PRESENTEEISM IN THE AFTERMATH OF COVID-19: NEW TRENDS AND CONTRIBUTIONS REGARDING SICKNESS PRESENCE AT WORK

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PRESENTEEISM IN THE AFTERMATH OF COVID-19: NEW TRENDS AND CONTRIBUTIONS REGARDING SICKNESS PRESENCE AT WORK

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EDITORIAL
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Editorial: Presenteeism in the Aftermath of COVID-19: New Trends and Contributions Regarding Sickness Presence at Work

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Editorial on Research Topic

Presenteeism in the Aftermath of COVID-19: New Trends and Contributions Regarding Sickness Presence at Work

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As Guest Editors for the Frontiers in Psychology (Organizational Psychology section), we are delighted to announce that 13 thought-provoking articles were accepted for inclusion in this Special Issue entitled "Presenteeism in the Aftermath of COVID-19: New Trends and Contributions Regarding Sickness Presence at Work". We believe all these research projects make a substantial contribution to the literature and will set the tone for future avenues of research on sickness presenteeism.

In that sense, after a peer review that had the contribution of more than 30 high-quality international external reviewers with expertise in the domain of presenteeism, the 13 accepted papers highlight relevant contributions to the growing field of presenteeism. Undeniably, the COVID-19 pandemic experience has introduced conjunctural and structural challenges in society, economy, organizations, and individuals with determining impact in our life. More than ever, the act of going to work while ill (i.e., presenteeism) has been questioned and, consequently, the construct deserves to be studied in more detail. The therapeutical act of presenteeism (c.f., Karanika-Murray and Biron, 2020) will never be perceived the way as it was before. Going to work with a contagious disease like the flu, something normal in the past, and sometimes supported by companies with climates (Ferreira et al., 2019) and cultures (Simpson, 1998) of presenteeism, will not likely be observed or even reinforced in the same way. Therefore, this new pandemic imposed some challenges for employees and managers and, as usually, when unexpected events happen, science moves forward. These papers represent just a few examples of how something so relevant such as presenteeism found room for a new era of research. With this collection of articles, we seek to provide some guidance for both managers and employees by helping them to clarify the "should I stay or should I go to work while ill" *dilemma*.

In order to develop new research, more instruments are required in the field. This Special Issue includes two important psychometric contributions from Gelfand et al. and Shan et al. with new important scales to measure presenteeism. The scale developed by Shan et al. revealed good psychometric properties and is recommended for use in the health sector, particularly for nurses. Another validation study conducted by Gelfand et al. also provide a mixed methods design to provide psychometric evidence on the Valuation of Lost Productivity Questionnaire. This study was validated in a sample of 383 caregivers

and provides evidence of feasibility and preliminary validity considering several outcomes, suggesting that this measure can be used as a tool to study presenteeism and absenteeism.

Other studies (e.g., Biron et al.; Chen et al.; Chou and Mach; Shimura et al.) adopted robust repeated-measures longitudinal methodologies to support their main findings and contributions to the field. For example, a six-months two-wave panel design study conducted by Chen et al. adopted the conservation of resources theory to explain a three-way interaction effect of presenteeism and social support at work, and collegial support on innovative behavior. This study is one of the first to link presenteeism and innovative behavior. Biron et al. provided a thought-provoking contribution by studying the impact of teleworking while sick in a three-way research design. Among other contributions to the workplace climate and working conditions, the authors showed that higher initial perceptions of psychological safety climate tend to reduce subsequent psychological demands which later decreases the decision to work while ill. The paper from Chou and Mach contributes to understand the psychological mechanisms influencing presenteeism over distinct timeframes (one week and 1 year), each leading to different personal and work outcomes. Among other notable contributions, the three-wave panel design provide evidence that presenteeism is positively associated with increased effort, work engagement, and job performance after 1 week. Then, the two-wave panel survey of before and after the first pandemic wave from Shimura et al. provide empirical evidence of the implications for people and organizations of the new scenario of working from home, as previous results had been conflicting on workers' mental health and presenteeism. Complementarily, the theoretical and conceptual study developed by Ferreira et al. provided a conceptual model where a new construct of remote-work presenteeism behavior mediated the relationship between different post pandemic health conditions (e.g., allergies, back pain, depression, anxiety) and future cumulative negative consequences.

Ruhle and Schmoll adopted a different methodological approach considering a qualitative study with a sample of 505 participants to explore (virtual) sickness presenteeism in the context of the COVID-19 pandemic. The authors addressed important questions, such as how virtual work affects the decision to disclose presenteeism behavior. Moreover, the authors provided relevant propositions to understand how the connection between telecommuting and virtual sickness presenteeism during a pandemic impact individuals and organizations.

Other important work presented in the Special Issue includes cross-sectional studies with big samples in sectors as distinct as education (e.g., Ferreira et al.), vocational counselors (Zürcher et al.), and self-employees (Vinberg et al.). For example, the work developed by Ferreira et al. addresses the role of productivity loss due to presenteeism in the relationship between observing cyberbullying situations among students and teacher burnout. Main findings show that teacher's productivity loss due to presenteeism mediated the relationship between observing cyberbullying incidents among their students and their burnout levels. Specifically, the effect of productivity loss due to presenteeism explained the effect of observing cyberbullying incidents on teachers' burnout levels. These results also shed light on the importance of wellbeing in the context of hostile situations. In the XXI century, with the rise of self-employees worldwide, Vinberg et al. developed an interesting study that may pave further research on the relationship between self-employees and presenteeism. In particular, the authors revealed that high workloads and increased demands on business operations (e.g., new product development, risk of bankruptcy and increased working hours) tend to explain the variance associated to sickness presenteeism among self-employed people. Another cross-sectional study of vocational counselors working from home during pandemic times (Zürcher et al.) illustrates how those professionals perceive themselves more productive and satisfied with their job, compared to working on-site.

As most studies on sickness presenteeism address both health and educational sector employees (Zhou et al., 2016), two studies included in this Frontiers Special Issue focus specifically on the IT professionals. Particularly, the cross-sectional manuscript written by Yang et al. covers the relationship between the event strength of co-worker presenteeism and innovative behavior among 374 IT professionals. The results showed the timing of co-worker presenteeism events moderated the relationship between the criticality of co-worker presenteeism events and promotion focus. Studying the same sector but including an experimental vignette study, Lohaus and Habermann focuses on the intricate decision-making process for or against working while ill. Drawing on expectancy theory, the authors found that the calculated and predicted decisions significantly matched the individuals' intentionally chosen decisions. The findings also provide insightful practical ideas for companies when managing interventions on attendance behavior.

Finally, these 13 papers included in this Frontiers in Psychology (Section: Organizational Psychology) Special Issue use robust and provocative theoretical approaches to provide evidence about the research developed around the construct of presenteeism in the specific context of the COVID-19 pandemic context. Most of these important contributions aim to reduce negative outcomes and to promote healthy organizational environments at different levels, so that companies, teams, and individuals could be more productive even in times of crisis. Moreover, their findings come from different theoretical backgrounds and cultural contexts, and the adoption of mixed and somewhat robust methodologies offer several clues for developing future studies and to implement multilevel interventions, particularly in the post-pandemic era.

We hope the scientific community can benefit from the theoretical and practical contributions derived from these contributions. Additionally, we expect that the main findings derived from these papers may attract the attention of the academicians in the field of presenteeism and other related-constructs (such as absenteeism)

to inspire further research considering the aftermath of COVID-19.

AUTHOR CONTRIBUTIONS

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

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ORIGINAL RESEARCH
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The Compensatory Protective Effects of Social Support at Work in Presenteeism During the Coronavirus Disease Pandemic

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The present study investigated the lasting effects of sickness presenteeism on well-being and innovative job performance in the demanding Chinese work context compounded with the precarities of the post-pandemic business environment. Adopting the conservation of resources (COR) theory perspective, especially its proposition of compensation of resources, we incorporated social resources at work (supervisory support and collegial support) as joint moderators in the presenteeism–outcomes relationship. We employed a panel design in which all variables were measured twice with 6 months in between. Data were obtained from 323 Chinese employees working in diverse industries in Taiwan. We found that after controlling for the baseline level of well-being, presenteeism did not have a lasting effect on employees' exhaustion. However, presenteeism did have a negative lasting effect on employees' innovative behavior 6 months later. Moreover, we found a significant three-way interaction of presenteeism, supervisory support, and collegial support on employees' innovative job performance, after controlling for the baseline level of performance. Specifically, when working under illness, employees displayed the best innovative performance with high levels of both supervisory and collegial support, the worst performance with both support being low, and the intermediate when any one of the support being high. This can be taken as the preliminary evidence to support the COR proposition of resource caravans, showing that supervisory support and collegial support compensated for each other as critical resources in alleviating the impact of working under sickness on employees' innovative performance. Theoretical implications of the findings are discussed, taking into account the macro-cultural context of the East Asian Confucian societies. We also reflected on the managerial implications of the lasting damages of sickness presenteeism and benefits of mobilizing social resources on employees' well-being and performance.

Keywords: sickness presenteeism, supervisory support, collegial support, innovative behavior, well-being, conservation of resource, cultural values

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INTRODUCTION

Year 2020 has witnessed the unprecedented triple pandemic rampaging the entire world, e.g., the health crisis of coronavirus disease 2019 (COVID-19), the economic recession caused by restrictions and lockdowns, and the social revolution triggered by amplified social injustices when the going gets tough. In the post-pandemic era, the consolidating mainstream values of well-being, equity, diversity, and inclusion call for concerted efforts from academics in the creation, communication, and application of scientific knowledge. In the post-pandemic business world, repeated lockdowns and the continuing "working from home" practice have blurred the demarcation between the work and home space, causing more excessive engagement in work activities (Cigna, 2020). While western countries are still fighting to control the upsurge of pandemic, Taiwan acted swiftly at the very beginning of the pandemic (early 2020) by sealing its borders, banning large gatherings, and mandating wearing of face masks. Consequently, Taiwan has succeeded in holding the death toll in single digit (Taiwan Centers for Disease Control, 2020) and largely maintained a "normal life" with no substantial restrictions on economic and social activities. Nonetheless, heavily reliant on export and deeply embedded in the global value chains, business outlook in Taiwan is uncertain; thus, fear for prolonged economic recession and resultant job insecurity are heightened among employees (Lee et al., 2017). Facing the precarities of the post-pandemic business environment, employees are compelled to commit more excessive work behaviors to protect job prospects and to catch up with increasing work demands. One common form of the excessive availability for work is sickness presenteeism (SP) (Cooper and Lu, 2019). SP (or presenteeism, hereafter used interchangeably) is the phenomenon of people who despite ill health that should prompt rest and absence from work are still turning up to their jobs (Aronsson et al., 2000). In the organizational research field, researchers now agreed that SP denotes to the *behavior* of going to work when sick (Johns, 2012). Responding to the post-pandemic challenges and the job insecurity pressures, we expect that the presenteeism behavior will become more prevalent in the West and the East, and its noxious effects will compound the generic post-pandemic challenges on individual well-being and organizational effectiveness. Thus, the present study aimed to clarify the *lasting* negative consequences of the behavior on the individual's well-being and job performance, which in aggregate contributes to organizational effectiveness. Further, contributing to the inclusiveness of scientific contents, our study targeted the under-represented Asian populations in the extant presenteeism literature. This is because in the East Asian societies, presenteeism is more prevalent and poses graver impacts on the employees. Lu et al. (2013a) found that Taiwanese employees reported significantly higher rates of presenteeism, and consequently suffered greater exhaustion and lower job satisfaction, compared with their British counterparts.

Whether employees force themselves to attend work out of fear for losing their jobs, succumbing to mounting work demands following the pandemic and recession, or honoring the cultural morals of "hard work," presenteeism can lead to exhaustion (Demerouti et al., 2009) and may be even costlier than absenteeism to employers due to reduced productivity (Hemp, 2004; Burton et al., 2006). Mobilizing valuable resources to alleviate the negative effects of working under illness is of paramount importance in the current changing work environment. In the conservation of resources (COR) theory, resources are broadly defined as those entities that either are centrally valued in their own right or act as a means to obtain centrally valued ends (Hobfoll, 2002, p. 307). Resources thus include a wide range of tangible and intangible things (e.g., physical, material, cognitive, motivational, social, and emotional) that all are inherently valuable. Social support is one of the most valuable resources in coping with work stress and can replace or reinforce other absent resources (Hobfoll, 1989). Stemming from the motivational facet of COR theory, individuals strive to obtain and retain multiple resources from different social networks to prepare themselves for potential future losses. We thus set out to explore how different sources of social support at work act as a resource caravan to alter the impact of SP on employees' strain and job performance. No study to our knowledge has investigated simultaneously the protective effects of collegial support and supervisory support in the SP situation, to empirically test the COR proposition of resource caravan, specifically resource compensation. This is an important oversight because employees have vertical (i.e., supervisory support) and horizontal relationships (i.e., collegial support) at work and thus have the option of mobilizing and investing different resources to cope with situational demands.

To sum, the thrust of this study is 2-fold. First, we aimed to clarify the lasting effects of working under illness on employees' well-being and innovative performance. Such claims have often been made in the extant literature without rigorous scientific evidence to endorse, largely due to the scarcity of longitudinal studies (Johns, 2012; Karanika-Murray and Cooper, 2018; Lohaus and Habermann, 2019). In particular, employees' innovative performance has rarely been investigated as a work outcome in the presenteeism research (Fan, 2018). Second, we aimed to examine the joint effects of supervisory support and collegial support in the presenteeism–work outcomes relationship. Applying the resource caravan proposition of COR theory, we focused on the compensatory effects of the dual social support on alleviating the impact of presenteeism on employees' well-being and innovative performance. By investigating the medium-term effects of sickness presenteeism on both exhaustion and innovative performance and, at the same time, by analyzing the compound effects of two kinds of social support, we believe that this study moves a step forward in the existing literature on presenteeism. The topic under consideration is of the utmost importance for organizations too. Furthermore, conducting our research in a Chinese society (Taiwan), the present study will enrich our cultural understanding of the presenteeism behavior in the cultural context of hard working and perseverance. **Figure 1** is the graphical representation of our research model.

HYPOTHESIS DEVELOPMENT

COR theory proposed that stress occurs (a) when the central or key resources are threaten with loss; (b) when the central or treasured resources are lost; or (c) when there is a failure

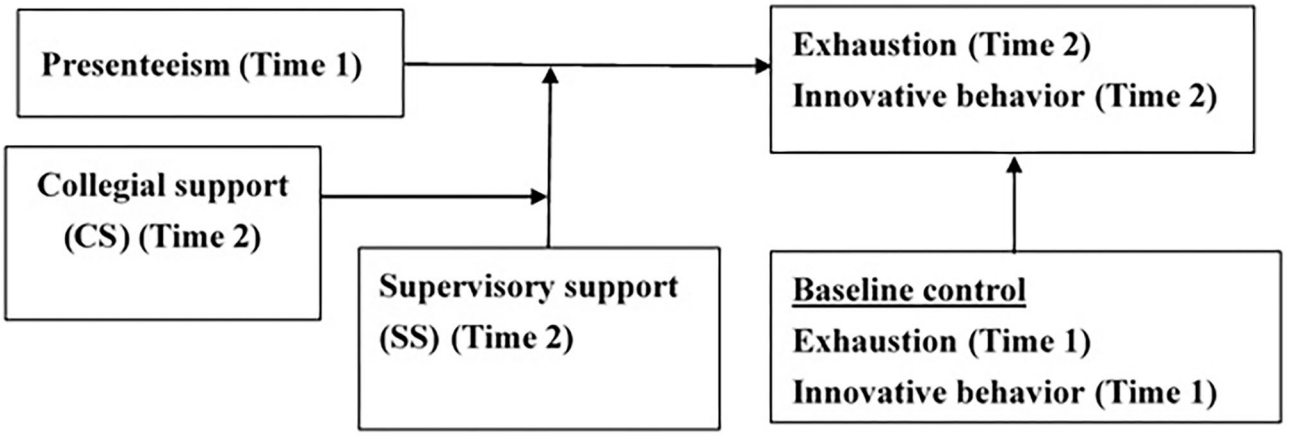

FIGURE 1 | The research model.

to gain centrally or key resources following significant efforts. In case of resources lost, an individual strives to obtain, retain, foster, and protect core value and resources to fend against work demands or life stress (Hobfoll et al., 2018). Hobfoll (1989) proposed the concept of resource caravans arguing that resources "run in packs" (Hobfoll, 2012), even though they may have distinct theoretical origins. However, the nature of resource caravans in COR theory is still not well-developed (Hobfoll, 2002, 2011), and we know little about *how* resources combine or compensate one another to meet personal goals, or *when* such resource combinations or compensations take effect. Acquiring new resources will give individuals a sense that they are capable of meeting stressful challenges, and in turn, they will become more confident in deploying resources and investing in gaining more resources (Hobfoll et al., 2018). Building on the idea of resource caravans, we focused on supervisory support as a salient work feature for the Chinese employees to examine a specific form of resource caravan; namely, when a key social resource is low or absent (lack of support from the supervisor), a second resource (support from co-workers) may substitute for it and perform the compensatory role in coping.

