the same time to predict family harmony, the regression coefficient of proactive work connectivity behaviors and family harmony is still significant

($\beta = -0.221$, $p < 0.001$), at the same time, ego depletion had a significant negative impact on family harmony ($\beta = -0.334$, $p < 0.001$). Thus, H4 was supported.

Further, using the SPSS macro program PROCESS' MODEL4 proposed by Preacher and Hayes (2008) to analyze the indirect effect of self-efficacy and ego depletion. The bootstrapping sample size was set to 5,000, the confidence interval was set to 95%, and the results were shown in Table 6. The indirect effect of self-efficacy between proactive work connectivity behaviors and family harmony was 0.106 and the 95% confidence interval (LLCI = 0.056, ULCI = 0.161) did not include 0, indicating that Hypothesis 3 got fully supported. However, we further found that the total effect ($\beta = -0.303$, 95%CI = [−0.412, −0,194]) and the direct effect ($\beta = -0.409$, 95%CI = [−0.512, −0.306]) of proactive connectivity behaviors on family harmony were negative. The indirect effect of self-efficacy between proactive connectivity behaviors and family harmony was positive, that is, the sign of the direct effect coefficient was opposite to that of the indirect effect coefficient, indicating that self-efficacy played a suppressing effect between proactive connectivity behaviors and family harmony (MacKinnon et al., 2000; Wen and Ye, 2014). The indirect effect of ego depletion between passive work connectivity behavior and family harmony was −0.182 and the 95% confidence interval (LLCI = −0.275, ULCI = −0.106) did not include 0, indicating that Hypothesis 4 got fully supported.

TABLE 6 Results of bootstrapping mediation effect examination.

Effect	Estimate	S.E.	95%LLCI	95%ULCI
Proactive work connectivity behaviors→ self-efficacy→ family harmony				
Total effect	−0.303	0.056	−0.412	−0.194
Direct effect	−0.409	0.052	−0.512	−0.306
Indirect effect	0.106	0.027	0.056	0.161
Passive work connectivity behaviors→ ego depletion→ family harmony				
Total effect	−0.427	0.054	−0.533	−0.320
Direct effect	−0.245	0.059	−0.361	−0.129
Indirect effect	−0.182	0.043	−0.275	−0.106

Furthermore, we analyzed the interactive effects of proactive work connectivity behaviors and passive work connectivity behaviors with family support. In model 3, the results indicate that the interaction between proactive work connectivity behaviors with family support was significantly related to self-efficacy ($\beta = 0.182$, $p < 0.01$), thus Hypothesis 3 was supported. In model 6, the results indicate that the interaction between passive work connectivity behaviors with family support was significantly related to ego depletion ($\beta = -0.332$, $p < 0.001$), thus Hypothesis 4 was supported. We also adopted simple slope analysis to describe the difference in the impact of proactive work connectivity behaviors on self-efficacy with different levels of family support, which were based on one standard deviation above and below the mean (±1 SD). As plotted in Figure 2, when family support was at a high level (+1 SD), the positive impact of proactive work connectivity behaviors on self-efficacy was stronger ($\beta = 0.411$, $p < 0.001$). On the contrary, when the family support was at a low level (−1 SD), the positive impact of proactive work connectivity behaviors on self-efficacy was weaker ($\beta = 0.136$, $p < 0.05$). Thus, further supporting Hypothesis 5. Similarly, as plotted in Figure 3, when family support was at a high level (+1 SD), the positive impact of passive work connectivity behaviors on ego depletion was weaker ($\beta = 0.220$, $p < 0.01$). On the contrary, when the family support was at a low level (−1 SD), the positive impact of passive work connectivity behaviors on ego depletion was stronger ($\beta = 0.723$, $p < 0.001$). Thus, further supporting Hypothesis 6.

Finally, we used PROCESS' MODEL7 to examine the whole moderated mediation model, and the results were shown in Table 7. The results indicate that the indirect effect of proactive work connectivity behaviors on family harmony through self-efficacy (β

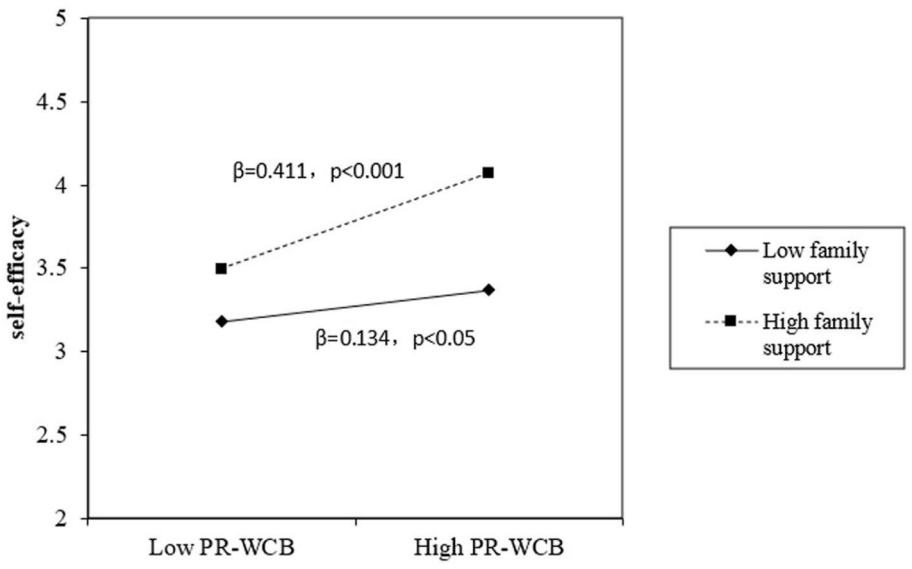

FIGURE 2
The moderating effect of family support on the impact of PR-WCB on self-efficacy.

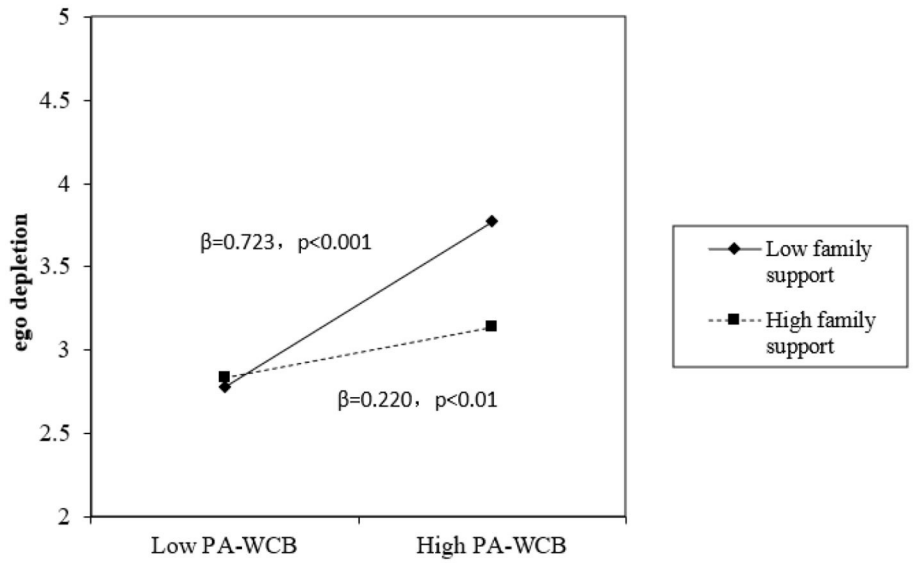

FIGURE 3
The moderating effect of family support on the impact of PA-WCB on ego depletion.

TABLE 7 Results for moderated mediation effect.

Effect	Estimate	S.E.	95%LLCI	95%ULCI
Proactive work connectivity behaviors→ self-efficacy→ family harmony				
Moderated mediation	0.077	0.028	0.024	0.135
Low level of family support	0.058	0.029	0.003	0.114
High level of family support	0.175	0.038	0.101	0.252
Difference	0.117	0.042	0.037	0.204
Passive work connectivity behaviors→ ego depletion→ family harmony				
Moderated mediation	0.107	0.035	0.049	0.185
Low level of family support	−0.233	0.060	−0.368	−0.134
High level of family support	−0.071	0.030	−0.137	−0.018
Difference	0.162	0.053	0.074	0.280

= 0.175, 95%CI = [0.101, 0.252]) was stronger with a high level of family support. In contrast, the indirect effect (β = 0.058, 95%CI = [0.003, 0.114]) was weaker when the family support was at a low level. And the differential effect between high levels and low levels of family support was significant (β = 0.117, 95%CI = [0.037, 0.204). Thus, Hypothesis 7 was supported. Similarly, the results indicate that the indirect effect of passive work connectivity behaviors on family harmony through ego depletion (β = −0,233, 95%CI = [−0.368, −0.134]) was stronger with a low level of family support. In contrast, the indirect effect (β = −0.071, 95%CI = [−0.137, −0.018]) was weaker when the family support was at a high level. And the differential effect between high levels and low levels of family support was significant (β = 0.162, 95%CI = [0.074, 0.280). Thus, Hypothesis 8 was supported.

Supplementary analyses: Multiple mediating effects test

The existence of the "suppressing effect" of self-efficacy, on the one hand, proved the existence of the indirect mechanism that proactive work connectivity behaviors affected family harmony through self-efficacy, on the other hand, it also showed that there were more effective mediators between proactive work connectivity behaviors and family harmony (Kenny et al., 2003). Therefore, we included self-efficacy and ego depletion into the model at the same time to explore whether self-efficacy and ego depletion play multiple mediating roles between proactive work connectivity behaviors and family harmony (as shown in Table 8). The results showed that proactive work connectivity behaviors have a positive impact on self-efficacy (β = 0.251, 95%CI = [0.146, 0.356]) and ego depletion (β = 0.289, 95%CI = [0.174 0.404]), which indicated that proactive work connectivity behaviors had both gain and loss effects on personal resources of employees (self-efficacy and ego depletion). The indirect effect of ego depletion between proactive work connectivity behaviors and family harmony was −0.083 and the 95% confidence interval (LLCI = −0.139, ULCI = −0.039) did not include 0, indicating that ego depletion mediates the relationship between proactive work connectivity behaviors and family harmony. Furthermore, we compared the mediating effects of self-efficacy and ego depletion. The mediating effect coefficient of self-efficacy (β = 0.081, 95%CI = [0.040, 0.130]) was a little less than that of ego depletion (β = −0.083, 95%CI = [−0.139, −0.039]). The difference in coefficient between the two mediating effects was 0.164 and the 95% confidence interval (LLCI = −0.111, ULCI = 0.226) did not include 0.

TABLE 8 Results of multiple mediating effects test.

Effect	Estimate	S.E	95%LLCI	95%ULCI
Total effect PR-WCB→FH	−0.303	0.056	−0.412	−0.194
Direct effect PR-WCB→FH	−0.300	0.053	−0.405	−0.197
Direct effect PR-WCB→SE	0.251	0.053	0.146	0.356
Direct effect PR-WCB→ED	0.289	0.058	0.174	0.404
Direct effect SE→FH	0.323	0.051	0.223	0.422
Direct effect ED→FH	−0.287	0.046	−0.378	−0.196
Indirect effect1 PR-WCB→SE→FH	0.081	0.023	0.040	0.130
Indirect effect2 PR-WCB→ED→FH	−0.083	0.026	−0.139	−0.039
IND1 + IND2	−0.002	0.039	−0.800	0.075
IND1 - IND2	0.164	0.029	0.111	0.226

PR-WCB, proactive work connectivity behaviors; SE, self-efficacy; ED, ego depletion; FH, family harmony.
IND1 + IND2 = the mediating effect of Self-efficacy plus the mediating effect of ego depletion.
IND1 - IND2 = the mediating effect of self-efficacy subtract the mediating effect of ego depletion.

Discussion

From the work-home resources model perspective, we propose a theoretical model that proactive work connectivity behaviors and Passive work connectivity behaviors impact family harmony through self-efficacy and ego depletion, and we explore the moderating role of family support in this relationship. Based on survey data collected from 364 questionnaires by using a three-wave time-lagged design, we get the following conclusions.

First, we tested the main effect between proactive/passive work connectivity behaviors and family harmony. The results showed that both proactive work connectivity behaviors and passive work connectivity behaviors have a significant negative impact on family harmony. However, compared with proactive connectivity behaviors, passive connectivity behaviors are more harmful to family harmony.

Second, we tested the suppressing effect of self-efficacy. When employees actively participate in work connectivity behaviors, they can gain a sense of control over their work and effectively complete their work goals, thereby improving self-efficacy (Schaufeli and Taris, 2014), and the accumulated personal resources will actively spill over into the family field, which is beneficial to family harmony. However, the direct effect between proactive work connectivity behaviors and family harmony is negative, and proactive work connectivity has a significant positive impact on self-efficacy and ego depletion, which indicates that proactive work connectivity has both gain and loss effects on personal resources. Based on the three-dimensional model of job demands and resources, job related factors can be divided into three categories according to their impact on personal resources: job resources, challenge job demands and hindrance job demands. Among them, job resources can bring gains to personal resources, hindrance job demands will consume personal resources, and challenge job demands will both gain and consume personal resources (Crawford et al., 2010). Therefore, different from previous studies, work connectivity behaviors are classified into job resources and job demands a priori. This study considers that proactive work connectivity behaviors have the attribute of challenge job demands, while passive work connectivity behaviors have the attribute of hindrance job demands.

Third, we tested the mediating effect of ego depletion. When employees are forced to participate in work connectivity behaviors, the workload and work intensity will increase, making it impossible for employees to recover physically and mentally, which will lead to the continuous reduction of personal resources, resulting in a bad state of ego depletion. The bad emotions associated with this state will negatively spill over to the family field, which will be harmful to family harmony. This is consistent with the previous results of regarding work connectivity behaviors as job demands and discussing its negative effects (Xie et al., 2018). Further subdivided, because passive work connectivity can only lead to the loss of personal resources, it has the property of hindrance job demands.

Fourth, we tested the moderating effect of family support. This study found that family support not only positively moderated the relationship between proactive work connectivity behaviors and self-efficacy, but also moderated the mediating role of self-efficacy between proactive work connectivity behaviors and family harmony. In addition, family support not only negatively moderated the relationship between passive work connectivity behaviors and ego depletion, but also moderated the mediating effect of ego depletion on the relationship between passive work connectivity behaviors and family harmony. It shows that family support, as a very important situational resource, can effectively promote the gain spiral of personal resources and restrain the loss spiral of personal resources. When employees receive a high level of family support, they will accumulate more self-efficacy when they voluntarily participate in work connectivity behaviors and then promote family harmony. In addition, if employees are forced to engage in work connectivity behaviors, family support can effectively slow down the loss of personal resources, alleviate their ego depletion, and thus reduce the adverse impact on family harmony.

Theoretical contributions

First, this study explored the relationship between work connectivity behaviors and family harmony from the perspective of employees' subjective motivation and extends the application of the W-HR model in the field of work connectivity behaviors research. Previous studies have mainly classified work connectivity behavior a priori, defined it as job resources or job demands, and discussed the positive and negative effects on work or family places respectively (Richardson and Thompson, 2012; Ter Hoeven et al., 2016). However, few studies have classified work connectivity behaviors into proactive work connectivity behaviors and passive work connectivity behaviors from the perspective of personal subjective motivation. This classification responds to the initiative of scholars to distinguish the attributes of work connectivity behaviors in future research (Ohly and Latour, 2014) and expands the research scope of the impact of work connectivity behaviors on the family field. In addition, this study also explored the attributes of proactive and passive connectivity behaviors, as well as their differential effects on individual family harmony. The results show that proactive connectivity behaviors have both promoting and inhibiting effects, which have the attributes of challenge job demands.

Passive connectivity behaviors only have an inhibiting effect, so it has the attribute of hindrance job demands. These findings enrich the research on the attributes of working connectivity behaviors.

Second, this study investigated the internal mechanism of the effect of work connectivity behaviors on family harmony from a process perspective to further verify the applicability of the W-HR model. The process perspective refers to the view of work-family conflict and work-family enrichment as the interactive process between the work and family domains. Specifically, work-family conflict represents a process in which "demands in the work domain consume personal resources, resulting in increased negative outcomes in the family domain", and work-family enrichment represents a process in which "resources in the work domain develop personal resources and drive increased positive outcomes in the other family domain" (ten Brummelhuis and Bakker, 2012). From the process perspective, the whole variable relationship is highlighted as a work-family conflict process and a work-family enrichment process. However, the existing research mainly adopts the perspective of outcome view, that is, work-family conflict and work-family enrichment are regarded as the outcome variables in the family field, and it is believed that the demands or resources in the work field produce the results of work-family conflict and work-family enrichment in the family field through the response of individual resources. In other words, the outcome view is reflected in the presence of variables such as work-family conflict and work-family enrichment in the model, rather than specific results in the work or family field, such as family harmony. Therefore, based on the original view of the W-HR model, we conducted research from the perspective of the process view and discussed that the proactive work connectivity behaviors lead to the increase of employees' resources, and the accumulated self-efficacy actively overflows to the family field, thereby promoting family harmony, which reflects the work-family enrichment process in the W-HR model. In addition, the passive work connectivity behaviors lead to the loss of personal resources, which leads to the negative spillover of employee ego depletion to the family field, thereby inhibiting family harmony, which reflects the work-family conflict process in the W-HR model. The above findings further shed light on the black box between work connectivity behaviors and family harmony.

Third, this study revealed the contextual conditions under which work connectivity behaviors generate resource gains or losses, namely the moderating effect of family support. The results found that under a high level of family support, proactive work connectivity behaviors would enhance the positive effect (improve self-efficacy). With low levels of family support, passive work connectivity can enhance its negative effect (increasing ego depletion). This indicates that family support can promote the resource gain function of proactive work connectivity behavior and alleviate the resource loss function of passive work connectivity behavior. In addition, previous studies generally support the resource gain function of family support (Seiger and Wiese, 2009; ten Brummelhuis and Bakker, 2012; Park and Fritz, 2015). It can be seen that the findings of this study are consistent with previous studies.

Practical implications

First, organizations need to pay attention to employees' willingness to work connectivity. Managers should be aware that forcing employees to participate in work connectivity behavior is inefficient and will cause the loss of personal resources of employees, which is detrimental to their physical and mental health and family harmony. The manager can control the work connectivity behaviors in a reasonable range and negotiate with the employees about the work connectivity time that is acceptable to both sides. For example, the manager can fix a certain period of time to discuss the work during non-working hours to reduce the interference in the life of the employees. In conclusion, organizations should not advocate or even force employees to use mobile communication devices to deal with work-related affairs after work. An organizational culture that promotes the use of mobile communication devices to deal with work-related affairs during non-working hours may lead to the highly normalized use of mobile communication devices after hours, resulting in an "always on, always connected" organizational atmosphere. It is not conducive for employees to recover from long-term depletion (Reinke and Ohly, 2021). Organizations can allow employees to use mobile communication devices to deal with work affairs after work, but do not expect it.

Second, employees need to rationally understand and use work connectivity tools. With the update in information technology and the intensification of enterprise competition, the demand for employees' work connectivity is becoming increasingly urgent. It is becoming more pervasive to use mobile communication devices for employees to deal with work affairs during non-working hours. Therefore, for employees themselves, they need to take the initiative to adapt to the changes in work situations and ways brought about by the development of science and technology promptly on time, effectively arrange the time, reasonably set the boundary between work and life, and reduce the adverse impact of work connectivity behaviors on life. At the same time, employees need to correctly use work connectivity tools, fully understand and give play to the positive aspects of work connectivity behavior, and constantly accumulate personal resources to achieve the goal of using technology for their purposes. In addition, employees should not regard work connectivity behavior as an obligation. When they are forced to participate in work connectivity behavior and bring harm to themselves and their families, they can use the right to disconnect, and do not necessarily need to deal with work affairs in non-working hours. The best approach is to actively communicate with leaders about their actual expectations and preferences for dealing with work affairs in non-working hours, so as to obtain the initiative to use mobile communication devices, and achieve diversified and autonomous use of mobile communication devices.

Third, both organizations and employees should attach importance to the demands of employees' families. For the organizations, they can formulate work-family balance policies to help employees meet work and family demands (Bardoel et al., 2014). For example, regulate the working time regulations and emphasize that the non-working time should be the real non-working time, that is, the non-working time should be used for other areas of employees' life, whether it is family activities or personal activities. And it is not necessary to increase the expectation of availability beyond working hours, help employees divide their work and personal life, and strive for the support of their family members. For individual employees, while actively seeking support from family members should also actively perform family duties to promote a positive feedback loop of family harmony and support from family members. Moreover, employees should be careful not to invest "excessive" time and energy in their work. Relevant studies have shown that workaholism

often leads to work-family conflict, which is not conducive to family harmony (Daniel et al., 2022).

Limitations and future research

First, this study unexpectedly found that proactive connectivity behaviors have both positive and negative effects, which has a "double-edged sword" effect on family harmony through self-efficacy and ego depletion. However, the research still just explores the linear relationship between proactive connectivity behaviors on the personal resources of employees and family outcomes. In the future, we can explore whether there is an inverted U-shaped relationship between proactive connectivity behaviors and work or family domain outcomes, that is, to study the different degrees of proactive connectivity behavior. Specifically, Individuals can keep energetic and bring high self-efficacy in the process of proactive work connectivity. However, in the long run, how excessive proactive work connectivity behaviors will affect employees' work and life needs to be further discussed. Second, although this study examined the moderating effect of family support, a family context resource, on the relationship between work connectivity behaviors and personal resources, there may be other moderating mechanisms. Future research can further improve the boundary conditions of the influencing mechanism of work connectivity behaviors from the perspective of personal traits, such as time management (Fenner and Renn, 2010), boundary segmentation preference (Andrade and Matias, 2021), etc. In addition, the research can also choose the variables of work in the selection of outcome variables, such as employee creativity. Third, although this study adopted a three-wave multi-time point questionnaire collection method to reduce the common method bias that may be caused by cross-sectional data, the samples were from a single source and were all self-reported by employees. Future research may consider multiple sources and allow family members to evaluate variables in the household domain to enrich the validity of sample measurement. In addition, this study used cross-sectional self-report data. Thus, the relationships in this study do not indicate causality. In future studies, experimental methods can be used to further verify the causal relationship, and the experience sampling method can also be considered to further improve the research design.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by Zhongnan University of Economics and Law. The patients/participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

HH developed the theoretical model and wrote the manuscript. DL was responsible for the data collection as well as for the application of analytical tools. YZ and PZ participated in revising the manuscript. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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References

Andrade, C., and Matias, M. (2021). Work-related ICT use during off-job time, technology to family conflict and segmentation preference: a study with two generations of employees. *Inf. Commun. Soc.* 25, 2162–2171. doi: 10.1080/1369118X.2021.1933564

Bandura, A. (1986). *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice Hall.

Bardoel, E. A., Pettit, T. M., De Cieri, H., and McMillan, L. (2014). Employee resilience: an emerging challenge for HRM. *Asia Pac. J. Hum. Resour.* 52, 279–297. doi: 10.1111/1744-7941.12033

Boswell, W. R., and Olson-Buchanan, J. B. (2007). The use of communication technologies after hours: the role of work attitudes and work-life conflict. *J. Manage.* 33, 592–610. doi: 10.1177/0149206307302552

Carvalho, V. S., Correia, I., and Chambel, M. J. (2021). Is it ok to be connected outside the office? The impact on well-being at work and the mediating role of the work and family relationship. *Int. J. Organ. Anal.* 30, 1856–1856. doi: 10.1108/IJOA-01-2021-2577

Chen, Z., and Ellis, A. M. (2021). Crossover of daily job stressors among dual-career couples: A dyadic examination. *J. Organ. Behav.* 42, 668–683. doi: 10.1002/job.2520

Crawford, E. R., LePine, J. A., and Rich, B. L. (2010). Linking job demands and resources to employee engagement and burnout: a theoretical extension and meta-analytic test. *J. Appl. Psychol.* 95, 834–848. doi: 10.1037/a0019364

Daniel, C., Gentina, E., and Mesmer-Magnus, J. (2022). Mindfulness buffers the deleterious effects of workaholism for work-family conflict. *Soc. Sci. Med.* 306, 115118. doi: 10.1016/j.socscimed.2022.115118

Derks, D., Bakker, A. B., Peters, P., and van Wingerden, P. (2016). Work-related smartphone use, work–family conflict and family role performance: the role of segmentation preference. *Hum. Relat.* 69, 1045–1068. doi: 10.1177/0018726715601890

Dumas, T. L., and Perry-Smith, J. E. (2018). The paradox of family structure and plans after work: Why single childless employees may be the least absorbed at work. *Acad. Manage. J.* 61, 1231–1252. doi: 10.5465/amj.2016.0086

Fenner, G. H., and Renn, R. W. (2010). Technology-assisted supplemental work and work-to-family conflict: the role of instrumentality beliefs, organizational expectations and time management. *Hum. Relat.* 63, 63–82. doi: 10.1177/0018726709351064

Fornell, C., and Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *J. Mark. Res.* 18, 39–50. doi: 10.1177/002224378101800010