The Lasting Damages of Presenteeism: Working Under Illness as a Depletion in Resource

Cooper (1996) originally defined presenteeism as being physically present but functionally absent, implying a reduction in individual productivity while working under suboptimal health conditions. Subsequent organizational researchers too mostly approach the presenteeism behavior as a decision option (against absenteeism) when employees are faced with "to go or not to go" choices precipitated by an ill-health event (Johns, 2010; Halbesleben et al., 2014; Miraglia and Johns, 2016; Gosselin, 2018). Not surprisingly, the bulk of the presenteeism research has focused on antecedents and correlates of the behavior, while empirical research on the outcomes of presenteeism is still sparse (see reviews by Miraglia and Johns, 2016; Karanika-Murray and Cooper, 2018; Lohaus and Habermann, 2019). Another lacuna of the organizational research on presenteeism is the scarcity of longitudinal studies demonstrating lasting effects (positive or negative) on employees' well-being and job performance (see reviews by Miraglia and Johns, 2016; Cooper and Lu, 2019; Lohaus and Habermann, 2019). While cross-sectional studies have found that presenteeism is negatively associated with the concurrent employees' health, work attitude, job performance, and innovation (Lu et al., 2013b; Conner and Silvia, 2015; Miraglia and Johns, 2016), we have little insight into the lasting effects of presenteeism on individuals (Demerouti et al., 2009; Lu et al., 2013b, 2014; Skagen and Collins, 2016) and the processes that change the outcomes of the behavior. More research on the dynamic relationship between presenteeism and employees' work outcomes, especially the trajectory over time, is thus needed to distinguish the assumed negative outcomes of the behavior (*bad presenteeism*) (Cooper, 1996; Hemp, 2004; Demerouti et al., 2009; Lu et al., 2013b) from the purported positive outcomes (*good presenteeism*) (Ashby and Mahdon, 2010; Miraglia and Johns, 2016).

Viewed from the COR perspective, sickness presenteeism represents a scenario for resource depletion (Ferreira, 2018). COR theory relies centrally on the differential effects of objective and cultural contexts on determining the stress process (Hobfoll, 2001). Specifically, individuals strive to obtain, retain, foster, and protect their resources not only in case of resource lost but also in normal time to prepare themselves to deal with potential future losses (Hobfoll et al., 2018). For employees, stress can come from working under illness. By precluding the possibility of recovery, excessive work behaviors including long hours and working through illness induce sustained negative activation, soliciting the constant "feelings of tension and distress" (Hahn et al., 2012), which causes detrimental effects on the psychobiological system (Ursin and Eriksen, 2004). Research has found that working long hours (Lu and Chou, 2020) and inability to detach after work (Sonnentag and Fritz, 2015) trigger continuous resource loss leading to lasting strain. Few longitudinal studies have also found that working while ill predicted future poor self-rated

general health, but the findings were less clear when specific measures of physical health were used (Skagen and Collins, 2016). Studies with Chinese workers produced mixed results, as presenteeism was associated with well-being measures in a 2-month (Lu et al., 2013b) but not 3-month (Lu et al., 2014) follow-up. It seems that presenteeism may constitute a hazard for the individual's quality of life, but not necessarily precipitate specific health problems. Also, clear research on the incubating time frame is need. We thus focused on a subjective indicator of well-being, exhaustion, as the likely outcome of the sustained negative activation of working under sickness. Demerouti et al. (2009) showed a positive reciprocal relationship between presenteeism and exhaustion for Dutch nurses, indicating that working while sick increases exhaustion that, in turn, raises the likelihood of presenteeism. Lu et al. (2013b) also found evidence of a reciprocal relationship between presenteeism and exhaustion in a heterogeneous sample of Chinese employees, using a different measure of presenteeism. As a generic stress theory, exhaustion as an indicator of strains is one of the most studied outcome variables in the COR literature (Hobfoll, 2011). We thus hypothesized:

H1a: Presenteeism at T1 will be positively related to employees' exhaustion at T2.

Although presenteeism is viewed as a precursor to decreased performance, thus productivity loss for organizations (Hemp, 2004; Burton et al., 2006; Halbesleben et al., 2014), there is surprisingly little empirical research on the relationship between the two. The available but also inconclusive research has highlighted a weak or non-existent relationship between presenteeism and job performance (Munir et al., 2005; Johns, 2011; Lu et al., 2013b, 2014). Even rarely examined is the employees' performance on innovation, separate from in-role task performance. Employees' innovative behavior involves both the generation of new ideas and the subsequent stages of internal promotion and implementation of such ideas (Anderson et al., 2014; De Clercq et al., 2016). Innovative behavior of employees is an important aspect of work performance, which is intricately linked to organizational innovation and competitiveness (Amabile et al., 1996; Yuan and Woodman, 2010). COR theory purports that individuals strive to obtain, retain, foster, and protect their resources in stress and coping (Hobfoll et al., 2018). However, working under illness hampers the recovery of vital physical and psychological resources. Presenteeism is found to be associated with certain psycho-affective states, such as low energy, negative affect (Gustafsson and Marklund, 2011), depression, and anxiety (Lu et al., 2013b; Conway et al., 2014), which are harmful to employees' creativity. Empirical research has further demonstrated that presenteeism hampered cognitive functioning and negatively affected brainstorming, concentration, and both the quantity and quality of work produced (Hansen and Andersen, 2008). In a rare empirical examination of the direct relationship between presenteeism and employees' innovative behavior, Fan and Lu (2020) found a U-shaped trajectory moderated by the psychological drives to commit the presenteeism behavior. Specifically, they noted that the positive drives (e.g., for professionalism and career promotion) enhanced the U-shape relationship (making it steeper), while the negative drives (e.g., for fear of loss and social criticism) weakened the U-shape relationship (making it flatter). Viewed from the COR perspective, working while unwell requires more effort to maintain the expected level of performance, as employees need to increase concentration and cognitive labor to overcome the distracting symptoms of illness. In such a resource hemorrhage circumstance, employees may have to conserve valuable energy and brain power to maintain performance on in-role tasks, leaving little resources for the "above and beyond" innovative performance. Thus, we hypothesized:

H1b: Presenteeism at T1 will be negatively related to employees' innovative behavior at T2.

The Resource Compensation Mechanism: Interactive Effects of Social Support at Work

According to COR theory, an individual would try to gain other resources to protect against resources loss and strain (Hobfoll et al., 2018). *Guanxi*, Chinese for "relationships," which equals to the concept of human capital or social support, is an invisible but critical resource in the collectivistic cultural context and could buffer or exacerbate the relationship between presenteeism and work outcomes (Lu et al., 2013a; Glazer and Amren, 2018). Workplace social support is not a monolithic construct but rather emanates from multiple sources, including supervisors, coworkers, and employing organization (Halbesleben, 2006; Kossek et al., 2011), and may have different effects on individual behavior and outcomes. Although past studies have linked supervisory support to positive work behavior (Gilbreath and Benson, 2004; Rad and Yarmohammadian, 2006) and documented the beneficial effect of collegial support in employee retention in the organizational literature, little research has explored how different kinds of social relationships might interactively affect employees' job performance and strains. In other words, we know little about *how* resources combine to meet personal goals, or *when* resource combinations take effect (Hobfoll, 2002, 2011). This is what the concept of "resource caravans" in the COR aims to explain (Hobfoll, 1989, 2012). Furthermore, while past studies focused exclusively on personal motivational factors, innovative behavior is the joint outcomes between the individual and the situation (Amabile et al., 1996). We thus include social resources at work as situational moderators in the presenteeism–innovation relationship.

Resources "run in packs" and interact with one another is arguably the least developed and rarely tested theoretical proposition in the COR framework. Building on the idea of resource caravans, we focused on social support at work for employees working under illness to examine a specific form of resource caravan; namely, when a key social resource is low or absent (e.g., lack of support from the supervisor), a second resource (e.g., support from colleagues) may substitute for it and perform the compensatory role in coping. Brunner et al. (2019) found that job and personal resources can buffer the negative effects of job stressors (time pressure, performance constraints, work overload, or task uncertainty) on health-related

productivity losses caused by presenteeism and absenteeism. Furthermore, they also found the compensatory effect of job resources for employees with low personal resources facing high job stressors.

Applying the resource caravan perspective, employees have to work and communicate with supervisors and colleagues in the workplace; thus, the support from supervisors and coworkers could be concurrently mobilized and jointly affected. However, the *interactive* effects of these two most salient forms of social support on the stressor–outcomes relationships are rarely discussed and empirically examined. The extensive literature in stress and coping has shown that social support gained from different sources can have different implications for coping. For example, when coping with demands of the work and family dual role, supervisory support was more useful in reducing the work and family conflict (negative spillover), while spousal support was more instrumental in creating the work and family enrichment (positive spillover) (Lu and Chang, 2014).

In the work context, supervisory support as an indicator of good leader–member relationship is crucial for career advancement and good quality of work life, such as satisfaction and engagement (Karimi and Nouri, 2009; Karimi et al., 2011). However, coworker friendship as an indicator of social embeddedness and comradeship is also vital for workplace social integration and well-being (Chiaburu and Harrison, 2008; Poon, 2011; Zaitouni and Ouakouak, 2018). Research has found that when working under illness, supervisory support buffered the negative impact of presenteeism on employees' exhaustion (Lu et al., 2013a). This is because supervisors can decide how to allocate resources in the workplace. Thus, when presenteeism was triggered by organizational constraints such as heavy workload or shortage of manpower, the instrumental value of supervisory support would be realized if workload could be adjusted or supplementary manpower assigned. However, in the present environment of post-pandemic recession and cut down, removing the organizational constraints or granting work flexibility is often not the managers' discretion. At such testing times, the value of support from other sources for instance, those close at work, would be amplified for coping with the noxious effects of demanding work. This dynamism of resource mobilization from different sources at work is unraveled in a qualitative study with nurses interviewed in focus groups (Dew et al., 2005). Some nurses used a metaphor of "sanctuary." When they had to work while ill, they were caringly helped by their "family." Consequently, they were able to work through mild sickness and eventually felt better or ignored discomfort altogether. It is likely that when the individual is caught in a continuous resource depletion situation (e.g., working through illness), in addition to (or lacking) supervisory support, mobilizing support from the colleagues and gain help or comfort from whom close at work may compensate for the loss or absence of other resources.

This is in line with the notion of "resource caravan" in the COR: resources exist in groups and clusters within the ecological realm, and those with greater resources are less vulnerable to resource loss and more capable of resource gain (Hobfoll et al., 2018). It thus seems that when social resources are mobilized from all corners and sources at work, employees may be better equipped to cope with the noxious effects of presenteeism, thus containing its impacts on individual well-being and performance. More importantly, resources can foster the gain or loss spirals, and this is why individuals with low levels of resources are less able to achieve resource gains (e.g., they do not have enough resources to invest). To prevent and prepare for future resources lost, an individual tends to create more potential resources (e.g., strengthen bond and sense of comradeship with colleagues) and help employees to cope and adapt in the context of presenteeism (Lu et al., 2013a). Acquiring new resources will give individuals a sense that they are capable of meeting stressful challenges, and in turn, they will become more confident in deploying resources and investing in gaining more resources (Hobfoll et al., 2018). Conversely, individuals who lack resources are more vulnerable to resource loss and less capable of resource gain. Research has indeed shown that employees with more resources are more adaptive and can solve job- and career-related difficulties and achieve their personal goals more successfully than those with fewer resources (Hobfoll, 2002). We thus expect that individuals with the abundance of resources (e.g., high on both supervisory and collegial support) will cope the best while working through sickness, showing the *least* damaging effects on well-being and performance. Those having the minimal resources (e.g., low on both supervisory and collegial support) will suffer the most severe blow on well-being and performance when working under sickness. To demonstrate the resource caravans idea, we expect that individuals with high levels of either supervisory support or collegial support can use it as a second resource when primary resource depletion is high (lack of collegial support or supervisory support) and, thus, are compensated to a certain extent for the negative consequences of working through illness. More precisely, the relationship between presenteeism and individual outcomes (i.e., exhaustion and innovative performance) will vary depending on the individual's level of supervisory and collegial support, thereby demonstrating a pattern of moderated moderation. We thus hypothesized:

H2a: A three-way interaction of presenteeism and social support from supervisor and colleagues is related to employees' exhaustion. Specifically, in sickness presenteeism, the employee exhaustion is at the lowest level when supervisory support and collegial support are both at high levels; at the highest level when supervisory support and collegial support are both at low levels; and at the intermediate level when one of the supports is high and the other is low.

H2b: A three-way interaction of presenteeism and social support from supervisor and colleagues is related to employees' innovative behavior. Specifically, in sickness presenteeism, the employee innovative behavior is at the highest level when supervisory support and collegial support are both at high levels; at the lowest level when supervisory support and collegial support are both at low levels; and at the intermediate level when one of the supports is high and the other is low.

METHOD

Procedure

As the majority of the existing studies on presenteeism employed a cross-sectional design, we are unable to generate comprehensive knowledge on the prospective effects of

presenteeism on performance and well-being (Lohaus and Habermann, 2019). We thus employed a two-wave panel design in which all variables were measured twice with the interval of 6 months. While there is a constant call for more longitudinal study designs, there is no consensus for the optimal time lag (Dormann and Griffin, 2015). As the Demerouti et al. (2009) looked at the long-term effect (time frame of 1.5 years) and Lu et al. (2013b) looked at the short-term effect (time frame of 2 months), we in the present study adopt a medium-term time frame of 6 months, allowing sufficient time for presenteeism to incubate its effects on job performance and well-being. Our sample was composed of full-time employees working in different organizations and diverse industries in Taiwan. The only inclusion criterion was "working" during the study period (July 2019 to April 2020). As normal life in Taiwan was largely undisrupted in the COVID pandemic, none of our participants were on furlough scheme or working from home. We did not include foreign nationals or migrant workers; thus, our sample was all ethnic Chinese. The study was approved by Research Ethics Committee of the principle researcher's institute. Individual written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements. The paper-pencil survey was carried out using convenient sampling to recruit participants through personal contacts of the researchers. Some participants were enrolled in executive education programs, and others were recruited through managers in various organizations. At Time 1 (T1), a cover letter accompanied the questionnaire, explaining the aims of our study and assuring confidentiality. Participants filled in questionnaires in their leisure and returned them in sealed envelopes to their contact persons or directly to the researchers. The initial survey was completed by 682 persons (response rate: 96.46%), with 631 persons providing usable data. Six months later, following the same procedure, 407 persons completed the survey again (T2, retention rate of 64.81%). By matching the code self-generated by respondents at T1, the T1 and T2 data from 333 persons were combined. The "match code" was only known to the participant, not disclosed to the researcher; thus, the questionnaire remained anonymous. We further excluded those with excessive missing data (more than 1/3) on the core variables, resulting in the final sample size of 323. We examined the attrition bias by comparing the participants in the panel sample and the dropouts on demographic characteristics and mean scores of all variables (T1). We found no significant differences in any variables, indicating no serious attrition bias.

All of our participants were white-collar workers. The sample was 33.7% male and 66.3% female, with a mean age of 36.91 (SD = 8.89, range = 20–65) and mean job tenure of 7.25 years (SD = 6.57). Just over half of the sample (54.2%) were married. Most of the sample had education above college level (96%), and more than a quarter of the respondents (28.8%) were managers. We asked participants to report the size of their organizations in three categories, employing under 250 people, between 251 and 1,000, and over 1,000. Data showed that our participants equally distributed in small- and medium-sized enterprises (SMEs) (35%, under 250 employees) and large companies (37.50%, over 1,000 employees). We also asked participants to identify the industries of their organizations and found service (25.50%), manufacturing (21.10%), education/culture (14.80%), and finance (10.80%) as being the top four industries. In Taiwan, these sectors are slightly affected by the COVID pandemic and maintained normal operations throughout.

Measures

The structured questionnaire was written in Chinese, and all the standard measures have been used and validated with Chinese samples in previous studies (the Chinese validation reference is given for each scale below).

Presenteeism

We used the two-item presenteeism scale developed and validated for the Chinese populations by Lu et al., 2013a, 2014) to measure the act of "sickness presenteeism" (e.g., "Although you feel sick, you still force yourself to go to work"). With a time frame of "past 6 months," four-point scales were used (0 = Never, 6 = More than five times) to rate the frequency of presenteeism behavior. The internal consistency reliability of the scale was 0.85 (T1) and 0.86 (T2) in the present study.