Fujimoto, Y., Ferdous, A. S., Sekiguchi, T., and Sugianto, L. F. (2016). The effect of mobile technology usage on work engagement and emotional exhaustion in Japan. *J. Bus. Res.* 69, 3315–3323. doi: 10.1016/j.jbusres.2016.02.013

Greenhaus, J. H., and Powell, G. N. (2006). When work and family are allies: a theory of work-family enrichment. *Acad. Manage Rev.* 31, 72–92. doi: 10.5465/amr.2006.19379625

Hagger, M. S., Wood, C., Stiff, C., and Chatzisarantis, N. L. D. (2010). Ego depletion and the strength model of self-control: a meta-analysis. *Psychol. Bull.* 136, 495–525. doi: 10.1037/a0019486

Halbesleben, J., Neveu, J.-P., Paustian-Underdahl, S., and Westman, M. (2014). Getting to the "COR": understanding the role of resources in conservation of resources theory. *J. Manage.* 40, 1334–1364. doi: 10.1177/0149206314527130

Hammer, L. B., Johnson, R. C., Crain, T. L., Bodner, T., Kossek, E. E., Davis, K. D., et al. (2016). Intervention effects on safety compliance and citizenship behaviors: evidence from the work, family, and health study. *J. Appl. Psychol.* 101, 190–208. doi: 10.1037/apl0000047

Huo, W., Xu, X., Li, X., Xie, J., and Sun, L. (2022). Work-related use of information and communication technologies after-hours (W_ICTs) and employee innovation behavior: a dual-path model. *Inf. Technol. People.* doi: 10.1108/ITP-06-2021-0500

Ip, P.-K. (2014). Harmony as happiness? social harmony in two chinese societies. *Soc. Indic. Res.* 117, 719–741. doi: 10.1007/s11205-013-0395-7

Judge, T. A., and Bono, J. E. (2001). Relationship of core self-evaluations traits—self-esteem, generalized self-efficacy, locus of control, and emotional stability—with job satisfaction and job performance: a meta-analysis. *J. Appl. Psychol.* 86, 80–92. doi: 10.1037/0021-9010.86.1.80

Kang, Y. J., and Peng, J. (2019). Benefits and costs of servant leadership behavior: a work-home resource model perspective. *Acta Psychologica Sinica.* 51, 227–237. doi: 10.3724/SP.J.1041.2019.00227

Kavikondala, S., Stewart, S. M., Ni, M. Y., Chan, B. H. Y., Lee, P. H., Li, K.-K., et al. (2016). Structure and validity of family harmony scale: an instrument for measuring harmony. *Psychol. Assess.* 28, 307–318. doi: 10.1037/pas0000131

Kenny, D. A., Korchmaros, J. D., and Bolger, N. (2003). Lower level mediation in multilevel models. *Psychol. Methods.* 8, 115–128. doi: 10.1037/1082-989X.8.2.115

Khalid, J., Weng, Q. D., Luqman, A., Rasheed, M. I., and Hina, M. (2021). After-hours work-related technology use and individuals' deviance: the role of other-initiated vs. self-initiated interruptions. *Inf. Technol. People.* 35, 1955–1979. doi: 10.1108/ITP-03-2020-0136

Lee, E. S., and Shin, Y.-J. (2017). Social cognitive predictors of Korean secondary school teachers' job and life satisfaction. *J. Vocat. Behav.* 102, 139–150. doi: 10.1016/j.jvb.2017.07.008

Lee, S., Zhou, Z. E., Xie, J., and Guo, H. (2021). Work-related use of information and communication technologies after hours and employee fatigue: the exacerbating effect of affective commitment. *J. Manag. Psychol.* 36, 477–490. doi: 10.1108/JMP-12-2019-0677

Lin, S.-H., and Johnson, R. E. (2015). A suggestion to improve a day keeps your depletion away: Examining promotive and prohibitive voice behaviors within a regulatory focus and ego depletion framework. *J. Appl. Psychol.* 100, 1381–1397. doi: 10.1037/apl0000018

Ma, H. Y., Xie, J. L., Tang, H. Y., Shen, C. G., and Zhang, X. X. (2016). Relationship between working through information and communication technologies after hours and well-being among Chinese dual-earner couples: a spillover-crossover perspective. *Acta Psychologica Sinica.* 48, 48–58. doi: 10.3724/SP.J.1041.2016.00048

MacKinnon, D. P., Krull, J. L., and Lockwood, C. M. (2000). Equivalence of the mediation, confounding and suppression effect. *Prevent. Sci.* 1, 173–181. doi: 10.1023/A:1026595011371

Mazmanian, M., Orlikowski, W. J., and Yates, J. (2013). The autonomy paradox: the implications of mobile email devices for knowledge professionals. *Organizat. Sci.* 24, 1337–1357. doi: 10.1287/orsc.1120.0806

McNatt, D. B., and Judge, T. A. (2008). Self-efficacy intervention, job attitudes, and turnover: a field experiment with employees in role transition. *Hum. Relat.* 61, 783–810. doi: 10.1177/0018726708092404

Ohly, S., and Latour, A. (2014). Work-related smartphone use and well-being in the evening: the role of autonomous and controlled motivation. *J. Pers. Psychol.* 13, 174. doi: 10.1027/1866-5888/a000114

Park, Y., and Fritz, C. (2015). Spousal recovery support, recovery experiences, and life satisfaction crossover among dual-earner couples. *J. Appl. Psychol.* 100, 557–566. doi: 10.1037/a0037894

Piazza, C. F. (2007). *Workplace Connectivity: A Hidden Ethical Dilemma.* California: Business and Organizational Ethics Partnership Markkula Center for Applied Ethics of Santa Clara University.

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., and Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *J. Appl. Psychol.* 88, 879–903. doi: 10.1037/0021-9010.88.5.879

Preacher, K. J., and Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behav. Res. Methods* 40, 879–891. doi: 10.3758/BRM.40.3.879

Ragsdale, J. M., and Hoover, C. S. (2016). Cell phones during nonwork time: a source of job demands and resources. *Comput. Human Behav.* 57, 54–60. doi: 10.1016/j.chb.2015.12.017

Reinke, K., and Ohly, S. (2021). Double-edged effects of work-related technology use after hours on employee well-being and recovery: the role of appraisal and its determinants. *Ger. J. Hum. Resour. Manag.* 35, 224–248. doi: 10.1177/2397002221995797

Ren, S., Hu, J., Tang, G., and Chadee, D. (2021). Digital connectivity for work after hours: Its curvilinear relationship with employee job performance. *Pers. Psychol.* doi: 10.1111/peps.12497

Richardson and Benbunan-Fich. (2011). Examining the antecedents of work connectivity behavior during non-work time. *Inf. Organizat.* 21, 142–160. doi: 10.1016/j.infoandorg.2011.06.002

Richardson, K. M., and Thompson, C. A. (2012). High tech tethers and work-family conflict: a conservation of resources approach. *Eng. Manag. Res.* 1, p29. doi: 10.5539/emr.v1n1p29

Schaufeli, W. B., and Taris, T. W. (2014). "A critical review of the job demands-resources model: Implications for improving work and health," in *Bridging occupational, organizational and public health: A transdisciplinary approach*. Berlin, Germany: Springer Science + Business Media. p. 43–68. doi: 10.1007/978-94-007-5640-3_4

Schlachter, S., McDowall, A., Cropley, M., and Inceoglu, I. (2018). Voluntary work-related technology use during non-work time: a narrative synthesis of empirical research and research agenda. *Int. J. Manag. Rev.* 20, 825–846. doi: 10.1111/ijmr.12165

Schulte-Braucks, J., Baethge, A., Dormann, C., and Vahle-Hinz, T. (2019). Get even and feel good? Moderating effects of justice sensitivity and counterproductive work behavior on the relationship between illegitimate tasks and self-esteem. *J. Occup. Health Psychol.* 24, 241. doi: 10.1037/ocp0000112

Schwarzer, R., Bäßler, J., Kwiatek, P., Schröder, K., and Zhang, J. X. (1997a). The assessment of optimistic self-beliefs: comparison of the German, Spanish, and Chinese versions of the general self-efficacy scale. *Appl. Psychol.* 46, 69–88. doi: 10.1111/j.1464-0597.1997.tb01096.x

Schwarzer, R., Born, A., Iwawaki, S., Lee, Y.-M., and et al. (1997b). The assessment of optimistic self-beliefs: comparison of the Chinese, Indonesian, Japanese, and Korean versions of the general self-efficacy scale. *Psychologiat.* 40, 1–13.

Seiger, C. P., and Wiese, B. S. (2009). Social support from work and family domains as an antecedent or moderator of work–family conflicts? *J. Vocat. Behav.* 75, 26–37. doi: 10.1016/j.jvb.2009.03.001

Siu, O., Lu, J., Brough, P., Lu, C., Bakker, A. B., Kalliath, T., et al. (2010). Role resources and work–family enrichment: the role of work engagement. *J. Vocat. Behav.* 77, 470–480. doi: 10.1016/j.jvb.2010.06.007

Sonnentag, S. (2018). The recovery paradox: portraying the complex interplay between job stressors, lack of recovery, and poor well-being. *Res. Organ. Behav.* 38, 169–185. doi: 10.1016/j.riob.2018.11.002

Tang, S., Siu, O., and Cheung, F. (2014). A study of work–family enrichment among Chinese employees: The mediating role between work support and job satisfaction. *Appl. Psychol.* 63, 130–150. doi: 10.1111/j.1464-0597.2012.00519.x

Tangney, J. P., Baumeister, R. F., and Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *J. Pers.* 72, 271–322. doi: 10.1111/j.0022-3506.2004.00263.x

ten Brummelhuis, L. L., and Bakker, A. B. (2012). A resource perspective on the work–home interface: the work–home resources model. *Am. Psycholog.* 67, 545–556. doi: 10.1037/a0027974

Ter Hoeven, C. L., van Zoonen, W., and Fonner, K. L. (2016). The practical paradox of technology: the influence of communication technology use on employee burnout and engagement. *Commun. Monogr.* 83, 239–263. doi: 10.1080/03637751.2015.1133920

Wan, M., Shaffer, M. A., Lau, T., and Cheung, E. (2019). The knife cuts on both sides: examining the relationship between cross-domain communication and work–family interface. *J. Occup. Organ. Psychol.* 92, 978–1019. doi: 10.1111/joop.12284

Watson, D., Wiese, D., Vaidya, J., and Tellegen, A. (1999). The two general activation systems of affect: structural findings, evolutionary considerations, and psychobiological evidence. *J. Pers. Soc. Psychol.* 820–838. doi: 10.1037/0022-3514.76.5.820

Wen, Z. L., and Ye, B. J. (2014). Analyses of mediating effects: the development of methods and models. *Adv. Cogn. Psychol.* 22, 731–745. doi: 10.3724/SP.J.1042.2014.00731

Xie, J., Ma, H., Zhou, Z. E., and Tang, H. (2018). Work-related use of information and communication technologies after hours (W_ICTs) and emotional exhaustion: a mediated moderation model. *Comput. Human Behav.* 79, 94–104. doi: 10.1016/j.chb.2017.10.023

Yang, Y., Yan, R., and Meng, Y. (2022). Can't disconnect even after-hours: how work connectivity behavior after-hours affects employees' thriving at work and family. *Front. Psychol.* 13, 865776. doi: 10.3389/fpsyg.2022.865776

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The medium-term perceived impact of work from home on life and work domains of knowledge workers during COVID-19 pandemic: A survey at the National Research Council of Italy

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Objective: The study aimed to investigate perceptions and determinants of the overall impact on life and work domains among a community of knowledge workers after 18 months of forced work from home due to the pandemic.

Methods: A cross-sectional study with a retrospective assessment was conducted early in 2022 at the National Research Council of Italy. Five single-item questions explored the perceived impact on life domain while a 7-item scale the impact on the work domain. Bivariate analyses and multivariate regressions were used to evaluate the associations between impacts and some key factors defined by 29 *ad hoc* closed questions.

Results: More than 95% of the 748 respondents reported a perceived change in at least one item of the life domain. For each of these items, although a large group of subjects has reported that working from home had no impact (from 27 to 55%), in the rest of the sample the positive evaluation (from 30 to 60%) clearly prevailed over the negative one. Overall, most of the subjects (64%) rated the impact on the work experience positively. Relationship with colleagues and participation in the work context were the items where the greatest number of negative rates was concentrated (27 and 25%, respectively). On the other hand, positive perceptions prevailed over both negative perceptions and lack of impact perceptions on the subjects of organizational flexibility and quality of work. The frequency of work-room sharing, home-work commute time and changes in sedentary lifestyle, have been identified as common explanatory factors of perceived impacts on both domains.

Conclusion: Overall, respondents reported positive rather than negative perceived impacts of forced work from home in both their lives and work. The obtained results suggest that policies to promote the physical and mental health

of employees, strengthen inclusion and maintain a sense of community are necessary to improve workers' health and prevent the effects of perceived isolation on research activities.

KEYWORDS

knowledge workers, life domain, work domain, perceived impact, forced work from home, smart work

1. Introduction

In Italy, the first official COVID-19 case locally acquired was detected on 20 February 2020 in Lombardy and the rapid growth of infections prompted the Italian government to impose a first localized lockdown as early as February 23, (1). From 23 February to 11 March, more restrictive measures were introduced throughout the national territory, including the suspension of non-essential production activities and home working as an exception to legal obligations, in the public and private sectors (Decrees Law of Italian Presidency of the Council of Ministers of 23 February and 11 March 2020). The succession of pandemic waves and the related restrictions have led to the extension of smart working by way of derogation until 31 October 2021. The generic term "work from home" (WFH) is therefore more suitable than the more common term "smart-work" to describe the situation. In fact, key features such as spatial and temporal flexibility and the opportunity to achieve work-life balance from organizational flexibility have been hampered by public health measures.

In Italy, the smart working was in its first steps shortly before the pandemic, both in terms of regulating laws and application. In 2019, 81.7% of Italian employees worked mainly in premises or offices made available by the employer. Out of an estimated 7 million workers with a profession that can be exercised remotely under ordinary conditions, only 0.8% of employees had a teleworking contract (strictly regulated since 1998) or a smart working contract, (2). Furthermore, only 3.6% of Italian public institutions had implemented the Directive n. 3 of 2017 introducing smart work, (3). This was in line with the European trend, given that 9% of employed people in the EU-27 worked from home at least once in 2019 and only 5.4% regularly, with high cross-country differences, (4). Hence, the forced transition to WFH was a new experience for virtually all workers, who often lacked the basic tools and training necessary to consider working from home as authentically smart (5).

Before the pandemic, the benefits and disadvantages of flexible forms of work both for employers and employees have been assessed considering primarily work-related outcomes rather than workers' health and wellbeing (6, 7). The pandemic and the consequent worldwide use of the WFH as a containment measure, have introduced a new and disruptive element in this investigation process. The focus has shifted more often to the assessment of the impact on workers' health and wellbeing, mainly in association with the first periods of lockdown (e.g., (8–12)). This approach, often based on preliminary or partial analyses of large data collections, contributed to the important purpose of providing recommendations and guidelines to both workers and employers to better and timely address the emergency situation (7, 13). A study with similar aims was also conducted at the Italian research institutions in the spring of 2020, (14). However, at that time the fears and expectations regarding the pandemic could have influenced the perceived impact of forced WFH on life and work domains (14, 15). Enough time has passed since the initial emergence phase and these confounding effects should have reduced their influence, so as to make possible a reflection on forced WFH that could also be valid for agile working after the pandemic.

With this in mind, we designed a survey among employees of the largest public research body in Italy, the National Research Council (Consiglio Nazionale delle Ricerche, CNR). Before the pandemic, the CNR had not yet introduced forms of agile work on a large scale. The aim of this study was 2-fold: (1) to explore the medium-term perception of the change in quality of life and work experience that occurred during the entire period of working from home from February 2020 to October 2021 compared to the previous situation and (2) to identify factors associated with this perception. The analyses conducted in this study can serve as a useful tool to identify critical areas in remote work environments. The study will provide managers of CNR and similar public institutions with valuable experiential knowledge, enabling them to formulate new practices or improve existing to support the health and wellbeing of smart-workers in the post-pandemic work organization.

2. Material and methods

2.1. Study population and work organization

CNR has over 8.500 employees (47% female) who belong to 88 Institutes distributed throughout Italy, including the islands. With the exclusion of managers, employees are classified into 4 professional profiles: researcher (51%), technologist (9%), administrative (10%) and technician (27%, source CNR).

The CNR, together with other public research bodies, is part of the Italian public administration. The organization of the work of researchers and technologists is then largely different from that of university professors, while the differences are minor for technical and administrative staff. Each employee is assigned to a workplace (an Institute) and face-to-face work was the ordinary way of working before the pandemic. The working hours of the technical and administrative staff are spread over 5 days and 36 h a week, with limited flexibility. Researchers and technologists can independently manage their working time, but still referring to 5 days and 36-h week. Moreover, these latter are not subject to any hierarchical supervision of their research activity. Researchers are not required to carry out teaching activities. Before the pandemic, only a small percentage of workers (around 5%) was recurring to teleworking (the number of possible positions was 2% until 2018, raised to 10% in 2019) or part-time (3.3%). At

the start of the WFH, therefore, the CNR had to face on a large scale the need to provide IT support such as computers, mobile devices or other equipment, software for secure remote access to institutional resources (databases, bibliographic resources), software for meetings and all the related training.

After the end of the emergency (end of 2021), regulated smart working was introduced for all employees, up to a maximum of 10 days a month.

2.2. Survey

We designed a cross-sectional study with a retrospective assessment among all CNR permanent workers hired before 1 June 2019. An online individual questionnaire was administered, through a dedicated server managed by a private company (eResult s.r.l.) which acted as an external processor pursuant to the Regulation (EU) 2016/679. Data was collected using the LimeSurvey open source tool (Community Edition version 3.26.1). The invitation was sent by e-mail to the mailing list including all the employees, with the authorization of the CNR General Manager. The survey started on 12 January 2022 and was closed on 9 March 2022. Up to 3 follow-up emails reminded employees to take the survey.

The survey was developed by researchers in the fields of public health, health and wellbeing, work-related stress and statistical methods. Subjects were asked to directly report their perception of the impact of WFH on their life domains through 5 questions "According to your perception, how the experience of working from home has affected your (Q1) lifestyle, eating habits and health status; (Q2) quantity/quality and disturbances of sleep, and daytime sleepiness; (Q3) psychological status; (Q4) quality of interpersonal relationships within the family; (Q5) quality of interpersonal relationships within the network of friends." A 5-point Likert-type scale from 1 (very negatively) to 5 (very positively) was used.

As far as changes in the work domain are concerned, subjects were asked to report their perception of the impact of WFH on their work experience by using a 7-item scale: "According to your perception, how the experience of working from home has affected your (i) ability to take initiatives and propose solutions in the workplace; (ii) participation in the working context; (iii) relationship with colleagues; (iv) relationship with superiors; (v) quality of work; (vi) organization of personal environment and workspace; (vii) management of the working time. The same 5-point Likert-type scale reported above was adopted.

A total of further 29 closed questions investigated socio-demographic data, individual factors [related to hobbies and pastimes, time spent on walking, on vigorous and moderate physical activity, (16)], family factors (e.g., size of the house, number of family members sharing the same accommodation, the number and age of children in the household and the presence inside and outside the home of people in need of assistance), and individual organizational factors related to the working space available in the home. Moreover, the survey included a few clinical questionnaires validated for the Italian population (MeDAS (17), PSQI (18), ESS (19), MEQr (20) and PHQ (21, 22). All of these questionnaires, except the MEQr, were asked to be filled in referring both before and during the WFH period.

The questionnaire was organized in four sections and took about 40 min to be completed. With the aim of encouraging a large participation, only section 1 investigating socio-demographics, individual and family factors together with the work domain was fully mandatory.

A first version of the questionnaire was pretested to verify the clarity of the terminology, the absence of ambiguity, the completeness of the alternative answers, the absence of inadequate or privacy-damaging questions, the possible presence of questions deemed unnecessary as well as the ease of use of the administration tool. Twenty subjects from the target group were involved on a voluntary basis and were asked to provide a detailed opinion on each *ad-hoc* question, the questionnaire as a whole and on the encountered technical difficulties. The questionnaire was then refined according to the results of the pilot phase.

This analysis focuses on one of the purposes of the general study, and other aspects will be discussed in dedicated articles.

2.3. Ethical issues

The study was conducted for research purposes only, in accordance with the 1964 Helsinki declaration and ethical approval was provided by the CNR Research Ethics and Integrity Committee, on October 28, 2021 (Ethical Clearance 0078918/2021). The invitation email was sent directly by the principal investigators of the study. The purpose of the research as well as all the precautions taken to ensure confidentiality and data protection have been clearly explained in the email. Participation was voluntary, without compensation. Only a few of the authors had access to the gathered data, including participation, that were not communicated to the CNR Administration. Informed consent was a prerequisite for participation. A conservation period of 3 years has been fixed for data verification during publication, after that data and their digital copies will be deleted. On the meanwhile, the filled questionnaires are kept in a locked file.

2.4. Statistical analysis

Descriptive statistics included crude and relative frequency data and location-scale summaries. Frequencies were aggregated in case of very low values. The frequency of the option "I don't know" for each item was computed (from 0.8 to 5.1%) and imputation based on the most frequent response was applied.

Bivariate analysis was based on both the chi-square test and the non-parametric Wilcoxon test and Kruskal-Wallis test (with the Bonferroni correction for multiple testing).

2.4.1. Life domain analysis

For inference purposes, the very negative (very positive) and negative (positive) responses to (Q1)–(Q3) were merged as the extreme frequencies were very low. A first cross-check on the reliability of the (merged) responses to (Q1)–(Q3) based on the total score variations of the clinical questionnaires (MeDAS for the

lifestyle, PSQI and ESS for sleep quality, PHQ for depressive status) was made by the Kruskal-Wallis test.

The total score variations of MeDAS, PSQI, ESS and PHQ were then classified in terms of worsening (decrease in MeDAS score, increase in PSQI, ESS, and PHQ scores), no change, and improvement (increase in MeDAS score, decrease in PSQI score, ESS and PHQ scores) and a further cross-check was made by the chi-square test on the 3 × 3 contingency tables of self-reported rates vs. measured variations. Consistency was established if the standardized residuals on the main diagonals of the significant contingency tables were all positive and significant with respect to the quantiles of a standard normal distribution.

Finally, a univariable multinomial regression analysis was carried out to select the variables to be included in a full multivariable multinominal logistic regression for the outcomes from Q1 to Q5. The no perceived impact group was considered as the reference group. Any variable whose univariable test had $p < 0.20$ was included in the multivariable model. Stepwise model selection by AIC was used to identify a final, parsimonious model and determine effect measures in the form of adjusted odds ratios (ORs) and 95% CIs of perceived positive/negative impact of WFH vs. no perceived impact on the life domain. The adjusted generalized variance-inflation factor [aGIF = GVIF^(1/(2×df))] with the conservative vif-threshold of 5 was computed to deal with multicollinearity and further refine the model up to the definition of the main effect model (23).

2.4.2. Work domain analysis

Cronbach's alpha and Guttman's λ_4 and λ_6 were computed on the imputed data. The average inter-item correlation was 0.54, very close to the median inter-item correlation of 0.53. The reliability coefficients were Cronbach's Alpha = 0.89 (95% CI: 0.87–0.90), λ_4 = 0.91 and λ_6 = 0.89. Leave-one-out item reliability ranged from 0.86 to 0.88 for both Cronbach's Alpha and λ_6. Homogeneity of the items was also confirmed by the ICLUST algorithm, indicating one only cluster of the seven items. The existence of one only latent trait underlying the data was investigated by a confirmatory factorial analysis with one factor. Although the calculated indices did not provide a univocal indication of one-dimensionality ($\chi^2 = 292.351$ with 14 df, root mean square residual of 0.082, 90% CI of the root mean square error of approximation from 0.147 to 0.180), high values of the Comparative Fit Index (0.985) and of the Tucker-Lewis Index (0.977) suggested a good model fit. The 7 scores were then averaged to form a composite measure of the impact of WFH on the work experience, the work experience measure (WEM), with higher values implying more positive impact. Computations were carried out using the R packages psych (24) and lavaan (25).

The univariate association of sociodemographic, individual, familiar and organizational factors with WEM was analyzed by Wilcoxon test and Kruskal-Wallis test. The WEM score was recoded into three classes of increasingly positive impact using the tertiles of its sample distribution. A proportional odds model for the categorical WEM response was used to determine adjusted odds ratios and 95% CIs. The AIC and the likelihood ratio test were used to identify the final model. The assumption of proportional odds was checked by the likelihood ratio test comparing the multinomial model to the main proportional odds model (26, 27).

The level of significance was fixed at 5%. Unless otherwise specified, significant association will be a short for statistically significant association. Statistical analysis was performed by R (28).

3. Results

3.1. Sample characteristics

A total of 748 participants (median age from 50 to 59 years) completed the questionnaire and, after validation of the data, all respondents have been included in the study. A total of 733 subjects (98%) completed all the four sections (742 section 2, 737 section 3, 740 section 4). The completion rates ranged from 78.4 to 79.6%. A flow chart about study participants is presented in Supplementary Figure 1.