Supervisory Support

We used the four-item Supervisor Support Scale developed by O'Driscoll et al. (2004; for the Chinese version: Lu and Chang, 2014). Respondents were asked how often they had received four different types of support from their supervisors: helpful information or advice, sympathetic understanding and concern, clear and helpful feedback, and practical assistance. Six-point frequency scales were used (1 = Never, 6 = Very frequently). The internal consistency reliability of this scale was 0.96 (T1) and 0.96 (T2) in the present study.

Collegial Support

We used the six-item Workplace Friendship Prevalence Scale developed by Nielsen et al. (2000; for the Chinese version: Mao, 2006) to measure the prevalence of workplace friendship (e.g., "I have formed strong friendships at work"). Five-point agreement Likert scales were used (1 = Completely disagree to 5 = Completely agree). The internal consistency reliability of this scale was 0.83 (T1) and 0.85 (T2) in the present study.

Exhaustion

According to past research, emotional exhaustion is the core component of burnout compared with other dimensions (depersonalization and personal accomplishment) and the most obvious manifestation of the syndrome (Taris et al., 2005). We used a nine-item emotional exhaustion scale from the Maslach Burnout Inventory (Maslach and Jackson, 1986; for the Chinese version: Lu et al., 2013b) to measure exhaustion (e.g., "I feel used up at the end of the workday"). Seven-point scales were used (0 = Never experienced such a feeling to 6 = Experienced such feelings every day). The internal consistency reliability of the scale was 0.93 (T1) and 0.94 (T2) in the present study.

Innovative Behavior

We used the five-item scale developed by Scott and Bruce (1994) to assess innovative behavior (e.g., "I search out new

technologies, processes, techniques, and/or product ideas"). Five-point agreement Likert scales were used (1 = Completely disagree, 5 = Completely disagree). The internal consistency reliability of the scale was 0.85 (T1) and 0.90 (T2) in the present study.

Control Variables

People with different levels of personal resources may react differently to the same stressful situation. For example, Li et al. (2019) demonstrated that the older and married employees exhibited more presenteeism behavior. Other past research also found that female and managers reported sickness presenteeism more often than male and non-managers (Lu et al., 2013a; Sendén et al., 2016). We thus included gender (0 = female; 1 = male), age, marital status (0 = not married, 1 = married), and job position (0 = not manager, 1 = manager) in all analyses to exclude potential confounding factors.

Strategy of Analysis

We used the SPSS 24 and PROCESS macro version 2.16.3 (Model 3) to test the moderated moderation effect. According to Hayes et al. (2017), PROCESS macro and hierarchical regression analysis produce consistent results, but PROCESS is able to directly estimate the mediated moderation effect. Bootstrapping with 5,000 samples was used to calculate bias-corrected confidence intervals. To take advantage of our two-wave data, we used independent variable (presenteeism) as measured at T1, and moderators (supervisory support, collegial support) and dependent variables as measured at T2 in all the following analyses. We further *controlled for the base-line levels of the dependent variables*, that is, exhaustion and innovative behavior as measured at T1. Before testing hypotheses, we conducted a confirmatory factor analysis (CFA) to verify the factor structure by confirming that each measure is loaded on a particular factor (Byrne, 2001). We also checked for the common method variance (CMV) bias, as our data are all self-reported (Podsakoff et al., 2003).

RESULT

Descriptive Analysis

Prior to the hypotheses testing, bi-variable correlations were computed, and results are shown in **Table 1**. Presenteeism (T1) positively correlated with exhaustion (T2). Both supervisory support (T2) and collegial support (T2) positively correlated with innovative behavior (T2). Exhaustion (T2) negatively correlated with innovative behavior (T2). None of the demographical characteristics correlated with presenteeism, though age positively correlated with exhaustion, supervisor support, and collegial support; and gender (male) and position (managers) correlated with innovative behavior.

Hypothesis Testing

In order to test for discriminant validity, we conducted a CFA using AMOS 24. Combining data from both waves, we compared a hypothesized five-factor model (presenteeism, supervisory support, collegial support, exhaustion, and innovative behavior)

TABLE 1 | Correlations among study variables ($N = 323$).

	Mean	SD	Gender	Age	Marriage	Position	T1SicPre	T2SicPre	T1SS	T2SS	T1WF	T2WF	T1Exhaustion	T2Exhaustion	T1InnoBeh	T2InnoBeh
Gender	0.34	0.47	–													
Age	36.92	8.91	0.01	–												
Marriage	0.54	0.50	0.10	0.45***	–											
Position	0.29	0.45	0.17**	0.32***	0.24***	–										
T1SicPre	5.19	1.76	−0.08	−0.02	−0.00	0.01	–									
T2SicPre	5.55	1.75	−0.02	0.01	0.07	0.05	0.49***	–								
T1SS	16.61	4.89	−0.01	−0.18***	−0.16**	−0.05	0.04	0.08	–							
T2SS	15.62	4.89	0.06	−0.09	−0.00	0.03	−0.03	0.05	0.55***	–						
T1WF	21.33	3.94	−0.09	−0.12*	−0.06	−0.03	0.06	0.01	0.38***	0.18***	–					
T2WF	21.50	3.90	−0.09	−0.15**	−0.03	−0.00	0.02	−0.10	0.26***	0.23***	0.63***	–				
T1Exhaustion	21.17	10.89	−0.01	−0.16**	−0.10	−0.03	0.27***	0.16**	−0.13*	−0.08	−0.15**	−0.08**	–			
T2Exhaustion	21.08	11.20	0.01	−0.19***	−0.04	0.04	0.20***	0.26***	−0.05	−0.06	−0.12*	−0.12*	0.53***	–		
T1InnoBeh	18.42	2.90	0.24***	0.01	−0.03	0.17**	−0.08	−0.04	0.23***	0.11*	0.15**	0.00	−0.15**	−0.21***	–	
T2InnoBeh	18.42	3.00	0.22***	0.05	−0.04	0.14**	0.00	0.01	0.16**	0.20***	0.12*	0.17**	−0.11*	−0.18***	0.59**	1

Marriage, marital status; Position, job position; SicPre, sick presenteeism; SS, Supervisory Support; WF, Workplace friendship.
Gender: 0 = female, 1 = male. Marital status: 0 = not married; 1 = married. Job position: 0 = employees; 1 = managers.
$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$.

with alternative models (in which these five factors were combined in different ways). The results displayed that the five-factor measurement model displayed a suitable fit to the data [$\chi^2/df = 2.92$, comparative fit index (CFI) = 0.91, root mean square error of approximation (RMSEA) = 0.08, standardized root mean square residual (SRMR) = 0.05] and outperformed any simpler representations of the data ($p < 0.01$ for all model comparisons). Self-report may increase the threat of CMV bias, a CMV test was performed following the procedure used by Williams et al. (1989); and this analysis revealed that the method factor did improve model fit ($\chi^2/df = 2.742$; CFI = 0.26; RMSEA = 0.07; RMR = 0.07), which is expected. Consequently, we calculated the variance explained by the method factor (Williams et al., 1989), accounting for only 13.5% of the total variance. This amount is less than the 25% threshold recommended by Williams et al. (1989). Thus, it was concluded that CMV was not a major concern in this study. Results of these tests are summarized in **Table 2**.

Moderated Moderation Effects of Social Support at Work

We adopted Model 3 in PROCESS 2.16.3 to examine the moderated moderation effects with 5,000 bootstrap samples. This model was developed by Hayes et al. (2017) in order to estimate simultaneously the conditional effects and their significance based on 95% bootstrap confidence intervals. In the first step, the effects of individual characteristics and baseline dependent variable (i.e., exhaustion and innovative behavior at T1) were controlled. In the second step, we examined simultaneously the two-way and three-way interactions of presenteeism, supervisory support, and collegial support on exhaustion (T2) or innovative behavior (T2) separately. As shown in **Tables 3**, **4**, the full model explained 32 and 42% of the variance in exhaustion [$F_{(12,299)} = 11.83$, $p < 0.001$] and innovative behavior [$F_{(12,299)} = 18.04$, $p < 0.001$], respectively.

The proposed relationship between presenteeism and exhaustion at T2 was not significant (**Table 3**); thus, our hypothesis 1a was not supported. Neither was the hypothesized three-way interaction of presenteeism × supervisory support × collegial support significant on exhaustion; thus, our hypothesis 2a was not supported. However, the pattern was different for innovative performance. There was a significantly negative effect of presenteeism on innovative behavior at T2 (**Table 4**), thus supporting our hypothesis 1b. The hypothesized three-way interaction of presenteeism × supervisory support × collegial support was also significant on innovative behavior (coefficient = −0.01, $p < 0.05$, 95% CI: −0.0162 to −0.0001), thus supporting our hypothesis 2b.

To reveal the moderation pattern, we applied the worksheet available online at http://www.jeremydawson.co.uk/slopes.htm (see also Dawson, 2014) to plot the simple effects for four subsamples as shown in **Figure 2**. Although slope tests revealed no pairwise significant differences among the simple regression lines, the overall pattern corroborated our hypothesis. Namely, when working through sickness, the innovative performance of those with high supervisory support coupled with high colleague friendship (subsample 1: abundance resources) were *the least* affected. Those having minimal resources (subsample 4: low on both supervisory and collegial support) suffered the most severe blow on innovative performance under sickness conditions, showing as the lowest line in the group. Contrasting the pair of lines for those with at least one source of support available (subsample 2: high supervisory support; subsample 3: high collegial support) against the bottom line (subsample 4), we noted that the negative effect of presenteeism on innovative performance was somewhat reversed (i.e., Lines 2 and 3 went upward). Thus, our theorized compensatory effect of resources was tentatively confirmed under the sickness presenteeism condition, though the substantial benefit of supervisory support and collegial support seemed equivalent. Overall, the pattern of the three-way interaction supported our hypothesis 2b; that is, in sickness presenteeism, the employee innovative behavior was at the highest level when both supervisory support and collegial support were high.

DISCUSSION

Theoretical Contribution

The objective of this study is to clarify the lasting effect of presenteeism on employees' well-being and innovative behavior, incorporating the joint effect of dual source of social support at work on alleviating the potential damages of the presenteeism behavior. Contributing to the inclusiveness of scientific contents in the post-pandemic era, our study was conducted in the under-studied Asian populations who nonetheless are more prone to commit sickness presenteeism and suffer worse consequences of the behavior (Lu et al., 2013a). In the time frame of 6 months, we did find lasting damaging effects of presenteeism on employees' future innovative performance, though not on exhaustion. Consistent with the Hansen and Andersen (2008) findings, we confirmed that working under illness is indeed harmful for innovative performance, and such damage was not transient, as it lasted for at least 6 months. However, it is worth noting that we did not find a lasting damaging effect of presenteeism on employees' future exhaustion, contrary to some existing studies (Demerouti et al., 2009; Lu et al., 2013b), but consistent with other studies (e.g., Lu et al., 2014). The mixed findings may be due to different measures of presenteeism (Demerouti et al., 2009), or different time frames used (Demerouti et al., 2009; Lu et al., 2013, Lu et al., 2014), or intervening psychological mechanisms, such as motivational regulation (Dew et al., 2005) and organizational support (Garrow, 2016). Clear research on the consequences of presenteeism for attitudinal, affective, and motivational processes is sparse (Miraglia and Johns, 2016), and we need more studies to understand the development of such consequences over time.

More importantly, we found three-way interactive effects of presenteeism, supervisory support, and collegial support on employees' innovative performance. As the analysis of the moderated moderation model showed, when working under illness, employees displayed the best innovative performance with high levels of both supervisory and collegial support. We also found that employees benefited from having at least one source of support, from either the supervisors or the colleagues.

TABLE 2 | Summary of the goodness-of-fit indices of the competing models ($N = 323$).

Model	Model description	χ^2 (df)	χ^2/df (NC)	RMR	SRMR	GFI	NFI	CFI	RMSEA
Model 1	5 factors	843.12 (289)	2.92	0.08	0.05	0.83	0.87	0.91	0.08
Model 2	3 factors	3,016.23 (296)	10.19	0.18	0.15	0.53	0.53	0.55	0.17
Model 3	1 factor	4,131.56 (299)	13.82	0.23	0.20	0.44	0.35	0.37	0.20
Model 4 (CMV check)	One latent method variable	721.41 (263)	2.74	0.07	0.20	0.84	0.89	0.92	0.07

Five-factor model (Full model): presenteeism, supervisory support, collegial support, innovative behavior, exhaustion. Three-factor model: presenteeism, supervisory support+collegial support, innovative behavior+exhaustion. One-factor model: presenteeism+supervisory support+collegial support+innovative behavior+exhaustion.
SRMR, standardized root mean square residual; GFI, goodness of fit index; NFI, normed fit index; CFI, comparative fit index; RMSEA, root mean square error of approximation; CMV, common method variance.

TABLE 3 | Moderated moderation effect of social support at work on the relationship between presenteeism and exhaustion ($N = 323$).

	Exhaustion (T2 strain)			
	Coefficient (B)	SE	Coefficient (β)	95% CI (LL, UL)
Step 1: CV				
Gender	−0.32**	1.18	−0.01	−2.64 2.00
Age	−0.22***	0.07	−0.18	−0.37 −0.08
Marriage	1.70	1.22	0.08	−0.70 4.10
Position	2.24	1.28	0.09	−0.29 4.76
T1Strain	0.49	0.05	0.48	0.39 0.60
Step 2: X/W/Z				
T1Presentism (X)	−4.97	4.67	0.07	−14.14 4.20
T2Supervisory support (W)	−0.87	1.87	0.01	−4.55 2.81
T2Collegial support (Z)	−1.34	1.17	−0.10	−3.64 0.95
X * W	0.25	0.35	−0.01	−0.44 0.95
X * Z	0.26	0.22	0.04	−0.17 0.70
W * Z	0.05	0.09	−0.03	−0.12 0.21
X * W * Z	−0.01	0.02	−0.04	−0.04 0.02
Total R^2			0.32	
F			11.75***	

Marriage, marital status; Position, job position.
Gender: 0 = female, 1 = male. Marital status: 0 = not married; 1 = married. Job position: 0 = employees; 1 = managers.
***p < 0.01, ***p < 0.001.*

Our findings are consistent with previous studies; for example, Brunner et al. (2019) found that job and personal resources can buffer the negative effects of job stressors on health-related productivity losses. Furthermore, they also found that the compensatory effect of job resources for employees with low personal resources in the high stress situations. Therefore, we confirmed the rarely investigated compensatory effects of resources in the stressor–strain relationships, by disentangling the joint effects of different resources.

Above all, this study contributes to the flourishing presenteeism literature and COR theory in two ways: First, adding to the scarce research on the relationship between presenteeism and employee innovation (Hansen and Andersen, 2008; Fan and Lu, 2020), we confirmed that the lasting negative effect of working under illness is indeed harmful for employee innovative performance. As employee innovative behavior is critical for firm innovation and competitiveness (Amabile et al., 1996; Yuan and Woodman, 2010), such a key aspect of the employees' job performance should be included in evaluating the consequences of presenteeism. Our finding thus contributes to substantiating the "bad presenteeism" scenario (Cooper, 1996; Hemp, 2004; Demerouti et al., 2009; Lu et al., 2013b), extending its negative outcomes to the future innovative performance.

Second, we extend the resource caravans perspective of the COR theory and confirm the joint effects of supervisory and collegial support in the relationship between presenteeism and innovative behavior. This is in line with the COR proposition that resources gain are even more important when facing

TABLE 4 | Moderated moderation effect of social support at work on the relationship between presenteeism and innovative behavior ($N = 323$).

	Innovative behavior (T2)				
	Coefficient (B)	**SE**	**Coefficient (β)**	**95% CI (LL, UL)**	
Step 1: CV					
Gender	0.60*	0.30	0.09	0.01	1.19
Age	0.04*	0.02	0.11	0.00	0.07
Marriage	−0.54	0.30	−0.09	−1.13	0.06
Position	−0.01	0.32	−0.00	−0.65	0.62
T1InnoBeh	0.55***	0.05	0.53	0.46	0.65
Step 2: X/W/Z					
T1Presentism (X)	−2.69*	1.17	0.11	−4.99	−0.39
T2Supervisory support (W)	−0.96*	0.48	0.13	−1.90	−0.02
T2Workplace friendship (Z)	−0.68*	0.29	0.18	−1.26	−0.11
X * W	0.17	0.09	−0.01	−0.01	0.35
X * Z	0.14*	0.06	0.02	0.03	0.25
W * Z	0.05*	0.02	0.04	0.01	0.09
X * W * Z	−0.01*	0.00	−0.09	−0.02	−0.00
Total R^2			0.42		
F			18.02***		

Marriage, marital status; Position, job position.
Gender: 0 = female, 1 = male. Marital status: 0 = not married; 1 = married. Job position: 0 = employees; 1 = managers.
$^*p < 0.05$, $^{***}p < 0.001$.

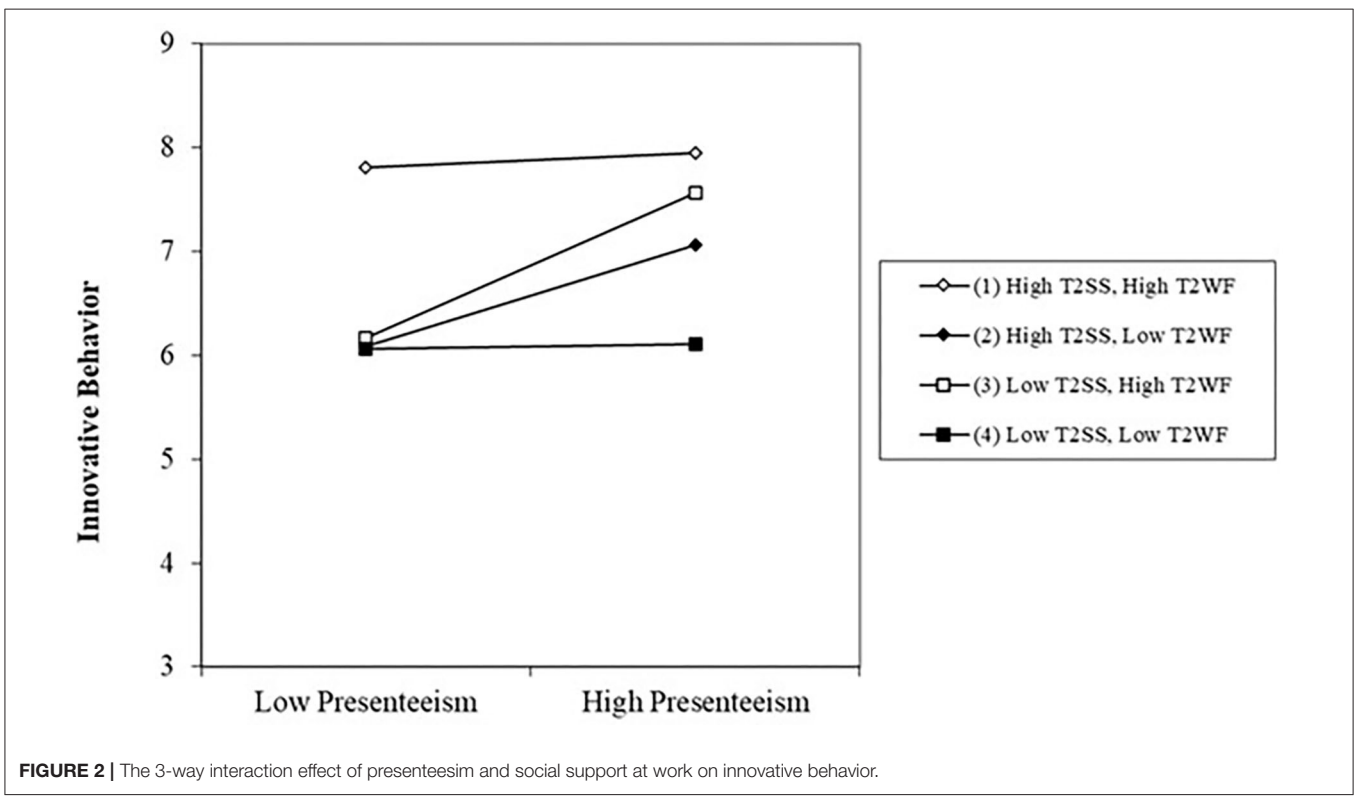

FIGURE 2 | The 3-way interaction effect of presenteesim and social support at work on innovative behavior.

resource loss (Hobfoll, 2012). Our pattern of the three-way interaction (**Figure 2**) also corroborates Hobfoll and Leiberman (1987) finding that having more than one type of resource, whether personal resources or social resources, may be better than having one only. This pattern of resource value as a function of *source* may be more pronounced in the Asian societies of

"the Confucian Circle," including the mainland China, Taiwan, Hong Kong, Japan, Korea, and Singapore. This is because the Confucian tradition puts great emphasis on *Guanxi* (social relationships) as the fiber of the society. More importantly, theoretical analysis on *Guanxi* regarding the characteristics of the collectivist culture postulates that different relationships are used to satisfy different needs and thus have different values for adaptation (Hwang, 1997). The two broad genres of relationships in Confucian societies, vertical and horizontal, manifest in the supervisor–subordinate and co-workers interactions at work. The vertical relationships, namely, those with the authorities in the society, seniors in the family, and superiors at work, help secure valuable resources, prospects and advancement; the horizontal relationships, namely, those with people of the same social gradient in the society, the same generation in the family, and peers at work, help satisfy psycho-emotional needs of belongingness and intimacy (Triandis and Gelfand, 1998). As a pillar of the Confucian ethics, the Five Cardinal Relationships (*Wu Lun*) dictate that the vertical relationships command much greater eminence that the horizontal relationships for the society and the individual (Hwang, 1997); thus, the Chinese societies are dubbed vertical collectivism (Triandis and Gelfand, 1998).

In the collectivist culture where the present study was conducted, vertical relationship (e.g., supervisory support) and horizontal relationship (e.g., collegial support) are fundamentally different but equally valuable social resources to people (Hwang, 1997). In the Chinese workplace, supervisory support is a general indicator of good leadership–member exchange (LMX), which emphasizes leaders' provision of resources and support at the individual level, rather than amending organizational matters such as the imposition of detriments on employees taking sick leave (Wang et al., 2018). Employees with high-quality relationships with their leaders (LMX) have more job resources to deal with work stress and demands (Cheng et al., 2012). Line management support is of utter importance in making presenteeism a "sustainable choice" for employees should they be willing to do so (CIPD, 2016). On the other hand, collegial support is also a vital work resource to mitigate the noxious effects of presenteeism on employees' well-being and productivity (Dew et al., 2005). Our findings thus confirm the advantageous effect of having the abundance of resources at one's disposal in a challenging work situation (i.e., having two is the best scenario); it also seems that the resource compensatory effect as proposed by the COR occurred for both collegial support and supervisory support (i.e., having one is better than none). This pattern of nuanced disparity in the utility of support from different sources, and the underlying dynamism of mobilizing different types of work support deserves further exploration, for example, the joint effects of personal resources and job resources on the stressor–strain relationships (Hobfoll and Leiberman, 1987; Brunner et al., 2019).

Managerial Implications

In the West, an understanding supervisor may be able to relieve subordinates from fear of leaving a bad impression when taking sick leaves; thus, there is no need to use presenteeism as either a career-protecting or a career-promoting tactic. Baker-McClearn et al. (2010) discovered in a qualitative study in the UK that supervisory support was pivotal for employees deciding not to come to work when ill. However, factors involved in deciding to turn up to work while ill may be very different for the Chinese employees. As the Chinese culture puts so much emphasis on hardworking and perseverance, even with a sympathetic direct line supervisor, employees may still push themselves to work to present a good image to a wider audience, including co-workers, managers of higher levels, and even customers. Thus, when supervisory support is absent or non-effective, supplementing it with other resources such as collegial support may change the game, especially when the going gets tough in the post-pandemic times. Strengthening team cohesion was found to enhance member satisfaction and performance in the demanding Chinese work environment (Lu and Fan, 2017). Thus, to constructively manage presenteeism and protect employees' well-being and performance, line managers and co-workers need to be educated and trained to play key roles in sustaining integration at work. For instance, managers still need to be aware that work overload precipitates presenteeism, harming employees' job outcomes. Furthermore, organizations and supervisors should nurture good leader–subordinate relationship as well as coworker relationships, to foster emotional support and work-directed interventions, such as setting work replacements to ensure supplement when an employee is ill.

In addition, although we found evidence that social support played an important role in attenuating some long-lasting noxious effects of presenteeism, organizations and managers still need to be aware that sickness presenteeism is harmful to employees' job performance and well-being, both immediately and in the long run. Thus, to tackle the problem at its root, organizations should invest in health promotion programs and work-directed interventions, such as setting work replacements. Amid economic recession and prevailing hardships at the wake of the triple pandemic, caring for employees' well-being and quality of work creates a more poignant impression of good employer responsibility and corporate commitment.

Limitation and Future Directions

The current study is subject to some limitations and opens up new avenues for further research. First, we adopted self-report measures, which may increase the threat of CMV bias (Podsakoff et al., 2003). In an effort to minimize such bias, we adopted a panel design and measured all study variables twice, to separate the independent variables (presenteeism), moderators (supervisory support and collegial support), and dependent variables (exhaustion and innovative behavior) in time. To get more comprehensive knowledge, we suggest future studies should consider including objective measurements of job performance. Second, we used Hayes' PROCESS (Hayes, 2013) to test the simultaneously intervention effects of supervisory support and collegial support on the relationship between presenteeism and outcomes. Our proposed moderated moderation model was supported for innovative performance, but not for exhaustion. Future research may measure the concept of burnout including other dimensions (i.e., depersonalization or personal accomplishment) (Taris et al., 2005) and further

explore the interactive effects of collegial support and supervisory support on a wider range of strains and outcomes.

Third, another limitation is the fact that we did not assess any personal resources. Previous studies on innovation and creativity have found the protective role of numerous personal variables, such as mindfulness (Montani et al., 2019). However, the broad concept of resource caravans proposes that employee would utilize multiple resources at a time, depending on the demands and the context (Hobfoll et al., 2018). For instance, Stetz et al. (2006) found that self-efficacy and social support had joint effects on the stressor–strain relationships. Future research could investigate the simultaneous interaction effects of a wide range of individual or organizational resources in the context of working under illness. Fourth, we did not include any COVID-19-related variables in the study. As Taiwan has been very fortunate in escaping from the devastating impact of the pandemic and largely successful in holding on to a normal life with the cost of strictly sealing its borders and thoroughly reinforcing quarantines, it was deemed unnecessary to include any COVID-19-related variables, given the small variations. In hindsight, it is wiser to directly assess the COVID-19-related individual exposure as control variables to rule out any potential individual differences. Finally, although our results confirmed the resources compensatory effects of the dual social support in the presenteeism–outcomes relationship for Chinese workers, we cannot rule out the possibility of artifacts, as our study was situated in the Confucian culture, where work is given a high priority. Social capital is a vital resource for Taiwan employees in stress coping, regardless of the source (supervisory support or collegial support), and thus may equally help sustain the employees' innovative performance when working ill. More research is needed to replicate and understand the moderated moderation effects of supervisory and collegial supports in other cultures.

To conclude, sickness presenteeism did hamper employees' innovative behavior even measured in 6 months after the behavior. Mobilizing social resources at work, namely, supervisory support and collegial support, could mitigate the lasting damages of working with illness. Employees with the abundance of resources fared the best; however, social resources compensate for one another in coping, leaving the ones with the minimal resources to suffer the worst. As the going gets tough and dark night seems long, creating, nurturing, deploying, and utilizing resources may hold the key for thriving, not just surviving.

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 Research Ethics Committee, National Taiwan University. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

LL: conceptualization and funding acquisition. LL and JC: methodology and writing—original draft preparation. JC: formal analysis. CC: resources. LL, JC, and CC: writing—review and editing. All authors have read and agreed to the published version of the manuscript.

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Development and Validity of the Nurse Presenteeism Questionnaire

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This study aimed to develop and test the reliability and validity of a multi-item nurses' presenteeism behaviour questionnaire. Study 1 administered the Nurse Presenteeism Questionnaire (NPQ) to 250 Chinese nurses. Study 2, surveyed 650 nurses with the NPQ, the Sickness Presenteeism Questionnaire, the Stanford Presenteeism Scale, the General Health Questionnaire, and the Emotional Exhaustion Scale using convenience sampling. After item analysis, the subjects were randomly divided into two groups to verify the questionnaire structure. Study 1 revealed the nurses' core symptoms when they go to work with illness, and the NPQ with 11 items was developed. Study 2's item analysis revealed that 11 NPQ items had good discrimination ($t = 22.67 \sim 36.11$, $p < 0.01$) and high homogeneity. Besides, the scale had good reliability (Cronbach's = 0.93) and external criterion validity ($r = 0.24 \sim 0.84$, $p < 0.01$). Thus, the NPQ can be used to measure presenteeism behaviour in nursing.

Keywords: presenteeism, nurse presenteeism questionnaire, reliability, validity, China

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INTRODUCTION

In an Eastern cultural context, persisting with work in spite of illness has been regarded as a sign of diligence and dedication since antiquity, and such behaviours have been reported by mainstream media as meritorious deeds in China for the past several decades. However, in recent years, the widespread occurrence of negative social phenomena, such as "overwork death," has not only attracted people's attention to health, but also started a debate on working despite illness, which has become a hot topic in the society. Besides, this phenomenon has received close attention from scholars (e.g., Aronsson et al., 2000; Johns, 2010; Lu et al., 2013b; Sun and Zhang, 2015; Yang et al., 2019). They have defined this behaviour as "presenteeism behaviour," in which an individual, who is supposed to be on leave for being sick, still attends work in poor health (Aronsson et al., 2000). Studies have shown that nurses are one of the professional groups with high and frequent presenteeism behaviour (Pilette, 2005; Bergström et al., 2009). Freeling et al. (2020) summarised studies on nurse presenteeism behaviour in multiple countries from 2006 to 2018, revealing that the incidence of nurse presenteeism behaviour ranged from 15.74% ($N = 147$) (Brborovic et al., 2016) to 86.96% ($N = 951$) (Dellve et al., 2011). In most studies, the average incidence of the behaviour was approximately at 50%–sometimes, even higher. In China, Shan et al. (2021) discovered that 94.25% of Chinese nurses reported that they had engaged in presenteeism behaviour in the preceding 6 months, and the incidence was 82.08% in their direct leaders' eyes. Thus, it is urgent to attach importance to the presenteeism behaviour in Chinese nursing professions.

In 2016, the Central Committee of the Communist Party of China and The State Council issued *The Program of Healthy China 2030* (hereinafter referred to as *the program*), which elevates people's

health issues as the fundamental strategy for China's development. *The program* puts forward new requirements for national health and new targets for optimising health services. It clearly points out that the medical service system should be further improved to facilitate the quality of medical services (The State Council of the CPC Central Committee, 2016). As promoters of human health, guardians of healthy life, and communicators of health literacy, nurses make up the highest proportion of China's medical service teams and shoulder the important task of people's health development.

Moreover, the World Innovation Summit of Health (WISH) suggested that nurses and midwives are the most critical players in universal healthcare (Crisp et al., 2018). The improvement of the national health level is closely related to the quality of nurse care. However, the presenteeism behaviour of nurses tends to affect the treatment and rehabilitation of their patients, reduce their nursing quality, and introduce negative effects, such as an increase in the number of falls of patients and drug errors (Letvak et al., 2012). Nurse presenteeism behaviours will not only affect nurses' physical and mental health, reduce job satisfaction and engagement, and increase job burnout, but also bring financial burden and productivity loss to medical organisations (Demerouti et al., 2009; Letvak et al., 2012; Kandemir Türe and Bayram, 2017; Zhang et al., 2018; Shan et al., 2021).

To sum up, the common occurrence of unhealthy work behaviours (i.e., presenteeism behaviours) among nurses is not only related to their own health, but also has a profound impact on the promotion of public health and the improvement of the country's overall medical service and quality. This further illustrates the significance of investigating nurses' presenteeism behaviour.

Although presenteeism behaviour has caused widespread concern among scholars in areas such as occupational health psychology, organisational behaviour, and human resource management, research on presenteeism has been mainly conducted in Europe and the United States, while it is still in its infancy in China. Furthermore, research on presenteeism behaviour against the background of Chinese culture is scarce, and the corresponding measurement tools need to be further improved (Johns, 2010; Sun and Zhang, 2015; Zhang and Li, 2016; Li et al., 2019). Generally, scholars have different interests in measuring presenteeism behaviour, and their main measurement methods differ. They can be divided into two categories: one that focuses on the measurement of productivity loss caused by the behaviour, and the other that focuses on the behaviour itself. The former defines presenteeism behaviour based on its negative outcome (Johns, 2010). Moreover, the ambiguous nature of productivity in many jobs and the implicit characteristics of the link between health and productivity may make it difficult to accurately estimate presenteeism related productivity losses (Johns, 2012). Therefore, at present, most scholars tend to interpret presenteeism behaviour as the behaviour of working in an unhealthy state" based on the nature of presenteeism behaviour, instead of making positive or negative judgments on the behaviour itself (Li et al., 2019; Ruhle et al., 2019).