Women represent 57.6% of respondents, including <1% who chose "Other" or "I prefer not to answer." General characteristics of the sample and the CNR population are reported in Table 1. According to gender and geographic distribution, women and employees living in the North of Italy were over-represented in the sample. Concerning age, there was a slight under-representation of both younger and older employees. A higher percentage of researcher and technologists with respect to the administrative and technical staff participated to the survey.

3.2. Main perceived changes in the life domain

More than 95% of the respondents reported a perceived change in at least one item of the life domain. Approximately 30% of respondents positively and 6.3% negatively assessed the impact on lifestyle, sleep quality and psychological status (Q1–Q3) simultaneously. The 17% of subjects responded positively to all aspects of the life domain, while 1.6% negatively.

Figure 1 shows the frequency distributions of self-reported perceptions of the impact on the life domain of WFH. For the sake of clearness, very negative and negative rates were combined due to low frequencies of the very negative responses (<1.5%). Aside from a large group of subjects reporting that WFH had no impact (27 to 55%), there was a clearly prevalent positive vote (30 to 60%). The lack of any impact was highly prevalent with respect to sleep disturbances quality (Q2, 48%) and relationships within the network of friends (Q5, 55%). The negative evaluation of the impact appears more frequently in relation to the psychological status (Q3, 20%) while the positive evaluation was given more frequently in relation to the quality of interpersonal relationships within the family (Q4, 60%) and lifestyle, eating habits and health status (Q1, 58%). In the latter two cases, the percentage of very positive responses was higher than the percentage of negative ones.

A strong consistency was found between self-reported perceived impacts and variations in MeDAS, PSQI, ESS and PHQ total scores. Significant association was found for each assessment (see Supplementary Table 1) and in each case all the relevant standardized residuals were positive and significant ($p < 0.001$). The increase in adherence to the Mediterranean diet as measured by the MeDAS score was significantly higher within the subjects rating positively on (Q1) than within the other two groups of

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TABLE 1 Participants' general characteristics. Comparison with the source population as of December 2021, 31st, excluding managers, where feasible. Source CNR.

	Source population n=8, 543	Sample n= 748	
	%	*N*	%
Gender			
Man	53.0	317	42.4
Woman	47.0	425	57.6
Age group (years)			
≤39	14.9	90	12.0
40–49	35.1	275	36.8
50–59	35.3	285	38.1
≥60	14.7	98	11.9
Living status			
Living alone	–	108	14.4
Married or living together, no children	–	358	47.9
Married or living together, with children	–	282	37.7
Italian macro-region			
North	24.0	244	32.6
Center	40.4	261	34.9
South	25.1	168	22.5
Islands	10.5	75	10.0
Education level			
Bachelor's degree or higher	–	583	82.1
Less than a bachelor's degree	–	134	17.9
Professional profile			
Administrative and technical staff	38.2	238	31.8
Researcher and technologist	61.8	510	68.2

subjects (adjusted $p < 0.0002$). As far as PSQI, ESS and PHQ are concerned, significant decreasing trends of the median variations along with increasingly positive perception of the impact of WFH on (Q2) and (Q3) were obtained, and all the pairwise comparisons were statistically significant (see Supplementary Figure 2).

3.3. Main perceived changes in the work domain

Overall, over 97% of respondents reported a perceived change in at least one job dimension: 12% rated the impact on all job-related items positively while <2% rated the experience as completely negative. Figure 2 shows in more detail how WFH was perceived to influence the work experience. For the sake of clearness, very negative and negative rates were combined due to low frequencies of the very negative responses (≤3%). The participation and relational aspects are those in which the perception of absence of impact prevailed (44–65%). But, at the same time, the items on the relationship with colleagues and the participation in the work context collected the greatest number of negative responses (27 and 25%, respectively). It stands out that negative perceptions (27%) prevailed over positive ones (24%) in the subject of relationships with colleagues. Positive perceptions prevailed over both negative perceptions and lack of impact perceptions in the subjects of flexibility (organization of personal workspace and management of the working time), taking initiatives and proposing solutions, and quality of work.

Most of the subjects (64%) obtained a value of the work experience measure >3 (mean = 3.362, s.d.= 0.746, median = 3.357, interquartile range from 2.86 to 3.86), and all the range of the 5-point Likert-type scale from 1 (very negative) to 5 (very positive) was used. Figure 3 shows that the three classes defined by the tertiles 3 and 3.71 of the WEM's empirical distribution can be reasonably interpreted as a negative (WEM < 3), moderately positive (3 ≤ WEM < 3.71) and very positive (WEM ≥ 3.71) perceived impact of WFH on the working experience.

3.4. Factors associated with the perceived changes in the life and work domains: bivariate analysis

Table 2 reports the bivariate associations of life domain (Q1-Q5) and work domain (WEM) with demographics, individual, family and organizational characteristics. As a small percentage of negative responses has been recorded in Q4 (see Figure 1), from Q4 and Q5 a new variable Q4/5 was defined considering only the worst response of the two, so as to better balance the groups in a conservative way. Since there were no significant differences in perceived impacts between men and women ($p > 0.12$), the analysis in this section was not stratified by gender. All the remaining factors had at least a weak association with at least one of the considered outcomes. The following factors showed a significant association with all the outcomes: frequency of sharing the work room at home ($p \leq 0.03$), time to get from home to work ($p \leq 0.006$), number of days of work in presence ($p \leq 0.02$), sedentary lifestyle ($p < 0.001$), vigorous physical activity ($p \leq 0.006$), moderate physical activity ($p \leq 0.006$), hobbies/pastimes ($p \leq 0.002$) and more weakly, size of the city of residence ($p \leq 0.10$).

All these common factors showed the same relationship with each of the self-reported outcomes. Subjects living in larger cities were more likely to rate negatively all the item of the life domain. Moreover, the WEM was significantly lower among subjects living in the largest cities (> 150000 habitants) with respect to those living in the smaller ones (< 50000 habitants). As far as home-to-work travel time is concerned, among the subjects with a longer time (> 15 minutes) the WEM value was significantly higher. Living away from the workplace made it more likely a positive judgment

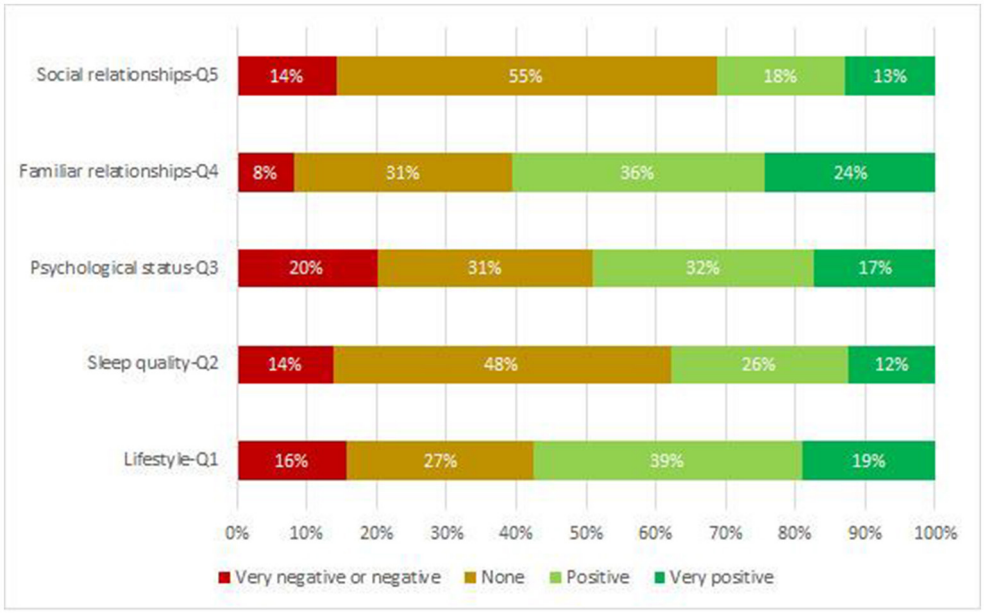

FIGURE 1
Perception of the impact of WFH on: Q1- lifestyle, eating habits and state of health; Q2-quantity/quality and disturbances of sleep, and daytime sleepiness; Q3-psychological status; Q4-quality of interpersonal relationships within the family; Q5-quality of interpersonal relationships within the network of friends. Very negative and negative rates have been combined due to very low frequencies of the very negative rate.

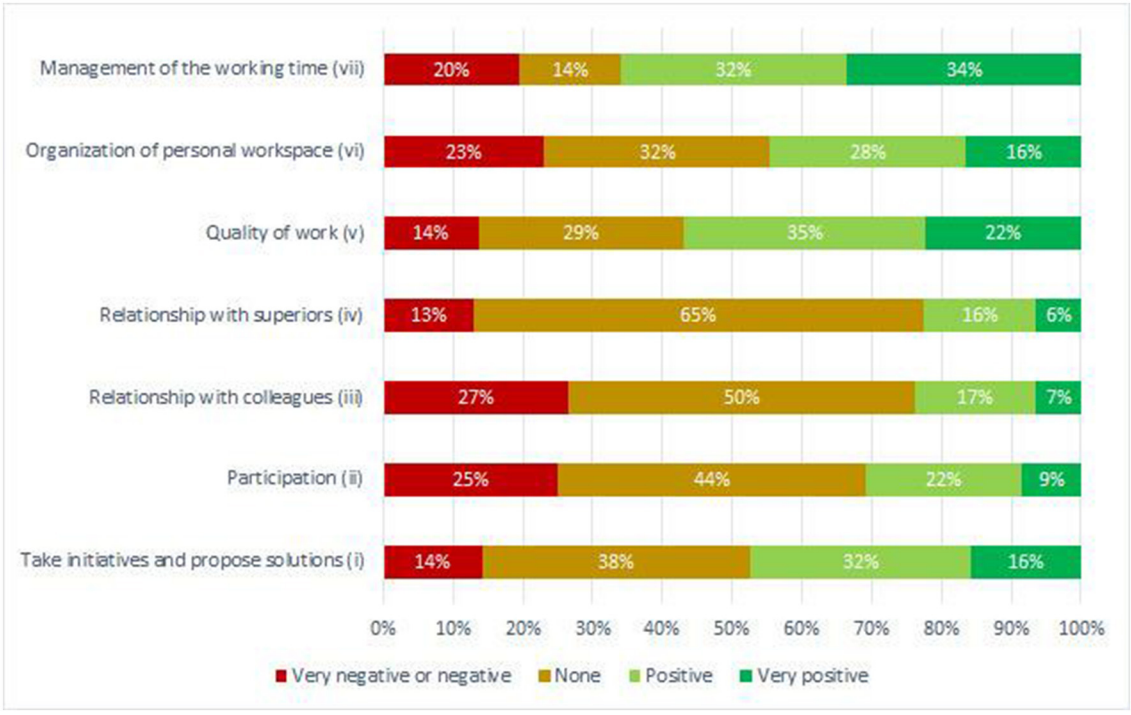

FIGURE 2
Perception of the impact of WFH on: (i) ability to take initiatives and propose solutions in the workplace; (ii) participation in the working context; (iii) relationship with colleagues; (iv) relationship with superiors; (v) quality of work; (vi) organization of personal environment and workspace; (vii) management of the working time. Very negative and negative rates have been combined due to very low frequencies (≤3%) of the very negative rate.

in every aspect of the life domain as well. In our sample, home-to-work travel time was strongly associated with the size of the city of residence ($p < 0.0001$), with a significant number of subjects living in small cities far from the workplace and, vice versa, with a significant number of individuals living in larger cities near the workplace. Subjects who were able to make fewer days of work in

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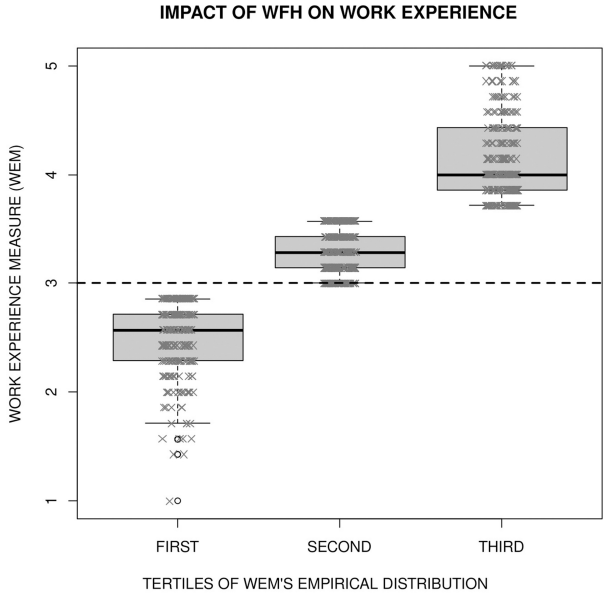

FIGURE 3
Empirical distribution of the WEM rating the impact of WFH on the work experience in the three classes defined by the tertiles 3 and 3.71.

presence were more likely to rate all the items of the life domain positively and to have a higher WEM value. Individuals who had to frequently share the work room with other family members were more likely to rate all the items of the life domain negatively and to have a WEM value significantly lower than those who never shared. A high frequency of sharing the work room at home was not associated with gender ($p = 0.19$).