An effective measurement is the basic condition for further research. Presently, the measurement of presenteeism behaviour is mainly based on unverified single- or double-item measurements (Miraglia and Johns, 2016; Lohaus and Habermann, 2019). To measure presenteeism behaviour, Aronsson et al. (2000) posed this question: "Has it happened over the previous 12 months that you have gone to work despite feeling that you really should have taken sick leave due to your state of health?" Participants were asked to report the frequency of the behaviour based on a four-point rating method. Such questionnaires limit the health status of individuals at the time of the occurrence of presenteeism to a "health status that warrants sick leave." Demerouti et al. (2009) simplified Aronsson et al.'s (2000) measurement by posing the question to measure presenteeism behaviour: "Has it happened over the previous 12 months that you have gone to work despite feeling sick?" Participants were asked to answer with "yes/no" to measure their presenteeism behaviour although their health condition was not defined. Subsequently, Lu et al. (2013a) used a two-item questionnaire to measure the frequency of presenteeism behaviour. The two items were: "Although you feel sick, you still force yourself to go to work" and "Although you have physical symptoms such as headache or backache, you still force yourself to go to work." Such a measure exceeds the limit of individuals' health conditions, but the term "force" implies that the individuals who engaged in presenteeism behaviour may have required extra effort to finish their work.

Therefore, due to the lack of a unified development standard, the emphasis of measurement tools developed by various scholars also differs. Moreover, different scholars used different ways of expression, answers, and recall cycles to measure the content of presenteeism behaviour, which also restricted the comparison of the measured results of presenteeism behaviour (Skagen and Collins, 2016; Hou, 2019; Ruhle et al., 2019). In addition, studies have shown that participants' decision to be absent when they are ill is closely related to the symptoms and severity of the disease from which they suffer (Kaldjian et al., 2019). Thus, this study targets nurses as the research subjects in developing a multi-item presenteeism behaviour questionnaire, focusing on nurse characteristics by considering the role of disease symptoms and severity on the decision to engage in presenteeism; it then tests the reliability and validity of the questionnaire.

In this study, we intend to compile the disease symptoms despite which nurses go to work with illness through an open-answered questionnaire survey. Considering that individuals have different sensitivities to symptoms (Nielsen et al., 2009) and that there are many types of diseases and symptoms, it is not appropriate to make a unified classification. We focused on whether presenteeism behaviour occurred in situations in which participants experienced a physical state of being able to choose between engaging in presenteeism and taking leave. Therefore, we excluded diseases or symptoms that are seriously severe (i.e., that involve lack of behavioural competence), and defined the severity of the disease as follows: although behavioural competence is basically normal, having a significant sense of discomfort, which can be overcome or mitigated with a certain amount of willingness and effort.

In order to examine the external validity of the Nurse Presenteeism Questionnaire (NPQ), the presenteeism-related

variables were examined. First, although the number of questions in the Sickness Presenteeism Questionnaire (SPQ) by Lu et al. (2013b) was too small to conduct a test of validity, previous studies confirmed that it has good internal consistency reliability (Lu et al., 2014). Moreover, 90% of Chinese studies on presenteeism behaviour have applied this questionnaire. Thus, this study not only took the SPQ as the basic reference for the development of the NPQ, but also regarded it as an important criterion variable. The aim was to develop a questionnaire on nurses' presenteeism behaviour so that scholars can flexibly choose the appropriate measurement tools according to their own research needs. Previous studies had confirmed that presenteeism behaviour is closely related to the individual's health status (e.g., Skagen and Collins, 2016; Arjona-Fuentes et al., 2019), and health-related productivity losses (Rantanen and Tuominen, 2011; Li et al., 2019); moreover, individual emotional exhaustion is also closely related to presenteeism behaviour and its resulting productivity loss (Neto et al., 2017; Ferreira et al., 2019; Zhang et al., 2020). Therefore, this study examined individuals' general health status, health-related productivity loss, and emotional exhaustion as the external criteria of the NPQ.

MATERIALS AND METHODS

Study 1

The aim of Study 1 was to investigate the core symptoms of nurse presenteeism through an open-ended survey and generate the item pool, obtain the initial version of the NPQ.

Participants and Procedure

In this study, the open-ended questionnaire survey was conducted among a total of 250 nurses from five hospitals located in Henan province, China, through convenience sampling. After data cleaning, the questionnaires of 215 nurses were included for analysis with an effective response rate of 86.00%. In this survey, nurses were all females whose ages ranged from 20 to 44 years, with an average age of 29.18 years (SD = 4.47). Their nursing tenure ranged from 0.5 to 29 years, with an average of 7.11 years (SD = 4.69). The departments in which nurses worked included internal medicine, surgery, ophthalmology, paediatrics, obstetrics and gynaecology, emergency room, and outpatient service. Descriptive statistics was shown in **Table 1**, which included gender, marital status, and technical title.

The survey procedure was as follows: First, an open-ended question was posed to nurses to collect qualitative data about the various diseases and symptoms they experienced during presenteeism. Second, to determine the core diseases and symptoms of nurse presenteeism, the qualitative data were summarised and analysed repeatedly. Then, the item pool was constructed based on these core items to form the initial version of the NPQ. Two nursing professionals who were experienced in scientific research and clinical practice (both holding a master's degree in nursing and having worked in clinical nursing for more than 10 years) and three experts in psychology who were long engaged in scientific research (one professor, one postdoctoral student, and one doctoral student) were invited to jointly evaluate the content validity of this questionnaire. The items were modified and improved according to the suggestions of experts. Finally, the preliminarily version of the NPQ was developed after the content and expression of these items were unanimously approved by the expert group.

TABLE 1 | Descriptive statistics for all samples ($N_1 = 215$, $N_2 = 572$).

		Study 1 $N_1 = 215$	Study 2 $N_2 = 572$
Gender	Female	215 (100%)	559 (97.73%)
	Male	–	13 (2.27%)
Marital status	Married	149 (69.30%)	337 (65.03%)
	Unmarried	66 (30.70%)	200 (34.97%)
Technical title	Student nurse	4 (1.86%)	12 (2.10%)
	General nurse	42 (19.53%)	91 (15.91%)
	Senior nurse	111 (51.63%)	211 (36.89%)
	Professor of nursing	88 (26.98%)	252 (43.88%)
	Not respond	–	6 (1.05%)

Measures

Apart from general demographic characteristics such as gender, age, nursing tenure, marital status, technical title, and work units, the SPQ (Lu et al., 2013a) was adopted among nurses to collect data as the basic reference of this open-ended question survey. SPQ comprises two items, namely: "Although you felt sick, you still forced yourself to go to work" and "Although you had physical symptoms such as a headache or backache, you still forced yourself to go to work." Participants were required to rate how often they had experienced presenteeism during the previous 6 months. Each item was rated on a four-point scale (1 = never, 2 = once, 3 = 2–5 times, 4 = more than five times), with high scores representing more frequent instances of presenteeism. Then, the qualitative research data of core symptoms were collected using an open-ended questionnaire comprising one item, namely: "What kinds of diseases or symptoms (i.e., felling "sick" as mentioned above) did you have when you should have asked for sick leave but still turned up to work, in addition to the headache or back pain that is mentioned above? Please list them in the line below."

Analysis and Results

From the responses to this open-ended question, a total of 499 original expressions of diseases and symptoms were obtained from 215 participants. Through the initial screening, the combined expression of symptoms was split. For example, "nausea and vomiting" was split into "nausea" and "vomiting" and "pain in waist and leg" was split into "waist pain" and "leg pain." A total of 504 expressions of diseases and symptoms were thus obtained. Subsequently, through a further screening, some expressions that were beyond the scope of diseases or symptoms were deleted (e.g., being unwell, sick, unhappy, worried about my child, and having a scheduling conflict with parent–child activities), and a total of 487 expressions of diseases and symptoms were retained.

To facilitate further analysis of core symptoms, the unified expression of diseases and symptoms was coded. For example,

"*teng*" and "*tong*" are different Chinese words, but they have the same meaning as both express an ache. Moreover, compared to "*teng*," "*tong*" describes the physiological state of participants and the uncomfortable feeling caused by disease, which is more formal, so we uniformly coded all these feelings as "*tong*." Similarly, other symptoms with the same meaning were coded with the same word. For instance, "loose bowels" and "diarrhoea" were coded as "diarrhoea," "vertigo," and "dizziness" were coded as "dizziness," and "severe nasal congestion" was coded as "nasal congestion."

Based on this preliminary collation, a total of 124 types of diseases and symptoms was gathered, including 24 diseases (such as scapulohumeral periarthritis, upper respiratory tract infection, ligament strain) from 33 responses, which accounted for 6.78% of the total responses, and 100 symptoms (such as fever, cold, and headache) from 454 responses, which accounted for 93.22% of the total responses. Then, these diseases and symptoms were further summarised; 30 categories of symptoms and 19 categories of diseases were obtained, as shown in **Table 2** and **Table 3**.

There is great complexity and variation not only among the types of diseases afflicting the general population, but also with regard to the feelings they cause individuals; moreover, the expression of disease is also unique. In this study, the expression of disease accounts for less than 7% among nurses with high health literacy, which means that these expressions are uncommon with regard to the expressions of daily life. Therefore, we focus on the physical symptoms of presenteeism rather than the type of disease in this study. Analogously, mental and mood symptoms have been excluded from the questionnaire for two reasons. First, only a few participants (less than 5%) reported that they experienced mental illness (only one response) or mood-related symptoms during presenteeism in this study, which means that they were not widespread symptoms of presenteeism. And existing meta-analysis study also

TABLE 2 | Preliminary summary of symptom categories.

	Symptom Category	Frequency	Subcategory of Symptoms (Frequency)
1	Fever	66	Fever (61), low-grade fever (3), high fever (2)
2	Dizziness	40	Dizziness (39), almost fainting (1)
3	Cold	39	Cold (36), bad cold (1), nasal obstruction (2)
4	Lumbago	38	Osphyalgia (33), waist (1), backache (2), lumbar pain (1), soreness of waist (1)
5	Abdominal pain or discomfort	29	Stomachache (14), bellyache (11), lower abdomen pain (1), abdominal discomfort (1), abdominal tenderness (1), rebounding pain (1)
6	Palpitation or being flustered	29	Being flustered (19), occasionally flustered (1), palpitation (7), severe palpitations (need to take medicine, 1), tachycardia (1)
7	Psychological discomfort	24	Anxiety (6), high psychological pressure (3), psychological discomfort (2), mental stress (2), be agitated (1), fretfulness (1), fear (1), in bad mood (1), emotion changes (1), psychological illness (1), mood annoyed (1), uncomfortable mood (1), high pressure (1), depressed (2)
8	Pain or discomfort during menstruation	23	Dysmenorrhea (9), menstrual pain (8), menstrual abdominal pain (1), menstrual bellyache (1), menstrual period pain (1), menstrual period stomach pain (1)
9	Stomachache or stomach discomfort	21	Stomachache (17), stomach discomfort (2), hunger-related stomach cramps (1), flatulence (1)
10	Headache	17	Headache (16), recurrent migraine (1)
11	Leg pain or swelling	17	Leg pain (16), sore and swollen leg (1)
12	General malaise	15	Sore and swollen (10), exhausted (1), whole body ache (1), panidrosis (1), malaise (1), discomfort from sitting or standing for too long (1)
13	Eye discomfort	11	Ophthalmodynia (7), asthenopia (1), dry eye (1), giddiness (1), blurring of vision (1)
14	Pain in the neck or cervical spine	10	cervical pain (6), neck pain (4)
15	Nausea	9	Nausea (9)
16	Diarrhoea	9	Diarrhoea (9)
17	Chest tightness or chest discomfort	9	Chest distress (7), discomfort of the precordial area (1), pain in the chest (1)
18	Cough	8	Cough (8)
19	Lack of sleep	7	Lack of sleep (5), insomnia (2)
20	Foot pain	6	Foot pain (3), pain in the joints of the feet (1), heel pain (1), feet osteoproliferation pain (1)
21	Emesis	5	Emesis (5)
22	Pregnant reaction	4	Pregnant reaction (2), pregnancy discomfort (1), abdominal pain during pregnancy (1)
23	Pain or swelling in the extremities	4	Arm pain (1), edema of lower extremity (1), lower limb acid bilges (1), ache of lower limb (1)
24	Joint discomfort	4	Joint muscle soreness (1), joint pain (1), knee joint pain (2)
25	Toothache	2	Toothache (2)
26	Respiratory disturbance	2	Respiratory disturbance (1), breathing hard (1)
27	Omodynia	2	Shoulder pain (1), scapulalgia (1)
28	Wrist discomfort	2	Numb hand (1), wrist pain (1)
29	Interpulmonary neuralgia	1	Interpulmonary neuralgia (1)
30	Nosebleed	1	Nosebleed (1)

TABLE 3 | Preliminary summary of disease types.

	Symptoms	Frequency	Subcategory of Symptoms (Frequency)
1	Strain or sprain	6	Ligament injury (1), twisted foot (1), sprain (1), mild sprain of foot (1), foot sprain (1)
2	Glucopenia	5	Glucopenia (5)
3	Lumbar disc herniation	3	Lumbar disc herniation (3)
4	Periarthritis of shoulder	2	Periarthritis of shoulder (2)
5	Anaemia	2	Periarthritis of shoulder (2)
6	Lumbar muscle degeneration	2	Lumbar muscle degeneration (2)
7	Slipped disc	1	Slipped disc (1)
8	Ankle ligament injury	1	Ankle ligament injury (1)
9	Tenosynovitis	1	Tenosynovitis (1)
10	Varicosity	1	Varicosity (1)
11	Spasticity	1	Spasticity (1)
12	Kidney stone	1	Kidney stone (1)
13	Pre-excitation syndrome	1	Pre-excitation syndrome (1)
14	Upper respiratory infection	1	Upper respiratory infection (1)
15	Tonsillitis	1	Tonsillitis (1)
16	Cervical spondylosis	1	Cervical spondylosis (1)
17	Acute gastroenteritis	1	Sequela of foot injury (1)
18	Sequela of foot injury	1	Sequela of foot injury (1)
19	Gout	1	Gout (1)

indicated that the overall relationship between mental health and presenteeism was negligible (Miraglia and Johns, 2016). Second, a few participants reported that the mood factor falls within the scope of being "sick," but bad mood is hard to be the cogent reason to take sick leave in Chinese workplace culture. The evaluation of mood has strong subjectivity and instantaneity, which is easily affected by the environment. Accordingly, this study primary considered the objective aspects of physical symptoms as the conditions of presenteeism, disregarding the subjective aspects of mental state or mood.

In order to avoid the influence of stereotyped thinking, after an intentional interval of 1 month, we merged the symptoms of nurse presenteeism to obtain 18 types of symptoms (from 430 responses), as shown in **Table 4**. Based on the sorting of frequency, the top 10 core symptoms were selected as the main items of the NPQ, which accounted for 92.09% of the total responses. Moreover, to make the questionnaire as comprehensive as possible, another item was added to ensure that the other symptoms could be covered, namely, "Although you had other physical symptoms, you still persevered in going to work."

Study 2

The aim of Study 2 was to test the factor structure of the NPQ generated in study 1 through exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). The reliability and validity of the questionnaire were also tested using reliability analysis and criterion validity analysis to obtain the formal version of the NPQ.

Participants and Procedure

In this study, the formal NPQ survey was conducted through convenience sampling to test its applicability. A total of 650 hardcopy questionnaires were distributed to four hospitals in Henan province, China, and 572 valid questionnaires were collected, with an effective response rate of 87.69%. They ages ranged from 19 to 53 years, with an average age of 30.61 (SD = 5.21) years. Nursing tenure ranged from 0.5 to 30 years, with an average of 8.72 years (SD = 5.56). The departments in which nurses worked included internal medicine, surgery, ophthalmology, paediatrics, obstetrics and gynaecology, emergency room, and outpatient service. Other demographic variables were shown in **Table 1**, which included gender, marital status, and technical title.

Due to the study data being cross-sectional, half of the total data was randomly selected for EFA and for CFA. The Excel software function of RANDBETWEEN was adopted to generate a list of random assignment values that consisted of 0 and 1, which represented the part of data that would be used for EFA or CAF in the next stage, respectively. We obtained 288 items for EFA and 284 items for CFA. After importing the data into the analysis software, the corresponding statistical tests were conducted. Finally, the formal version of the NPQ was formed.