Diverse habits with respect to individual factors such as pursuing hobbies or physical activity were also associated with a different perception of the impact of WFH on both the life and work domains. Respondents who had no hobbies or pastimes prior to the pandemic but started cultivating them in the WFH period were more likely to give a positive score to all but Q1 items of the life domain and scored higher on the WEM scale. Moreover, subjects who previously had hobbies or pastimes and then abandoned them were more likely to give a negative response. The median WEM value in this latter group was < 3, toward a negative assessment of WFH impact on the work experience, and was significantly lower than the median value in both the groups of subjects having any hobbies/pastimes during WFH (both new and pre-pandemic). The group that abandoned hobbies and pastimes, however, was the smallest group (8.2%) almost equivalent to that of individuals who started to be engaged in hobbies or pastimes (8.6%). In fact, 71% of respondents participated in hobbies or pastimes before the pandemic and also during the WFH period. In our sample, significantly fewer women than men were able to maintain previous hobbies and pastimes during the WFH period.

As far as moderate or vigorous physical activities are concerned, the main results were quite similar to each other and, in principle, similar to those obtained for hobbies and pastimes. In our sample, the 35% of respondents were regularly exercising in either moderate or vigorous physical activity during the WFH period. Among the subjects regularly practicing moderate physical activity (58%), more than half increased while about 15% decreased the time spent on training with respect to the pre-pandemic period. Stopping physical activity due to COVID19 restrictions significantly increased the odds of a negative impact of WFH on the life domain. WEM also was significantly lower among those who stopped exercising than among those who regularly were practicing. In turn, subjects who maintained the physical activity but decreased the time devoted to it, scored significantly lower than those who increased the time, even much. Analogously, decreased time spent walking was associated with the lowest WEM score, while an increased time with the highest score. All these results are consistent with the significant association between a reduction in sedentary life and a higher WEM value and, conversely, between an increase in sedentary lifestyle and a lower value. Subjects who have reduced their sedentary lifestyle were more likely to rate all the life domain items positively. On the contrary, those who much increased their sedentary lifestyle were more likely to rate the impact of WFH on their family and friendship relationships negatively, and their WEM value was significantly lower (median <3).

Women more than men significantly decreased their sedentary lifestyle ($p = 0.005$). Among the respondents who did not change their sedentary lifestyle, significantly more than expected maintained the habit of hobbies and pastimes and conversely, significantly less than expected abandoned this habit. Abandoning hobbies and pastimes was significantly more frequent among the subjects who increased their sedentary life style.

3.5. Factors associated with changes in the items of the life domain: multivariable regression analysis

To determine effect measures in the form of adjusted odds ratios, multivariable multinomial logistic regression models were applied to the three classes of Q1-Q3 and Q4/5 outcomes (see section 2.4.1). The no perceived impact group was considered as the reference group. The final multivariable models met the non-collinearity requirement based on the conservative vif threshold of 5. The summary of the obtained results is presented in Supplementary Table 2. When compared to subjects who reported a lack of impact of WFH, respondents who lived not very close to their office, those who reduced their sedentary lifestyle and those who started to be engaged in hobbies or pastimes during the WFH period, have been more likely to rate the impact of WFH on all the aspects of life and work domains positively.

When adjusting for other covariates, subjects who regularly exercised were more likely to rate the impact of WFH on their psychological status (Q3) positively. A trend in the same direction was obtained for the impact on lifestyle (Q1). Stopping to pursue hobbies or pastimes during the WFH period made 5 times more likely a rate of negative impact on Q3. However, compared to the group of respondents with no habit of hobbies and pastimes, those who stopped their activities were about 4 times more likely to rate the WFH's impact on Q3 positively.

TABLE 2 Bivariate association of socio-demographic, individual, familiar and individual organizational factors with life dimension and work dimension.

Factors	*p*-value in the bivariate analysis				
	Q1[a] (lifestyle and health)	Q2[a] (sleep quality)	Q3[a] (psychological status)	Q4/5[a] (family and friends)	WEM[b] (work experience)
Gender	0.80	0.37	0.12	0.33	0.95
Age group	<0.001[§]	<0.001[§]	0.14	0.02[§]	0.32
Living alone	0.27	0.009[§]	<0.001[§]	0.36	0.32
Children at home for >6 months	0.46	0.08	0.32	0.57	0.80
Macro-region of residence	0.13	0.19	0.20	0.01	0.11[§]
Size of the city of residence[c]	0.04[§]	0.01	0.02	0.10	0.008
Size of the house	0.11	0.13	0.04	0.05	0.03
Availability of a fixed workstation at home	0.75	0.08	0.15[§]	0.001[§]	<0.001[§]
Frequency of sharing the work room at home	0.03[§]	0.02[§]	0.01[§]	0.002[§]	0.002[§]
Assistance to cohabitants	0.17	0.02	0.04[§]	0.45	0.26
Assistance to non-cohabitants	0.63	0.41	0.11	0.09	0.02[§]
Time to get from home to work	<0.001[§]	<0.001[§]	0.001[§]	0.006[§]	<0.001[§]
Number of days of work in presence	0.001[§]	0.005	0.02	0.02	<0.001[§]
Graduation	0.13	0.13	0.02[§]	0.06	0.03
Professional profile	0.12	<0.001[§]	0.01	0.12[§]	0.002[§]
Sedentary lifestyle	<0.001[§]	<0.001[§]	<0.001[§]	<0.001[§]	<0.001[§]
Vigorous physical activity	<0.001[§]	<0.001	0.003	<0.001	0.006
Moderate physical activity	0.006[§]	0.01	0.02[§]	0.004	0.002
Habit of walking	0.02	0.23	0.44	0.62	0.62
Hobbies/pastimes	<0.001[§]	<0.001[§]	<0.001[§]	0.002[§]	0.002

[a] Univariable multinomial logistic regression.
[b] Either Nonparametric ANOVA or Wilcoxon test.
[c] The bold character highlights variables associated with all the indicated items based on $p \leq 0.10$.
[§] Variables included in the final multivariable model for each item.

Lack of changes in the sedentary lifestyle significantly prevented a positive rating on all the life domain dimensions. Furthermore, subjects who much increased their sedentary lifestyle were 2.6 times more at risk than subjects who decreased of negatively evaluating the impact on the quality of interpersonal relationships within the family and the network of friends.

Respondents who lived alone during the WFH were more likely to rate the impact on their quality/quantity of sleep and psychological status negatively. Considering also weak significances, a frequent sharing of the work room had a negative impact on all the aspects of the life and work domains (see also the following sub-section). Subjects who had the highest number of office days during WFH were less likely to rate the impact on lifestyle, eating habits and state of health positively.

3.6. Factors associated with changes in the perception of the work experience: multivariable regression analysis

In order to disentangle specific individual, familiar and individual organizational factors influencing the way work experience was perceived, Q1-Q5, as summary indices, were excluded from the logistic analysis of WEM determinants despite the significant association of all of them with WEM. In slightly more detail, a significantly increasing median value of WEM along the three classes of negative, none and positive impact of WFH on Q1-Q3 and Q4/5 was found ($p = 0$; all the pairwise comparisons were significant, $p = 0$).

According to the estimated proportional odds logistic model, the availability of a work room (OR: 1.56, 95%CI: 1.12-2.18), any time > 15 minute to go from home to the office (ORs: from 1.87 to 3.96), being a member of the administrative staff compared to being a researcher (OR: 2.32, 95%CI: 1.42-3.88), the need to assist a non-cohabitant person (OR: 1.36, 95%CI: 1.01-1.85) and living on one of the major Islands compared to live in the North of Italy (OR: 2.04, 95%CI: 1.23-3.41) were significantly associated with a more positive assessment of the WFH impact on work experience. On the other hand, subjects who increased their sedentary lifestyle (ORs from 0.26 to 0.40), those who had to often share the work room (OR: 0.56, 95%CI: 0.39-0.81) and those who had the highest number of office days during WFH (OR: 0.62, 95%CI: 0.40-0.93) were more likely to rate the impact of WFH negatively. See Supplementary Table 3 for a complete list of results, where the reported ORs refer to the

outcomes high WEM versus a lower WEM, according to the R's parameterization of the model.

4. Discussion

Albeit with some distinctions, working from home has been extended in the Italian Public Administration for about 18 months after the beginning of the pandemic. Unlike other studies that focused on lockdown periods, we investigated how the whole experience of working from home has affected a few aspects that define the perceived quality of life (29) such as lifestyle and health status, quality of sleep and psychological status, quality of interpersonal relationships within both the family and the network of friends, and work experience in a community of knowledge workers. Research workers in particular, as they act mainly on non-material processes, apply subjective judgment to tasks and have large autonomy in organizing their work, should ideally have been better prepared than other categories of workers to deal with remote work. Despite this, not even the world of academic research seems to derive full benefits from smart working. Although less studied than other work environments, negative effects such as isolation, loss of feedback and collegial reinforcement, inadequate communication, lack of opportunities for skills development and even lower work efficiency have been highlighted in this environment as well (30, 31).

In our sample, the results on the life domain were characterized by the prevalence of a self-reported positive or very positive perception. The CNR does not have family support tools other than economic subsidies, such as company kindergartens or after-school facilities, except at an isolated and local level. Tools to promote individual well-being are also lacking. Considering also the rigidity of work organization before the pandemic, the prolongation of WFH seems to have made up for the lack of adequate policies, as well as playing the primary role of preventing contagion. It is interesting to note how our result differs from the survey by Cellini and colleagues (14), which showed that in spring 2020, 80% of CNR respondents did not consider the possibility to work from home as one of the main positive aspects of the WFH. However, to the question "Do you think having worked in smart working in exceptional conditions may have influenced your perception of smart working?" 39% of that sample answered Probably yes and 27% Certainly yes. The comparison, albeit indirect, between the two studies supports our assumption that by analyzing perceptions over the medium term, we can obtain a different picture than what is reported by the literature referring to lockdown periods only. This is also testified by the fact that currently just under 75% of staff have signed an individual agile working agreement against 54% of CNR respondents from the study by Cellini and colleagues who in spring 2020 reported are planning to apply for an extension of the smart-working at the end of the pandemic (probably yes, 32%; surely yes, 22%).

Except for gender, nearly all socio-demographic, individual, family and organizational factors were associated in bivariate analyses with the reported perceptions. As highlighted in Section 3, a few factors were associated with all the items investigating the life domain, also after adjustment for other covariates. The four most important factors were: the time taken to get from home to work (socio-demographic factor), the frequency of sharing the work room at home (individual organizational factor), changes in hobbies/pastimes and in sedentary habits (individual factors).

Reducing travel times is a well-known beneficial effect of smart working because, in addition to reducing costs, it allows for better management of work and family time, and the availability of more free-time. In our sample, 50% of respondents took more than 30 minutes to go from home to work, 17.5% at least 60 minutes and only 30% used public transport or walked. In general, to translate these positive aspects for Italian employees into reality, it is necessary that there should be investments in technological infrastructures especially in the smaller urban centers (Italy ranked 24th in DESI 2019[1]). In (14) it has been show that about 1 in 5 CNR worker in the sample complained about too slow connections, overloading of lines which prevented continuity of work and inability to remotely access own pc in the office. Furthermore, it is necessary that the time not spent in commuting does not translate entirely into additional working time, negatively affecting the work-life balance. The fact that part of the saved time may go directly back to the employer in the form of additional work time has already been proved a benefit to employers (10, 14, 32).

Among the individual organizational factors, a high frequency of work room sharing is associated with a perceived negative impact on all life domain issues, especially psychological status. The frequency of sharing was significantly associated with the presence of children in the house for at least 6 months during the WFH period, and with the number of children. Italy indeed is one of the European countries where schools were closed for the longest time (33). As expected, subjects with two or more school-age children (then experiencing remote learning and/or daycare closures, 25.3%) had to share the work room more often than others.