During the study, four trained researchers first contacted the heads of nursing departments in these hospitals to explain the purpose of the study and related matters of the NPQ. Participants completed the NPQ voluntarily and anonymously. Then the questionnaires were uniformly collected at the designated location and finally summarised by the researchers. The Ethical Review Board of the Institution of Psychology and Behaviour, Henan University, approved the design of this study. All participants provided oral informed consent prior to completing the NPQ, and the confidentiality principle of the questionnaire was explained in the instructions.

Measures

General demographic characteristics such as gender, age, tenure, marital status, technical title, and work units were collected.

Nurse presenteeism

In the item generation stage, 11 items were selected to constitute the NPQ. An example of the items is: "Although you felt dizzy or had a headache, you still persevered in going to work." The participants were required not repeat reports (just select 0) if the following situation occurs in the same sick attendance behaviour. The NPQ adopted a four-point Likert scale rating system ranging from 0 to 3 for these 11 items (0 = never, 1 = once, 2 = 2–5 times, 3 = more than five times), with high scores representing more frequent instances of presenteeism. In this study, the internal reliability coefficient of the NPQ was 0.94.

Sickness presenteeism

Sickness Presenteeism Questionnaire was adopted among nurses (Lu et al., 2013a) as one of the criterion-related variables, which

TABLE 4 | The core symptoms when presenteeism occurred and corresponding scale items.

	Symptoms	Frequency	Subcategory of Symptoms (Frequency)	Corresponding Item
1	Fever	66	Fever (61), low-grade fever (3), high fever (2)	Although you had a fever, you still persevered in going to work
2	Dizziness or Headache	57	Dizziness (39), almost fainting (1), headache (16), recurrent migraine (1)	Although you felt dizzy or had a headache, you still persevered in going to work
3	Abdominal pain or discomfort (include Pain or discomfort during menstruation)	52	Stomachache (14), bellyache (11), lower abdomen pain (1), abdominal discomfort (1), abdominal tenderness (1), rebounding pain (1), dysmenorrhea (9), menstrual pain (8), menstrual abdominal pain (1), menstrua (l), bellyache (1), menstrual period pain (1), menstrual period stomach pain (1)	Although you felt abdominal pain (including menstrual pain), you still persevered in going to work
4	Cold (include nasal obstruction and cough)	47	Cold (36), bad cold (1), nasal obstruction (2), cough (8)	Although you had a cold (e.g., stuffy nose or cough), you still persevered in going to work
5	Palpitation or being flustered chest tightness or chest discomfort respiratory disturbance	40	Being flustered (19), occasionally flustered (1), palpitation (7), severe palpitations (need to take medicine, 1), tachycardia (1), chest distress (7), discomfort of the precordial area (1), have pain in the chest (1), respiratory disturbance (1), breathing hard (1)	Although you felt chest distress, shortness of breath, or palpitations, you still persevered in going to work
6	Lumbago	38	Osphyalgia (33), waist (1), backache (2), lumbar pain (1), soreness of waist (1)	Although you felt discomfort in the lower back, you still persevered in going to work
7	Pain or swelling in the extremities	33	Leg pain (16), sore and swollen leg (1), arm pain (1), edema of lower extremity (1), lower limb acid bilges (1), +ache of lower limb (1), numb hands (1), wrist pain (1), Joint muscle soreness (1), joint pain (1), knee joint pain (2), foot pain (3), pain in the joints of the feet (1),heel pain (1), feet osteoproliferation pain (1), shoulder pain (1), scapulalgia (1)	Although you felt pain or swelling in limbs (and joints), you still persevered in going to work
8	Stomachache or discomfort	21	Stomachache (17), stomach discomfort (2), hunger-related stomach cramps (1), flatulence (1)	Although you had an upset stomach (e.g., stomachache, flatulence), you still persevered in going to work
9	General malaise	17	sore and swollen (10), exhausted (1), whole body ache (1), panidrosis (1), malaise (1), discomfort from sitting or standing for too long (1)	Although you felt whole body fatigue or discomfort, you still persevered in going to work
10	Nausea or emesis	14	Nausea (9), emesis (5)	Although you experienced nausea and felt like vomiting, you still persevered in going to work
11	Eye discomfort	11	Ophthalmodynia (7), asthenopia (1), dry eyes (1), giddiness (1), blurring of vision (1)	Although you had other physical symptoms, you still persevered in going to work
12	Pain in the neck or cervical spine	10	Cervical pain (6); neck pain (4)	
13	Diarrhoea	9	Diarrhoea (9)	
14	Lack of sleep	7	Lack of sleep (5), insomnia (2)	
15	Pregnant reaction	4	Pregnant reaction (2), pregnancy discomfort (1), abdominal pain during pregnancy (1)	
16	Toothache	2	Toothache (2)	
17	Interpulmonary neuralgia	1	Interpulmonary neuralgia (1)	
18	nosebleed	1	Nosebleed (1)	

were introduced in Study 1. In this study, the internal reliability coefficient of SPQ was 0.89.

Emotional exhaustion

Emotional exhaustion, a dimension of job burnout, was assessed using the Emotional Exhaustion Scale (EES) of Chinese Maslach Burnout Inventory (CMBI), which had previously been determined to have adequate reliability and validity in a Chinese sample (Li and Wu, 2005; Li et al., 2005). It was assessed by five items, such as: "I feel burned out from my work." The items were rated using a seven-point Likert scale, ranging from 1 (completely inconsistent) to 7 (completely consistent), with higher scores representing greater emotional exhaustion. In this study, the internal reliability coefficient of EES was 0.90.

Health-related productivity loss

Health-related productivity loss was assessed using the Chinese version of the Stanford Presenteeism Scale (SPS-6) (Zhao et al., 2010), which has been widely used to assess the impact of health problems on an individual's productivity (Koopman et al., 2002). It contains six items, including two dimensions of work constraints (with four items, e.g., "Despite having my health problem, my work pressure is more difficult to

adjust") and avoiding distraction (with two items, e.g., "Despite having my health problems, I was able to concentrate and finish the work," requiring reverse scoring). All the items were scored on a five-point Likert scale, ranging from 1 (completely disagree) to 5 (totally agree). Higher SPS-6 scores reflected greater loss of health-related productivity caused by presenteeism of the participants. In this study, the internal reliability coefficient of the SPS-6 was 0.86.

General health

General health was assessed using the 12-item General Health Questionnaire (GHQ-12), which required nurses to report their perceptions regarding their health conditions (Goldberg et al., 1997). The questionnaire focuses on the two areas of normal dysfunction and recently appearing distressing situations to assess an individual's current state. It seeks to identify any differences from the usual state (Fryers et al., 2004). It contains six positive items (e.g., "Have you been able to enjoy daily activities?," requiring reverse scoring) and six negative items (e.g., "Have you felt unhappy or depressed?"). All the items are scored on a four-point Likert scale, ranging from 1 (never) to 4 (usually). Higher scores reflect a lower health level (Gnambs and Staufenbiel, 2018). The questionnaire has been successfully conducted in Chinese samples and has already been proven to have good psychometric properties (Li and Li, 2015). In this study, the internal reliability coefficient of the GHQ-12 was 0.81.

Statistical Analysis

SPSS 22.0 and Amos 22.0 were used to analyse data. First, the independent-samples t test was used to evaluate the discrimination of items, and the correlation analysis was used to calculate the correlation between the item and complete questionnaire. Then, the EFA was used to determine the factor structure and the loading of items. Next, the CFA was adopted to further determine the NPQ structure. Finally, criterion-relative correlation analysis was conducted to access the criterion-relative validity of the NPQ.

RESULTS

Item Analysis

To test the discrimination of items, we calculated each participant's total o NPQ score. Then participants were divided into two groups based on their scores, from high to low. Specifically, the participants who scored the top 27% of participants with the highest scores constituted the high-score group while the bottom 27% of participants with the lowest scores constituted the low-score group Then, the differences in each item between the two groups were analysed. The results showed that all items had significant differences between the two groups ($t = 22.67 \sim 36.11$, $p < 0.01$). Subsequently, the correlation between each item and the total score was analysed to test the homogeneity of those items. The results showed that the correlation coefficients between each item and the total score were significant ($r = 0.74 \sim 0.85$, $p < 0.01$).

EFA

An EFA was conducted on the 11 items to determine the factor structure of the NPQ. The Kaiser-Meyer-Olkin (KMO) value of sampling adequacy was 0.95, and the result of Bartlett's test for sphericity showed a significant difference [$\chi^2/df = 2197.35$ (55), $p < 0.001$], which demonstrated that the sample was appropriate for factor analysis (Tabachnick and Fidell, 2013). Meanwhile, the maximum likelihood method was adopted, the factor was extracted based on the eigenvalue greater than 1, and the optimal skew method was used to rotate the factor. The results showed that only one factor was extracted, with a cumulative variance contribution rate of 63.06%. Besides, the internal reliability coefficient of the NPQ was 0.94. The factor loading results are shown in **Table 5**.

CFA

To verify the validity of the NPQ, AMOS 22.0 was used for CFA. When all 11 items were loaded into a single factor, the result generally showed a good fit ($\chi^2 = 143.92$, df = 41, $\chi^2/df = 3.51$, $p = 0.00$, comparative fit index [CFI] = 0.95,

TABLE 5 | Factor loading of the NPQ.

		EFA	CFA
Items		**Load**	**Load**
1	Although you had a fever, you still persevered in going to work	0.71	0.71
2	Although you felt dizzy or had a headache, you still persevered in going to work	0.80	0.77
3	Although you felt abdominal pain (including menstrual pain), you still persevered in going to work	0.71	0.67
4	Although you had a cold (e.g., stuffy nose or cough), you still persevered in going to work	0.75	0.71
5	Although you felt chest distress, shortness of breath, or palpitations, you still persevere in going to work	0.76	0.75
6	Although you felt discomfort in the lower back, you still persevered in going to work	0.72	0.70
7	Although you felt pain or swelling in limbs (and joints), you still persevered in going to work	0.78	0.73
8	Although you had an upset stomach (e.g., stomachache, flatulence), you still persevered in going to work	0.81	0.79
9	Although you felt whole body fatigue or discomfort, you still persevered in going to work	0.86	0.82
10	Although you experienced nausea and felt like vomiting, you still persevered in going to work	0.76	0.77
11	Although you had other physical symptoms, you still persevered in going to work	0.82	0.79

*The number of items is the same as in **Table 3**. The CFA loads are the standardized estimates.*

goodness of fit index [GFI] = 0.92, adjusted goodness of fit index [AGFI] = 0.87, root mean square error of approximation [RMSEA] = 0.09, standardised root mean square residual [SRMR] = 0.04). Meanwhile, the internal reliability coefficient of this questionnaire was 0.93.

Correlation Analysis

To further verify the validity of the NPQ, a correlation analysis between criterion-relative variables and nurse presenteeism was conducted, as shown in **Table 6**. The results revealed a positive and highly significant correlation between the NPQ and SPQ scores ($r = 0.84$, $p < 0.01$). The NPQ was moderately positively correlated with SPS-6 ($r = 0.24$, $p < 0.01$), GHQ-12 ($r = 0.33$, $p < 0.01$), and EES ($r = 0.45$, $p < 0.01$). These results proved the beneficial criterion-relative validity of the NPQ.

DISCUSSION

This study aimed to develop a multi-item presenteeism questionnaire for Chinese nursing occupations in order to explore the relationship between presenteeism and its related variables in depth and provide an alternative and effective measurement tool for future research. Therefore, based on the previous single-item and two-item questionnaire for presenteeism, the core disease symptoms of nurse presenteeism were investigated and incorporated into the NPQ after taking into consideration the existing literature and the compressive feedback provided by participants.

After being succinctly summarised based on the information collected from the open-ended questionnaire, 10 core symptoms of nurse presenteeism were obtained. The frequency of these symptoms reached 90.02% and an item "other symptoms" was added as a supplement, which indicated the wide coverage of these items. The results of item analysis revealed that there was a significant high correlation (correlation coefficient between 0.74 and 0.85) between each item and the total NPQ score. Meanwhile, the overall internal consistency reliability coefficient was higher than 0.9, which revealed the NPQ's good reliability. The EFA results indicated that all 11 items loaded in a single factor with a high factor load and that contributed to 63.06% of the total variance, which supported the single dimensional structure of NPQ. The subsequent results of CFA also confirmed the validity of the NPQ. The above preliminarily results proved the good reliability and validity of the NPQ.

Furthermore, some related variables of presenteeism were selected to verify the external validity of the NPQ. First, based on the content of this questionnaire, the SPQ that was developed by Lu et al. (2013a) and the NPQ in our study could both be used to measure nurse presenteeism; thus, they should be highly positively correlated, which is consistent with our results. In addition, compared with the SPQ, the internal reliability coefficient of the NPQ in our study reached 0.93 and above, which is higher than the internal reliability coefficient of the SPQ in previous studies on nursing participants (e.g., Zhang et al., 2018; Li et al., 2019). These results supported the good reliability of the NPQ. Second, presenteeism is inseparable from personal health. According to the recovery theory (Meijman and Mulder, 1998), people need enough resources to recover their physical and mental energy after work. If the recovery is insufficient and the energy continues to be consumed, people will be drained of energy to cope with their present job demand, further leading to long-term damage to their health. Empirical studies have also indicated that presenteeism, as a vital predictor of self-rated health status (e.g., Dellve et al., 2011; Gustafsson and Marklund, 2011), could lead to negative impacts on individuals' physical and mental health (e.g., Lu et al., 2013a; Conway et al., 2014) and cause a large amount of productivity loss for individuals and their organisations (e.g., Robertson and Cooper, 2011; Li et al., 2019). These studies support the finding in our study that presenteeism is negatively correlated with general health and health-related productivity loss. Finally, the positive correlation of presenteeism and emotional exhaustion in our study was also consistent with previous research. Demerouti et al. (2009) found a reciprocal relationship between presenteeism and emotional exhaustion in their longitudinal research, which pointed out that emotional exhaustion at the baseline (T1), led to presenteeism at 12 months (T2), which in turn resulted in more emotional exhaustion at 6 months (T3). It was explained that, when individuals felt exhausted, they would invest greater efforts to avoid the negative effects of progressive energy depletion, further leading to presenteeism, which in turn resulted in enhanced feelings of exhaustion. In addition, studies by Dellve et al. (2011) and Lu et al. (2013b) verified the positive relationship between presenteeism and emotional exhaustion, considering Chinese employees and Swedish healthcare workers as samples, respectively. Therefore, all these results confirmed the good criterion-related validity of the NPQ.

TABLE 6 | Correlate analysis between NPQ and its criterion-related variables (r, $n = 284$).

		M	*SD*	NPQ	SPQ	SPS-6	GHQ-12	EES
1	NPQ	1.50	0.84	(0.93)				
2	SPQ	1.61	1.05	0.84**	(0.88)			
3	SPS-6	2.58	0.69	0.24**	0.21**	(0.85)		
4	GHQ-12	2.04	0.50	0.33**	0.30**	0.37**	(0.83)	
5	EES	3.56	1.37	0.45**	0.43**	0.49**	0.66**	(0.91)

NPQ: Nurse Presenteeism Questionnaire; SPQ: Sickness Presenteeism Questionnaire; SPS-6: the Chinese version of the Stanford Presenteeism Scale; GHQ-12: the 12-item General Health Questionnaire; EES: emotional exhaustion scale of CMBI.

The Cronbach's α values are shown in brackets.

***p < 0.01.*

LIMITATIONS AND FUTURE RESEARCH

In this study, a multi-item NPQ was developed and its good reliability and validity were confirmed. Thus, it is an effective

measurement tool for future in-depth research of presenteeism and offers a degree of convenience in exploring the complex mechanisms between presenteeism and its related variables. However, some limitations of this research should be considered. First, the questionnaire was developed with Chinese nurses as samples, and the item pool was formed based on their responses. Hence, although the content of this questionnaire reflected the professional characteristics of nurses, its applicability to other occupational samples is uncertain and will necessitate further studies. In addition, although our questionnaire focused on the physical symptoms of female nurses, there were still a few male participants in our study 2. However, in China, male nurses account for about 2% of total number of registered nurses (Sun and Zhao, 2019). In present study, the proportion of male nurses was consistent with the prior study. Therefore, we did not remove the male samples in study 2. Future studies should recruit more male samples and conduct the gender invariance test to examine whether the questionnaire in present study could be applied in male nurses. Second, in the process of the items pool generation of the NPQ, core symptoms constituting the top 90% of responses were selected as the main items. Although "other symptom" was added as a supplement item, some symptoms were discarded, which may have affected the effectiveness of the questionnaire to a certain extent. Third, the Covid-19 pandemic is not completed overcome in a global context, and pandemic may influence our results in present study. However, on the current conditions of China, the work and life of residents has completely recovered. In addition, before study 2 was carried out, the cooperative hospitals had confirmed the nurses in the region had returned to normal work for more than 6 months. Furthermore, according to the Law of the People's Republic of China on Prevention and Treatment of Infectious Diseases, when nurses are infected with infectious diseases, for the sake of the health of themselves and others, they should be quarantined for treatment. Therefore, nurses have no chance to persist with work who have infectious diseases like SARS and Covid-19.

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 Henan University Institutional Review Board. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

YL was the principal investigator who generated the idea and designed the study. GS, SW, and KF were the primary writers of the manuscript and approved all changes. GS and WW assisted with the data input and data analysis. SG assisted with the data collection. All authors were involved in developing, editing, reviewing, and providing feedback for this manuscript and have given approval of the final version to be published.

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Does Co-worker Presenteeism Increase Innovative Behavior? Evidence From IT Professionals Under the 996 Work Regime in China

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Drawing on the event system and regulatory focus theory, this study constructed an impact mechanism model to investigate the relationship between the event strength of co-worker presenteeism and innovative behavior among IT professionals under the 996 work regime. In addition to test the direct effect, we examined the indirect effect of promotion focus and the moderating effect of event time in this relationship. Data were collected through an online survey administered to 374 IT professionals in China. The results showed a positive relationship between the criticality of co-worker presenteeism events and innovative behavior. An indirect effect of promotion focus was also found in this relationship. The timing of co-worker presenteeism events moderated the relationship between the criticality of co-worker presenteeism events and promotion focus. Specifically, the effect was more significant when co-worker presenteeism events occurred during project delays.

Keywords: co-worker presenteeism, promotion focus, innovative behavior, IT professionals, 996 work regime

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INTRODUCTION

Although the negative effects of presenteeism have been well researched, the positive consequences have received relatively less attention, and the effects of presenteeism on co-workers are largely unknown. Co-worker presenteeism refers to co-workers attending work despite being in a state of suboptimal health (Johns, 2010; Karanika-Murray and Biron, 2019; Ruhle et al., 2020). The COVID-19 pandemic increased employees' levels of uncertainty about their job characteristics and work context (Tang et al., 2020). In a large-scale survey of US employees, 96% of the participants reported that the pandemic had affected their stress levels and considered it the most stressful period of their professional careers (Ginger, 2020), with stress being an established factor in poor psychological and physical health (Zurlo et al., 2016). The pandemic has also spurred the rapid uptake of digital communication, services and consumption (e.g., telecommuting, online healthcare, online education and online fresh food shopping), which is demanding higher levels of efficiency and innovation from employees of related IT enterprises. With these developments in the IT industry and the associated increases in occupational stress, the phenomenon of co-worker presenteeism among IT professionals has sharply increased during

the period of the COVID-19 pandemic against the background of the already demanding '996' work regime.

The sudden death of a 23-year-old employee of the Pinduoduo e-commerce company on 29 December 2020 triggered heated discussions in China surrounding the 996 work regime (Damaojingjing, 2020). The 996 regime refers to a widespread regulation among IT companies in China that employees work from 9 a.m. to 9 p.m., 6 days a week. The 996 work regime has become a default corporate culture in IT companies over recent years and is sometimes mandatory. The rule has been adopted by many other well-known Chinese IT companies, such as Alibaba, Tencent and Jingdong (Xiao et al., 2020). The term originated from a project called '996ICU', which was uploaded to GitHub by a software programmer on 27 March 2019 as an act of protest. The project listed the companies requiring a 996 working pattern for blacklisting and promoted the slogan 'developers' lives matter' (Yang, 2019). Nevertheless, Jack Ma, the influential founder of Alibaba, expressed his support for 996 on his official Weibo account on 12 April 2019.

With almost all enterprises now facing a dynamic environment, organizations are reliant on innovation to survive and to gain competitive advantages (Han and Yang, 2011; Anderson et al., 2014). This is especially true for digital ventures and software development companies during and in the aftermath of the COVID-19 pandemic, as they must adapt to a rapidly changing market through innovation aimed at developing high-quality products and providing excellent services (Huang et al., 2017; Kude et al., 2019). Individual creativity is the foundation of an organization's innovation (Amabile, 1988), and for IT enterprises, as typical examples of knowledge-based organizations, innovative behavior by their professional employees is the primary source of their competitiveness.

In meeting the innovation needs of enterprises, employees naturally face the problem of pacing their work, and an organization's regulation of the intensity and speed with which its members operate is crucial to innovation management (Gersick, 1994; Dougherty et al., 2013). The 996 work regime is a typical manifestation of the time-pacing regulations of IT companies, especially against the background of the COVID-19 pandemic. It is not surprising to find that presenteeism, meaning to work in a state of suboptimal health, is commonly reported by IT professionals (Karanika-Murray and Biron, 2019). The unique working environment of IT professionals, which is often characterized by high perceived workloads, role ambiguity and role conflict, can easily induce both work exhaustion and presenteeism (Demerouti et al., 2009; Shih et al., 2013). The working patterns of IT professionals might mean that presenteeism is particularly prevalent in the IT industry.

In the past two decades, most studies on the impact of presenteeism believe that it is a kind of negative behavior or it has negative effects for organizations, teams, or individuals. However, a small but growing body of the literature is turning to explore the positive side of it. The direction expansion of the positive effects research can be understood deeply from the conceptual connotation and practical observation of presenteeism (Karanika-Murray and Biron, 2019).

First, there are two main definitions of presenteeism: one that emphasizes the act of working while ill and the other that focuses on the loss of productivity due to poor health conditions (Johns, 2010; Lohaus and Habermann, 2019). However, by either definition, the nature of presenteeism phenomenon can be partially understood if it focuses only on health-related issues and ignores the importance of work itself (Karanika-Murray and Biron, 2019). Presenteeism is also considered as an adaptive behavior that serves the purpose of balancing health constraints and job performance requirements, rather than just a negative behavior (Karanika-Murray and Biron, 2019). Second, from the observation of the real situation, employees can participate in work when their health conditions are not serious, and participation in work can help people meet some basic psychological needs, keep job control and maintain working relationship with colleagues and clients, which is conducive to recovery from illness to a certain extent (Demerouti et al., 2009; Van den Broeck et al., 2016; Ruhle et al., 2020). A growing body of evidence shows that presenteeism has certain positive effects on both individuals and organizations.

Therefore, based on the conceptual connotation and realistic research evidences, we should not solely focus on the negative effects of presenteeism, but should try to explore the positive aspects of it.

Although there has been extensive research undertaken on the outcomes of presenteeism, four aspects of the phenomenon are worthy of further exploration, especially against the background of the 996 work regime and in the aftermath of the COVID-19 pandemic. First, most studies have explored the negative effects of presenteeism, arguing that it is bad for the productivity of organizations and individuals. Studies focusing on the positive effects of presenteeism are relatively fewer but are increasing in number. A few studies have argued that presenteeism is an example of adaptive or organizational citizenship behavior (Miraglia and Johns, 2016; Karanika-Murray and Biron, 2019) with benefits for individual innovation performance (Xu et al., 2016). The present study enriches this body of research into the positive effects of presenteeism. Second, most studies have focused on the effects of presenteeism on the individual, with few having explored interpersonal effects, such as whether and how presenteeism affects the behavior of other employees (Luksyte et al., 2015). Grounded in event system theory (EST; Morgeson et al., 2015), the present article focuses on the effects of co-worker presenteeism on innovative behavior from an interpersonal perspective. Third, studies of the mediation mechanism between co-worker presenteeism and employee output have mostly adopted the perspective of discrete emotional responses (Luksyte et al., 2015), which are relatively situational and transient. However, the behavior of colleagues can also stimulate responses from some relatively stable traits, such as individual self-regulation preferences. According to EST and regulatory focus theory (RFT; Higgins, 1997), each person has a different regulatory focus for coping and responds differently to events occurring at different times. This paper expands on the research into the mediation mechanism between co-worker presenteeism and employee output from the perspective of self-regulation and, based on EST, further explores the boundary condition of event time on the relationship

between colleague presenteeism events and individual regulatory focus. Fourth, most research on the antecedents of innovative behavior, such as the attributes of the work, individual personality traits, or such situational factors as leadership style and organizational climate, has focused on the stable characteristics of the entities and has rarely explored the event-related antecedents. The present study extends this research into innovative behavior antecedents by considering event-related factors.

To fill these research gaps, this study draws on a sample of IT professionals to build an impact mechanism model of the relationship between co-worker presenteeism and employees' innovative behavior based on the EST (Morgeson et al., 2015) and RFT (Higgins, 1997). This study addresses the following research questions (1) Does co-worker presenteeism event strength affect innovative behavior among IT professionals in the context of the 996 work regime? (2) What is the regulatory focus-related mediation mechanism between co-worker presenteeism and innovative behavior among IT professionals? (3) What is the boundary condition in the relationship between co-worker presenteeism and individual regulatory focus?

THEORY AND HYPOTHESES

Theoretical Background

Event System Theory

The main paradigm of management research involves attending to the stable characteristics of the entity under study, which has meant that there has been relatively little research into the potentially transformational effects of events experienced by an entity (Liu and Liu, 2017). In contrast, EST systematically considers the different attributes of an event and its mechanism of influence on the entity. EST predicts that event strength (generated by criticality, novelty, etc.), event time (including timing and duration) and event space (including origin and spatial dispersion) affect the entity individually or collectively and directly or indirectly.

The EST points out that the attributes of strength, time and space of an event determine the influence degree of an event on an entity. For criticality in event strength, it reflects the extent to which the event requires priority response by the organization, and has a significant impact on the realization of the organization's goals (Liu and Liu, 2017). The more critical the event is, the more attention it requires the organization to pay. For instance, a more critical event is considered more likely to influence or trigger behaviors, characteristics and new events. Event time is posited as a moderator in the relationship between the event strength and the outcomes. Furthermore, events that are more consistent with the development stage of the entity are more influential (Morgeson et al., 2015). In addition, Liu and Liu (2017) pointed out that it is often difficult for researchers to study the three attributes of an event (strength, time and space) simultaneously; therefore, scholars ought to consider one or two of these attributes in combination with their own research focus to predict the corresponding dependent variables.

In our research model, we regard colleague presenteeism as an event, explore the influence path and mechanism of co-worker presenteeism event strength (criticality) on employees' innovative work behavior and combine the RFT to explore the moderating effect of event time (whether co-worker presenteeism events occurred in the period of project delay) on the relationship between event strength and promotion focus.

Regulatory Focus Theory

The hedonic principle, which emphasizes approaching pleasure and avoiding pain, has become the basic motivational assumption of many psychological theories. In itself, however, the principle does not explain the different ways that it operates. Self-regulation, for example, is essential for adaptation because people need to adjust their cognition and action in the process of pursuing goals within various complex environments (Baumeister et al., 1993). Higgins (1997) thus went beyond the hedonic principle to put forward the RFT, which provides a clear answer to the operation of the principle. RFT distinguishes the type of self-regulation focused on promotion (accomplishments and aspirations) from that focused on prevention (safety and responsibilities; Higgins, 1997). When people are driven by goals of promotion, they will scrutinize their surroundings for information related to the pursuit of success, but when people are driven by goals of prevention, they will focus on information related to the avoidance of failure, and their subsequent behavior will correspond to this specific self-regulatory focus (Lockwood et al., 2002).

Kark and Van Dijk (2007) further divided individual regulatory focus into chronic regulatory focus and situational regulatory focus. Chronic regulatory focus refers to a relatively stable individual trait that is gradually formed during the growth process of an individual. Situational regulatory focus refers to the relatively more variable individual characteristics that are stimulated with the change of the contextual environment.

Therefore, regulatory focus is not only influenced by individuals' personality (Wallace and Chen, 2006) but also evoked by environmental cues (Johnson et al., 2015). We assert that a co-worker presenteeism event can provide such a situational cue to arouse regulatory focus in employees. Then, the literature has long presented regulatory focus as a proximal motivational antecedent of work-related outcomes (Lanaj et al., 2012), so this study intends to use regulatory focus as an antecedent variable for innovative work behavior.

From the perspectives of EST and RFT, this study explores the effect of the strength of co-worker presenteeism events on employees' innovative behavior. In addition, the indirect effects of regulatory focus in this relationship are analyzed and discussed. Finally, the boundary condition of the timing of co-worker presenteeism events on the relationship between event strength and employees' regulatory focus is explored.

Theoretical Model and Hypotheses

Drawing on EST and RFT as the theoretical bases, we present our research model in **Figure 1**.

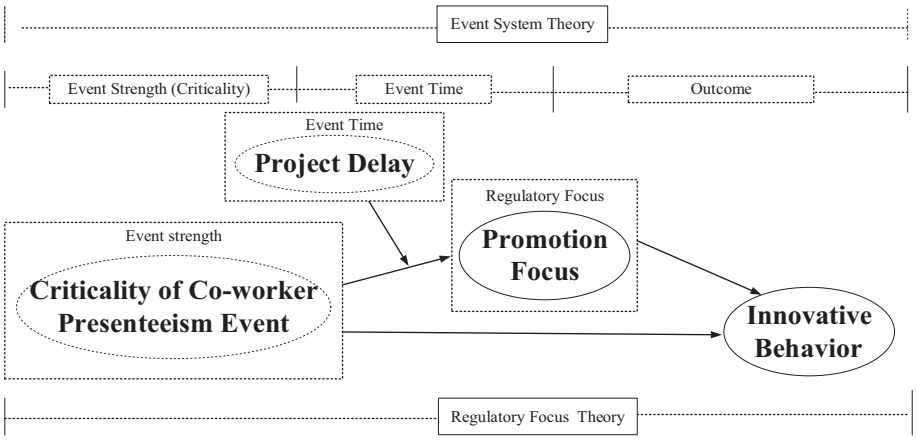

FIGURE 1 | Research model.

Effect of Criticality of Co-worker Presenteeism Events

Event criticality reflects 'the degree to which an event is important, essential, or a priority' to an entity (Morgeson and DeRue, 2006). It is not surprising that employees choose to attend work when experiencing suboptimal health under the 996 work regime of IT enterprises during and in the aftermath of the COVID-19 pandemic. Presenteeism is an adaptive job behavior that aims to balance health constraints and job demands, generally when experiencing noncontagious and common health problems (Karanika-Murray and Biron, 2019). It not only affects the physical and mental health and working relationships of employees but also has an impact on the productivity of an organization (Ruhle et al., 2020; Zhang et al., 2020).

The EST predicts that the more critical the event experienced by an entity, the more changes will be induced and the more attention and action will occur in response (Morgeson et al., 2015). We argue that a more critical co-worker presenteeism event will provide a greater incentive for innovative behavior. Furthermore, there are some circumstances under which going to work with an illness can be seen as making an effort to contribute and as a manifestation of organizational citizenship behavior (Johns, 2010; Miraglia and Johns, 2016). Some studies have shown that the altruistic behavior and interpersonal coordination found in organizational citizenship behavior are conducive to the formation of an atmosphere of innovation in a work team, which provides a foundation for increased individual innovation performance (Tang, 2005; Xu et al., 2016). Based on the integration of the above arguments, we hypothesize the following:

H1: Criticality of co-worker presenteeism events has a positive effect on innovative behavior.

Indirect Effect of Promotion Focus

Regulatory focus is not only influenced by personality (Wallace and Chen, 2006) but also evoked by situational cues (Johnson et al., 2015). The highly influential social learning theory proposes that individuals are likely to learn knowledge and norms by observing the behavior of others (Bandura, 1977). Observing the behavior of a co-worker is therefore an important form of situational stimulation for a specific self-regulatory focus among employees (Kim et al., 2021). Along these lines, we argue that a co-worker presenteeism event can provide such a situational cue to arouse regulatory focus in employees.

Scholars have conducted research on the regulatory mechanism during times of crisis. Markovits et al. (2014) argued that an economic crisis may encourage employees to pay more attention to the prevention rather than the promotion orientation and to use prevention as a strategy to cope with threatening circumstances, on the grounds that the economic crisis may reduce the chances of job promotion and success. However, the situation for the IT professionals in the present study is the opposite to that of an economic crisis, as the rapid development of digitalised industries, such as those involved in the provision of telecommuting, online medical care, online education, and online fresh food shopping, has been spurred by the COVID-19 pandemic. As the pandemic has provided space for the expansion of the related IT industries, we assert that co-worker presenteeism events will trigger promotion focus rather than prevention focus among IT professionals.