The important role played by leisure time activities on health and quality of life (34, 35) even more during the pandemic (36–38) is well-known. In our survey, we took into account changes in habits and frequency of physical activity, hobbies/pastimes and sedentary lifestyle in general. In the sample, be engaged in hobbies/pastimes and exercising were two important explaining factors of the positive impact on the life domain of WFH. Increased sedentary lifestyle was reported during COVID-19 lockdowns (37) due to social distancing and isolation policies. In our sample, almost half of the subjects (48%) reported increased sedentary lifestyle over a much longer period. As for health, institutional training at CNR focuses mainly on job security and during the WFH period, on working from home safety standards. Our results suggest the need for continuous training policies that promote physical and mental health by countering the tendency to sedentary lifestyles (39, 40) even with specific programs, as recommended during COVID-19-related restrictions on physical activity (41).

Changes in sedentary lifestyle were significantly associated with gender: in our sample women more than men significantly decreased their sedentary lifestyle. However, significantly fewer women than men were able to maintain previous hobbies and pastimes during the WFH period. Moreover, less women than men were used to vigorous or moderate physical activity. It would seem,

1 https://digital-strategy.ec.europa.eu/en/library/digital-economy-and-society-index-desi-2019

therefore, that working from home has meant that women devoted more time to home and family. Although many studies have shown that the family burden increased for women who had to work from home, with lower satisfaction with their work-life balance (42, 43), in our sample we did not find gender differences in the reported perceptions. The frequency of sharing the work room, which can be considered one of the evident elements of the overlap between work and family life, was not associated with gender. Although not directly addressed in this study, this lack of gender difference could be due to the increased involvement of fathers in childcare and homeschooling activities highlighted by several studies conducted during the pandemic (42, 44). After the experience lived during the WFH period, the maintenance on a large scale of flexible forms of work without their use penalizing the worker's career could in general favor greater adherence to company policies for the reduction of family conflicts, commonly underused by fathers even in organizations where these policies are more developed (45). These elements must be taken into account in planning the CNR's gender equality strategy. As gender differences can be masked in our study by other considered factors, it is necessary to better understand whether the increased flexibility in work corresponds to a real improvement in gender equality. Women could indeed gain more, from both the flexibility in their work and a more balanced distribution of family burdens (46). This could have a positive impact on children's wellbeing as well (47).

Although to a slightly lesser extent, the impact on work experience was also positively assessed. Apart from the selection bias issue, the overall positive impact on both the domains could also be an effect of the longer perspective of the study, as any perceived deterioration in quality of life and work experience due to the exceptional initial conditions has probably already been overcome. Similarly, the difficulties associated with low digital skills should have been overcome by now. The 7 items of the work domain investigated some well-known critical issues of WFH such as coordination and cooperation among workers (i-ii), relationship with the management (iv), work isolation (iii) and flexibility (vi-vii) which can interact with the work-life balance (8). The fact that relationships with superior and colleagues and participation in the work context were the items with the highest frequency of negative responses testifies to isolation as an aspect of concern for smart working. This was already noted in the relevant literature (48) but cannot be taken for granted as it is strongly related to the attitude of the single individual (49). The aspect of isolation also emerged in the study of Cellini and colleagues, but was attributed to the exceptional conditions of the beginning of the pandemic. In our study this aspect is confirmed as of general relevance. In our sample, researchers significantly less often than others reported a positive impact on participation in the work context and on relationships with colleagues. The perceived isolation can negatively affect knowledge sharing, future cooperation and overall work engagement (50, 51). To prevent this, policies aimed at strengthening inclusion should be implemented. During the pandemic period, the CNR organized online training sessions on the general topics of COVID19, best protection practices and vaccination. This activity also had the objective of reducing isolation by sharing the expert knowledge of colleagues on a topic of general interest. Scheduling similar activities on a regular basis can help maintain a sense of community. In addition, specialized training should be conducted for leaders focusing on how to support the workforce, connect employees and strengthen a sense of belonging to the CNR community. Until now, in fact, training for executives has mainly focused on regulatory aspects. Work engagement is negatively correlated with burnout (52), a specific phenomenon of the occupational context traditionally studied among health care workers and helping professions (53) and widely studied also among teachers, professors and academic staff since the end of the last century (54, 55). Emotional exhaustion is generally considered the core of the burnout concept, as a response to excessive work demands that run out the worker's emotional resources (56). In our sample, the work experience measure was positively correlated with all the items of the life domain suggesting a higher risk of burnout for subjects rating negatively the impact of WFH on life or work domain. A frequent sharing of the work room is one of the factors negatively affecting the work experience as well as the life domain in our sample, and one of the factors affecting emotional exhaustion in academic staff (57). Other related factors intervened on the perception of work experience. In fact, the availability of a room in which to work permanently favored a positive evaluation, being associated in our sample with a less frequent sharing of the work space with other family members. When a worker has to choose between ordinary ways of working and a flexible form of work, these family and individual organizational aspects must not be underestimated.

This study has several limitations, first of all the self-reported nature of the perceived impact of WFH. Second, as in several studies conducted at the beginning of the pandemic (e.g., (58, 59)) or even later (60), we asked colleagues to report pre-pandemic habits and sensations and therefore our study is also subject to the problem of recall bias. Retrospective questionnaires can be useful when other studies are not feasible, but only a few studies have validated the use of retrospective questionnaires in specific situations, (e.g. (61, 62)). In this study, the fact that recall bias may have resulted in removing initial negative effects due to the health crisis more than working from home was, in reality, an intended effect. However, the long period of time that has passed since the outbreak may have affected the memory of previous everyday life and this may have led to the prevalence of the no-impact option. Third, the study population consisted of a self-selected group of employees. Subjects who positively perceived the period of forced WFH both personally and at work, may have had greater motivation to join the survey. This can partly explain the lower participation of technical and administrative staff, whose tasks can only partially be performed remotely. Fourth, the response rate was only around 10%. From the point of view of the employee-employer relationship, it cannot be excluded that the low participation in the survey was also caused by a perception of employer control despite all the guarantees that the research group tried to give in terms of privacy and purposes of the investigation, as described in section 2.3. Since the survey was launched immediately after the regulation of smart working by the CNR (BoD resolution no. 203 of 21 December 2021) we nevertheless believe that the compilation was not influenced by fears or expectations regarding impacts of the survey on organizational prospects. Fifth, we administered the survey in a

single research center, and therefore some results may depend on the specific organizational framework and therefore, cannot be generalized tout court to other knowledge worker communities nor, least of all, to other sectors of the Italian public administration. Sixth, the use of an *ad-hoc* questionnaire does not allow comparison with other similar studies. There is also the possibility that some factors of interest were not included in the survey. Income, for example, has not been included for privacy reasons, however age and occupational profile can be considered together as an approximation of earned income. Furthermore, given the length of the questionnaire, we were unable to investigate in detail the aspects related to physical activity and hobbies/pastimes. Finally, the impact on the life domain was explored with single item questions rather than by using a validated quality of life questionnaire. The work experience measure developed in this study may not have fully captured the most critical issues to work activity. The life and work dimension measures were highly associated each other, which may explain the presence of almost the same predictors across the models.

The study has also important strengths. First, almost all the respondents completed the questionnaire in full, making it possible to verify in depth the consistency of the answers given. Second, the ability to confirm the self-reported behaviors on lifestyle, sleep quality and psychological status with objective measures based on the clinical questionnaires.

The results presented are in line with expectations, with some exceptions such as lack of gender differences. However, the fact that some factors together drive all the reported perceptions lends some strength to our results. Therefore, this study can provide general suggestions for working contexts in which adequate company policies for work-life balance and support for smart workers' wellbeing are still lacking.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

SG and ES selected validated questionnaires. AB, CL, PM, GP, AR, and SS developed the section investigating socio-demographic, individual, and family and individual organizational factors. MT and SS followed the entire ethical approval process. RG and SS took care of the online implementation aspects of the survey. GP ideated the 7-item scale for work dimension. AB and GP carried out items analysis on the collected data and collaborated on the preliminary, general analyses. AB, CL, and AR conceived the work and interpreted data and inferential results. AB carried out statistical analyses and wrote the original draft of the manuscript. All authors conceived the survey, critically reviewed the manuscript, read and approved the final version of the manuscript.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpubh.2023.1151009/full#supplementary-material

References

1. Riccardo F, Ajelli M, Andrianou XD, Bella A, Del Manso M, Fabiani M, et al. Epidemiological characteristics of COVID-19 cases and estimates of the reproductive numbers 1 month into the epidemic, Italy. *Eur Commun Dis Bull.* (2020) 25:2. doi: 10.2807/1560-7917.ES.2020.25.49.2000790

2. ISTAT The organization of work in Italy: times, places, degree of autonomy. (2020) (in Italian). Press release. Available online at: https://www.istat.it/it/archivio/247627 (accessed January 24, 2023).

3. ISTAT Censimento permanente delle Istituzioni pubbliche: risultati preliminari. (2020). l'anno dello Smart Working; 2021 (in Italian). Press release. Available online at https://www.istat.it/it/archivio/264696 (accessed January 24, 2023).

4. Milasi, S, González-Vázquez, I, Fernández-Macías, E. Telework in the EU before and after the COVID-19: where we were, where we head to. European Union - JRC 120945. (2021). Available online at: https://joint-research-centre.ec.europa.eu/system/files/2021-06/jrc120945_policy_brief_-_covid_and_telework_final.pdf (accessed January 24, 2023).

5. Ripamonti SC, Galuppo L, Provasoli G, Benozzo A. Unmasking reflexivity in HR managers during the COVID-19 lockdown in Italy. *Front Psychol.* (2020) 11:588128. doi: 10.3389/fpsyg.2020.588128

6. Vyas L, Butakhieo N. The impact of working from home during COVID-19 on work and life domains: an exploratory study on Hong

Kong. *Policy Des. Pract.* (2021) 4:59–76. doi: 10.1080/25741292.2020.1863560

7. Beckel JLO, Fisher GG. Telework and worker health and well-being: a review and recommendations for research and practice. *Int J Environ Res Public Health*. (2022) 19:3879. doi: 10.3390/ijerph19073879

8. Bolisani E, Scarso E, Ipsen C, Kirchner K, Hansen JP. Working from home during COVID-19 pandemic: lessons learned and issues. Manag. *Mark Challenges Knowl Soc*. (2020) 15:458–76. doi: 10.2478/mmcks-2020-0027

9. McDowell CP, Herring MP, Lansing J, Brower C, Meyer J.D. Working from home and job loss due to the COVID-19 pandemic are associated with greater time in sedentary behaviors. *Front Public Heal.* (2020) 8:597619. doi: 10.3389/fpubh.2020.597619

10. Tejero LMS, Seva RR, Fadrilan-Camacho VFF. Factors associated with work-life balance and productivity before and during work from home. *J Occup Environ Med*. (2021) 63:1065–72. doi: 10.1097/JOM.0000000000002377

11. Weitzer J, Papantoniou K, Seidel S, Klösch G, Caniglia G, Laubichler M, et al. Working from home, quality of life, and perceived productivity during the first 50-day COVID-19 mitigation measures in Austria: a cross-sectional study. *Int Arch Occup Environ Health*. (2021) 94:1823–37. doi: 10.1007/s00420-021-01692-0

12. Ipsen C, Kirchner K, Hansen JP. Experiences of working from home in times of covid-19 International survey conducted the first months of the national lockdowns March-May 2020. *DTU Manag.* (2020) 3:1–32. doi: 10.11581/dtu:00000085

13. Birimoglu Okuyan C, Begen MA. Working from home during the COVID-19 pandemic, its effects on health, and recommendations: the pandemic and beyond. *Perspect Psychiatr Care*. (2022) 58:173–9. doi: 10.1111/ppc.12847

14. Cellini M, Pisacane L, Crescimbene M, Di Felice F. Exploring employee perceptions towards smart working during the COVID-19 pandemic: a comparative analysis of two Italian public research organizations. *Public Orga Rev*. (2021) 21:815–33. doi: 10.1007/s11115-021-00559-9

15. Biron M, Peretz H, Turgeman-Lupo K. Trait optimism and work from home adjustment in the COVID-19 pandemic: considering the mediating role of situational optimism and the moderating role of cultural optimism. *Sustainability*. (2020) 12:9773. doi: 10.3390/su12229773

16. Mannocci A, Masala D, Mei D, Tribuzio AM, Villari P, La Torre G. International physical activity questionnaire for adolescents (IPAQ A): reliability of an Italian version. *Minerva Pediatr.* (2021) 73:383–90. doi: 10.23736/S2724-5276.16.04727-7

17. García-Conesa MT, Philippou E, Pafilas C, Massaro M, Quarta S, Andrade V, et al. Exploring the validity of the 14-item mediterranean diet adherence screener (MEDAS): a cross-national study in seven European countries around the mediterranean region. *Nutrients*. (2020) 12:2960. doi: 10.3390/nu12102960

18. Curcio G, Tempesta D, Scarlata S, Marzano C, Moroni F, Rossini PM, et al. Validity of the Italian version of the pittsburgh sleep quality index (PSQI). *Neurol Sci Off J*. (2013) 34:511–9. doi: 10.1007/s10072-012-1085-y

19. Vignatelli L, Plazzi G, Barbato A, Ferini-Strambi L, Manni R, Pompei FD'Alessandro R, GINSEN (Gruppo Italiano narcolessia studio epidemiologico nazionale). Italian version of the Epworth sleepiness scale: external validity. *Ital J Neuro. Sci.* (2003) 23:6. doi: 10.1007/s100720300004

20. Natale V, Esposito MJ, Martoni M, Fabbri M. Validity of the reduced version of the morningness–Eveningness questionnaire. *Sleep Biol Rhythms*. (2006) 4:72–4. doi: 10.1111/j.1479-8425.2006.00192.x

21. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med*. (2001) 16:606–13. doi: 10.1046/j.1525-1497.2001.016009606.x

22. Mazzotti E, Fassone G, Picardi A, Sagoni E, Ramieri L, Lega I, et al. The Patient Health Questionnaire (PHQ) for the screening of psychiatric disorders: a validation study versus the Structured Clinical Interview for DSM-IV axis I (SCID-I). *J Psychopathol.* (2003) 3:19.

23. Johnston R, Jones K, Manley D. Confounding and collinearity in regression analysis: a cautionary tale and an alternative procedure, illustrated by studies of British voting behaviour. *Qual Quant*. (2018) 52:1957–76. doi: 10.1007/s11135-017-0584-6

24. Revelle W. Procedures for Psychological, Psychometric, and Personality Research 2022.

25. Rosseel Y. lavaan: An R package for structural equation modeling. *J Stat Softw*. (2012) 48:1–36. doi: 10.18637/jss.v048.i02

26. Hosmer DW, Lemeshow S. *Applied Logistic Regression, Second Edition*. New York, NY: John Wiley & Sons, Inc. (2000).

27. Agresti A. *An Introduction to Categorical Data Analysis, Second Edition*. Hoboken, NJ: John Wiley & Sons, Inc. (2006).

28. R Core Team. *R: A Language and Environment for Statistical Computing*. Vienna: R Foundation for Statistical Computing (2022). Available online at: https://www.R-project.org/

29. WHO Team Mental Health and Substance Use. *The World Health Organization Quality of Life (WHOQOL)*. Geneva: World Health Organization (2012) WHO/HIS/HSI Rev.2012.03.

30. Aczel B, Kovacs M, van der Lippe T, Szaszi B. Researchers working from home: Benefits and challenges. *PLoS ONE*. (2021) 16:e0249127. doi: 10.1371/journal.pone.0249127

31. Adisa TA, Antonacopoulou E, Beauregard TA, Dickmann M, Adekoya OD. Exploring the impact of COVID-19 on employees' boundary management and work–life balance. *Br J Manag*. (2022) 33:1694–709. doi: 10.1111/1467-8551.12643

32. Sousa-Uva M, Sousa-Uva A, e Sampayo MM. Telework during the COVID-19 epidemic in Portugal and determinants of job satisfaction: a cross-sectional study. *BMC Public Health*. (2021) 21:2217. doi: 10.1186/s12889-021-12295-2

33. UNESCO Global School Closures COVID-19. (2022). Available online at: https://data.humdata.org/dataset/global-school-closures-covid19 (accessed January 23, 2023).

34. Vuillemin A, Boini S, Bertrais S, Tessier S, Oppert JM, Hercberg S, et al. Leisure time physical activity and health-related quality of life. *Prev Med*. (2005) 41:562–9. doi: 10.1016/j.ypmed.2005.01.006

35. Cunningham CO' Sullivan R, Caserotti P, Tull MA. Consequences of physical inactivity in older adults: a systematic review of reviews and meta-analyses. Scand. *J Med Sci Sports*. (2020) 30:816–827. doi: 10.1111/sms.13616

36. Haider S, Smith L, Markovic L, Schuch FB, Sadarangani KP, Lopez Sanchez GF, et al. Associations between physical activity, sitting time, and time spent outdoors with mental health during the first COVID-19 lock down in Austria. *Int J Environ Res Public Health*. (2021) 3:8. doi: 10.3390/ijerph18179168

37. Karageorghis CI, Bird JM, Hutchinson JC, Hamer M, Delevoye-Turrell YN, Guérin SMR, et al. Physical activity and mental well-being under COVID-19 lockdown: a cross-sectional multination study. *BMC Public Health*. (2021). 21:988. doi: 10.1186/s12889-021-10931-5

38. Faulkner J, O'Brien WJ, McGrane B, Wadsworth D, Batten J, Askew CD, et al. Physical activity, mental health and wellbeing of adults during initial COVID-19 containment strategies: a multi-country cross-sectional analysis. *J Sci Med Sport*. (2021) 24:320–6. doi: 10.1016/j.jsams.2020.11.016

39. Ali AM, Kunugi H. COVID-19: a pandemic that threatens physical and mental health by promoting physical inactivity. *Sport Med Head Sci.* (2020) 2:221–3. doi: 10.1016/j.smhs.2020.11.006

40. Edwardson CL, Biddle SJH, Clarke-Cornwell A, Clemes S, Davies MJ, Dunstan DW, et al. A three arm cluster randomised controlled trial to test the effectiveness and cost-effectiveness of the SMART Work & Life intervention for reducing daily sitting time in office workers: study protocol. *BMC Public Health*. (2018) 18:1120. doi: 10.1186/s12889-018-6017-1

41. Dwyer MJ, Pasini M, De Dominicis S, Righi E. Physical activity: Benefits and challenges during the COVID-19 pandemic. *Scand J Med Sci Sports*. (2020) 30:1291–4. doi: 10.1111/sms.13710

42. Del Boca D, Oggero N, Profeta P, Rossi M. Women's and men's work, housework and childcare, before and during COVID-19. *Rev Econ Househ*. (2020) 18:1001–17. doi: 10.1007/s11150-020-09502-1

43. Graham M, Weale V, Lambert KA, Kinsman N, Stuckey R, Oakman J. Working at home: the impacts of COVID 19 on health, family-work-life conflict, gender, and parental responsibilities. *J Occup Environ Med*. (2021) 63:938–43. doi: 10.1097/JOM.0000000000002337

44. Margaria A. Fathers, Childcare and COVID-19. Fem. Leg. Stud. (2021) 29:133–44.

45. Yogman MW, Eppel AM. The role of fathers in child and family health BT. engaged fatherhood for men, families and gender equality: healthcare, social policy, and work perspectives. In; Grau Grau, M., las Heras Maestro, M., Riley Bowles, H., Eds, Springer International Publishing: Cham. (2022) pp. 15–30 ISBN 978-3-030-75645-1

46. Alon T, Doepke M, Olmstead-Rumsey J, Tertilt, M. *The Impact of COVID-19 on Gender Equality*. Working Paper 26947. National Bureau of Economic Research. (2020). doi: 10.3386/w26947

47. Mangiavacchi L, Piccoli L, Pieroni L. Fathers matter: Intrahousehold responsibilities and children's wellbeing during the COVID-19 lockdown in Italy. *Econ Hum Biol*. (2021) 42:101016. doi: 10.1016/j.ehb.2021.101016

48. de Vries H, Tummers L, Bekkers V. The benefits of teleworking in the public sector: reality or rhetoric? *Rev Public Pers Adm*. (2019) 39:570–93. doi: 10.1177/0734371X18760124

49. Kamerade D, Burchell B. Teleworking and participatory capital: is teleworking an isolating or a community-friendly form of work? *Eur Sociol Rev*. (2004) 20:345–61. doi: 10.1093/esr/jch030

50. Even A. The Evolution of Work: Best Practices for Avoiding Social and Organizational Isolation in Telework Employees Available online: https://ssrn.com/abstract=3543122 (accessed December 9, 2022).

51. Mosquera P, Soares ME, Alvadia T. Is teleworking at odds with social sustainability and organizational learning? *Learn Organ An Int J*. (2022) 29:527–47. doi: 10.1108/TLO-01-2022-0002

52. Schaufeli WB, Salanova M, González-romá V, Bakker AB. The measurement of engagement and burnout: a two sample confirmatory factor analytic approach. *J Happiness Stud*. (2002) 3:71–92. doi: 10.1023/A:1015630930326

53. Leo CG, Sabina S, Tumolo MR, Bodini A, Ponzini G, Sabato E, Mincarone,P. Burnout among healthcare workers in the COVID 19 era: a review of the existing literature. *Front Public Heal.* (2021) 9:1661. doi: 10.3389/fpubh.2021.750529

54. Lackritz JR. Exploring burnout among university faculty: Incidence, performance, and demographic issues. *Teach Teach Educ.* (2004) 20:713–29. doi: 10.1016/j.tate.2004.07.002

55. Padilla MA, Thompson JN. Burning out faculty at doctoral research universities. *Stress Heal J Int Soc Investig Stress.* (2016) 32:551–8. doi: 10.1002/smi.2661

56. Maslach C, Schaufeli WB, Leiter MP. Job burnout. *Annual Rev Psychol.* (2001) 52:397–422. doi: 10.1146/annurev.psych.52.1.397

57. Özgül N, Polat E. Burnout levels of academic staff: an investigation at a Public University in Turkey. *Sakarya University J Sci.* (2018) 22:1752–9. doi: 10.16984/saufenbilder.392656

58. Amerio A, Lugo A, Stival C, Fanucchi T, Gorini G, Pacifici R, et al. COVID-19 lockdown impact on mental health in a large representative sample of Italian adults. *J Affect Disord.* (2021) 292:398–404. doi: 10.1016/j.jad.2021.05.117

59. Skoda EM, Bäuerle A, Schweda A, Dörrie N, Musche V, Hetkamp M, et. al. Severely increased generalized anxiety, but not COVID-19-related fear in individuals with mental illnesses: a population based cross-sectional study in Germany. *Int J Soc Psychiatry.* (2021) 67:550–8. doi: 10.1177/00207640209 60773

60. Alfonsi V, Scarpelli S, Gorgoni M, Couyoumdjian A, Rosiello F, Sandroni C, et al. Healthcare workers after 2 years of COVID-19: the consequences of the pandemic on psychological health and sleep among nurses and physicians. *Int J Environ Res Public Health.* (2023) 20:1410. doi: 10.3390/ijerph20021410

61. Schmidt ME, Slanger T, Chang-Claude J, Wahrendorf J, Steindorf K. Evaluation of a short retrospective questionnaire for physical activity in women. *Eur J Epidemiol.* (2006) 21:575–85. doi: 10.1007/s10654-006-9042-9

62. Dietch JR, Sethi K, Slavish DC, Taylor DJ. Validity of two retrospective questionnaire versions of the consensus sleep diary: the whole week and split week self-assessment of sleep surveys. *Sleep Med.* (2019) 63:127–36. doi: 10.1016/j.sleep.2019.05.015

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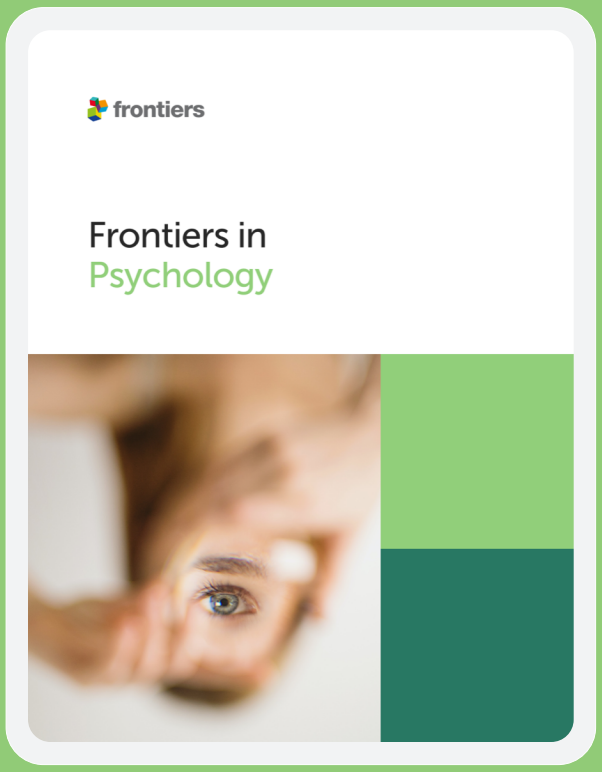

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