The basic relationship between the strength of co-worker presenteeism events and promotion focus has been clarified above, and we can also reveal the specific mechanism of inducing promotion focus through motivation-related theories. Any behavior and intention may stem from different motives, some from altruism and others from egoism (Ma et al., 2015; Lee et al., 2019), and promotion focus, like most human behavior and intentions, is caused by multiple motivations. The key point to distinguishing altruistic motivation from egoistic motivation is whether the ultimate purpose is self-serving (Batson, 1987). Existing studies on dispositional antecedents of promotion focus support this statement, such as altruistic-oriented conscientiousness and egoistic-oriented learning goal orientation (Gorman et al., 2012; Lanaj et al., 2012). Thus, the two coexistence mechanisms for

inducing promotion focus will be elaborated separately from the aspects of altruism and egoism in the following.

The mechanism of altruistic perspective, mainly combined with the theory of social exchange, regards the co-worker presenteeism event as a kind of helping behavior, especially in background of collectivism culture in East Asia (Moorman and Blakely, 1995; Alabak et al., 2016). In return, individuals will do their best to do things for colleagues and organization, to pursue better self-growth. Indeed, this contention is further strengthened by social exchange theory, which proposes that individual behavior is intended for the mutually beneficial exchange of resources, with the core attributes of this exchange being self-interest and interdependence (Emerson, 1976; Lawler and Thye, 1999). Presenteeism is an adaptive behavior when it involves noncontagious and common health conditions (Karanika-Murray and Biron, 2019). Caverley et al. (2007) found that the primary reason for employees choosing to engage in presenteeism was the fear that their colleagues would have to take on additional job responsibilities if they were absent. To the extent that the strength of co-worker presenteeism events represents an atmosphere of co-workers helping each other, it may elicit a cognitive focus on accomplishment and growth rather than on duty and obligation. Thus, we argue that as the criticality of co-worker presenteeism increases, employees are more likely to be promotion oriented.

There is also an egoistic perspective in the inducing mechanism of promotion focus besides the altruistic perspective. People tend to take the initiative to seize all opportunities to seek better development in a fierce workplace environment. When colleagues come to work with illness, their work efficiency may be affected and employees may take advantage of this opportunity to show themselves and gain a better competitive advantage. The literature also shows that individuals with high egoistic values are more inclined to receive information that promotes focus orientation and adopt related behavior (Lagomarsino et al., 2020). Therefore, we assert that as the criticality of co-worker presenteeism increases, individuals are apt to be promotion oriented.

The literature has long presented regulatory focus as a proximal motivational antecedent of work-related outcomes (Lanaj et al., 2012). In the initial stages of research into regulatory focus and innovative performance, Friedman and Förster (2001) argued that compared to the perseverant processing method induced by prevention cues, the explorative processing method induced by promotion cues would facilitate creativity. Indeed, according to Baas et al. (2008), the promotion focus elicits widespread attention and facilitates the conceptual acquisition of mental representations with lower prior accessibility. Promotion-oriented employees are more inclined to adopt an open attitude to change and focus on exploratory behavior, whereas prevention-oriented employees are more focused on conservative behavior and more inclined toward stability (Neubert et al., 2008). This suggests that a promotion orientation may engender innovative behaviors in employees.

Building on the integration of the above arguments, it is plausible that a promotion focus might act as a mediator in the relationship between the criticality of co-worker presenteeism events and innovative behavior. Therefore, we propose the following hypothesis:

> *H2*: Promotion focus has an indirect effect on the relationship between the criticality of co-worker presenteeism events and innovative behavior.

Moderating Role of Event Timing

Many companies must manage a portfolio of product development projects with a limited pool of resources. The competition between projects for the use of specific resources at specific times often results in project delays (Browning and Yassine, 2015), especially in IT enterprises (Haider and Kayani, 2020). With IT companies facing pressure to cope with the dynamic changes in market demand during and in the aftermath of the COVID-19 pandemic, they are highly likely to experience project delays.

Events have temporal characteristics that distinguish them from the constant features of a work environment. The timing of an event experienced by an entity can play a vital role in determining the impact of the event. The EST suggests that event timing moderates the relationship between event strength and outcome variables. Events that occur in time periods that match the development stage of the entity are more likely to trigger responses and generate change (Morgeson et al., 2015).

Based on the more severe work pressure faced by employees when the project they are working on is delayed, we argue that a co-worker presenteeism event occurring during a project postponement period is more likely to trigger a promotion focus than one occurring outside of a project postponement period. Thus, we hypothesize the following:

> *H3*: The timing of co-worker presenteeism events moderates the relationship between the criticality of co-worker presenteeism events and promotion focus. Specifically, the effect is more significant when a co-worker presenteeism event occurs during a time of project delay.

MATERIALS AND METHODS

Participants

With the administration of offline questionnaires not being possible during the COVID-19 pandemic, we conducted an online survey on the sojump.com platform to collect data for testing our research model. The data were collected from employees of Chinese IT companies. Participation in the study was voluntary, confidential, and anonymous. Upon completion of the questionnaire, each participant was given an electronic red envelope reward.

A total of 430 questionnaires were collected, and 374 questionnaires were obtained after deleting those with a total response time of less than 50 s and with the same number selected from beginning to end. Before proceeding with the statistical analyses, we identified multivariate outliers using Mahalanobis distance (1936) and verified the normality of the

data. A multivariate outlier analysis was carried out according to the method of Mahalanobis distance (1936), and the results showed that two samples were outliers, so these two outliers were eliminated, and finally 374 valid samples were obtained. Then, scholars suggested that the values of skewness and kurtosis between −1 and +1 are acceptable for most psychometric purposes (Hair et al., 2009; George and Mallery, 2019). In the present study, the skewness and kurtosis values of the variables in the model fulfilled the criteria, indicating that the data were normally distributed. Prior research has indicated that demographic variables, such as gender, age, work experience, education and job category, are likely to be associated with innovative behavior (e.g., Zhang and Bartol, 2010; Zhang et al., 2016). Hence, consistent with previous studies, we controlled for these variables in our data analyses. After data cleaning, the sample comprised 374 employees, of which 67.91% were men and 32.09% were women. Most of the participants were between 20 and 45 years old: specifically, 1.87% (7) were aged below 21 years, 35.03% (131) were aged 21–25, 37.97% (142) were aged 26–30, 16.84% (63) were aged 31–35, 4.81% (18) were aged 36–40, 2.67% (10) were aged 41–45 and 0.80% (3) were 46 or older. Concerning education background, 27.81% of the respondents had a Master's degree or above, 53.74% had a Bachelor's degree and 18.45% had completed junior college. In terms of work experience, 17.91% (67) of the participants had 1 year or less, 32.09% (120) had 1–3 years, 22.99% (86) had 4–6 years, 14.17% (53) had 7–9 years and 12.83% (48) had 10 years or more. Based on the criteria used by major IT companies, the job categories of the participants were products (14.97%), technology (48.66%), operations (11.50%), marketing (5.61%), design (3.74%), administration (7.49%) and others (8.02%).

Measures

All 18 items used to measure the latent variables were adapted from existing validated scales to fit the context of this study. All items were measured on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The questionnaire was translated into Chinese using a back-translation procedure (Brislin, 1970). Considering the cultural adaptability of the measurement tools, we also referred to the corresponding measurement instruments of other papers with Chinese samples in addition to the translation and back-translation to adapt instruments. The good reliability and validity of those instruments have been well confirmed in Chinese populations. Three professors in the field of organizational behavior were asked to check the content of the items, and six graduate students employed in the IT industry were asked to complete the survey to check its clarity. This ensured that the participants would be able to understand the items clearly.

Innovative behavior was assessed using Scott and Bruce's (1994) 6-item measure. The respondents were asked to rate the extent to which they engaged in certain behaviors (e.g., 'I search out new technologies, processes, techniques, and/or product ideas', 'I generate creative ideas' and 'I develop adequate plans and schedules for the implementation of new ideas') on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Cronbach's alpha for this scale in this study was 0.93, showing good reliability.

Promotion focus was assessed with the 9-item measure of Lockwood et al. (2002). The respondents were asked to rate the extent to which they agreed with a number of statements (e.g., 'I frequently imagine how I will achieve my hopes and aspirations', 'I typically focus on the success I hope to achieve in future', 'I see myself as someone who is primarily striving to reach my "ideal self" – to fulfill my hopes, wishes, and aspirations' and 'Overall, I am more oriented toward achieving success than preventing failure') on a 7-point scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Cronbach's alpha for this scale in this study was 0.95, showing good reliability.

Criticality of co-worker presenteeism event used a 3-item event disruption scale developed by Morgeson and DeRue (2006) and translated into Chinese by Liu and Liu (2017). The respondents were asked the following screening question before the three items were presented as follows:

> A co-worker presenteeism event refers to the behavior of a colleague participating in work in a state of ill-health (having a backache, cold, mental health issue, etc.). If a colleague is in the above situation, please continue to fill in the questionnaire. If the above situation does not exist, please exit the questionnaire (screening question).

The respondents were then asked to rate the extent to which they agreed with three statements on a 7-point scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Two sample items were 'The co-worker presenteeism event is critical for the long-term success of the team' and 'The co-worker presenteeism event is important for the team'. Cronbach's alpha for criticality of co-worker presenteeism event in this study was 0.87, showing good reliability.

The timing of the co-worker presenteeism event was measured with a single item asking 'whether the recent co-worker presenteeism event occurred in a period of project delay', for which respondents could select *yes* or *no* (coded as 1 and 0, respectively).

Data Analysis

Data preparation and all statistical analyses, including confirmatory factor analysis (CFA), common method variance (CMV), descriptive statistics, and hypotheses testing, were conducted with SPSS (version 23) and Amos (version 20).

The analysis had three steps. First, CFA was conducted to assess the discriminant validity of the core variables, and the CMV was examined. Second, the descriptive statistics and correlations between key variables were analyzed. Third, the postulated hypotheses were tested.

Measures of global fit were checked during model testing. The criteria used to evaluate reasonable global fit were chi-square minimum degrees of freedom (χ^2/df) <5 (Yang et al., 2016), root-mean-square error of approximation (RMSEA) <0.08

(Hu and Bentler, 1999), nonnormed fit index (NNFI) and comparative fit index (CFI) ≥0.90 (Cheung and Rensvold, 2002).

RESULTS

Discriminant Validity and Common Method Variance

Using Amos (version 20), we tested the discriminant validity with CFA. The CFA results indicate that our proposed three-factor model (criticality of co-worker presenteeism event, promotion focus and innovative behavior) yielded a better fit than alternative models (Model 1: χ^2/df = 3.154, RMSEA = 0.076, CFI = 0.949, NNFI = 0.940; Model 1 in order to test the discriminant validity between criticality of co-worker presenteeism event, promotion focus and innovative behavior; Model 2 in order to differentiate co-worker presenteeism event + promotion focus and innovative behavior; Model 3 in order to test whether above variables belong to one factor; Model 4 followed the suggestion of Podsakoff et al. (2003), and the unmeasured latent methods factor was applied, in order to test CMV; see **Table 1**). Therefore, the measures of the three core variables in this study captured the distinct constructs.

Common method variance was a potential problem in this study given of the use of a self-report questionnaire from a single source. A CFA was used to examine the issue. Following the suggestion of Podsakoff et al. (2003), the unmeasured latent methods factor was also applied. A latent method factor was constructed based on the original three-factor structure (i.e., the items for criticality of co-worker presenteeism event, promotion focus and innovative behavior loading on their respective constructs). The latent methods factor was uncorrelated with other factors, and all of the items were loaded on this latent methods factor.

A comparison of the unmeasured latent methods factor model and the theoretical model indicated a slight change of chi-square value, $\Delta\chi^2(18) = 135.359$, $p < 0.001$ (see **Table 1**). Chi-square values are easily impacted by sample size, especially when the sample size is larger than 200 (Cheung and Rensvold, 2002; Zhu and Zhang, 2019). Therefore, researchers have suggested examining the NNFI for model choice, with a change of NNFI of less than 0.05 indicating that adding the unmeasured latent methods factor does not significantly promote the theoretical model (Little, 1997; Zhu and Zhang, 2019). Given that the sample size in this study was 374, we followed this procedure and found that NNFI increased by 0.02 when the latent methods factor was included. Therefore, adding a latent methods factor did not significantly improve the model, and we concluded that CMV did not have a significant impact on the results.

Descriptive Statistics

The means, standard deviations and correlation matrices of the key variables are presented in **Table 2**. Criticality of co-worker presenteeism event was positively correlated with innovative behavior (r = 0.40, $p < 0.01$) and with promotion focus (r = 0.46, $p < 0.01$). Promotion focus was positively correlated with innovative behavior (r = 0.66, $p < 0.01$). The correlation results were in accordance with our hypotheses and indicated suitability for further hypothesis testing.

Hypothesis Testing

H1 predicts that criticality of co-worker presenteeism event is positively related to employees' innovative behavior. To test the direct effect, we controlled demographic variables. As presented in **Table 3**, M2 shows that criticality of co-worker presenteeism event has a significant effect on employees' innovative behavior (β = 0.35, $p < 0.001$). Therefore, H1 is supported.

H2 asserts that promotion focus would mediate the relationship between criticality of co-worker presenteeism event and employees' innovative behavior. We followed mediation testing procedure from Baron and Kenny (1986) to verify H2. As given in **Table 3**, M1 shows that the effect of criticality of co-worker presenteeism event on promotion focus is significant (β = 0.39, $p < 0.001$), M3 indicates promotion focus has a significant effect on innovative behavior (β = 0.68, $p < 0.001$) and M4 indicates that after joining promotion focus, the effect of criticality of co-worker presenteeism event on employees' innovative behavior is decreased, but still significant (β = 0.11, $p < 0.01$). R^2 was 0.46 ($p < 0.001$). Thus, H2 is supported.

Then, following the procedure of Baron and Kenny (1986), we used model 7 of the PROCESS macro in SPSS to test H3 and the whole research model (see **Figure 2**). Our results show that criticality of co-worker presenteeism event was significantly and positively correlated with employees' innovative

TABLE 1 | Results of confirmatory factor analysis (n = 374).

Model	χ^2	*df*	χ^2/df	RMSEA	CFI	NNFI	$\Delta\chi^2$	Δdf
Model 1 (three factors: CP, PF and IB)	411.211	130	3.163	0.076	0.946	0.937		
Model 2 (two factors: CP + PF and IB)	930.562	134	6.944	0.126	0.847	0.826	519.351***	4
Model 3 (one factor: CP + PF + IB)	1616.286	135	11.972	0.172	0.716	0.678	1205.075***	5
Model 4 (unmeasured latent methods factor)	277.105	112	2.474	0.063	0.968	0.957	134.106***	18

*CP, criticality of co-worker presenteeism event; PF, promotion focus; IB, innovative behavior. ***p < 0.001.*

TABLE 2 | Means, standard deviations and correlations for latent variables.

Variable	*M*	*SD*	CP	PF
Criticality of co-worker presenteeism event (CP)	4.99	1.11		
Promotion focus (PF)	5.47	0.95	0.46**	
Innovative behavior (IB)	5.42	0.96	0.40**	0.66**

***p < 0.01.*

TABLE 3 | Hierarchical regression analysis.

Predictors	PF		IB	
	M1	M2	M3	M4
Control variables				
Job category	0.04	−0.00	−0.02	−0.03
Gender	0.02	0.01	−0.02	0.00
Education level	0.02	0.09	0.07	0.08
Age	−0.02	0.16*	0.17**	0.17**
Work experience	0.05	−0.05	−0.09	−0.09
Independent variable				
CP	0.39***	0.35***		0.11**
Mediator				
PF			0.68***	0.62***
F	16.62***	13.75***	52.88***	47.42***
R^2	0.21	0.18	0.46	0.48

*CP, criticality of co-worker presenteeism event; PF, promotion focus; IB, innovative behavior. *p < 0.05; **p < 0.01; ***p < 0.001.*

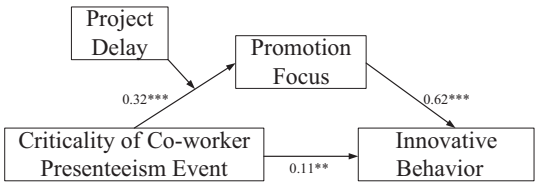

FIGURE 2 | Results of research model by using model 7 of the PROCESS. **$p < 0.01$; ***$p < 0.001$.

behavior ($\beta = 0.11$, $p < 0.01$). There was a significant positive association between criticality of co-worker presenteeism event and promotion focus ($\beta = 0.32$, $p < 0.001$). Promotion focus was positively associated with innovative behavior ($\beta = 0.62$, $p < 0.001$). As expected, results confirmed that the interaction between criticality of co-worker presenteeism event and the timing of co-worker presenteeism events (co-worker presenteeism events occurs during a time of project delay or not) on promotion focus was significant ($\beta = 0.18$, $p < 0.05$). The results of model 7 further showed that the mediating effect of promotion focus in the relationship between criticality of co-worker presenteeism event and employees' innovative behavior during a project postponement period (effect = 0.31, 95% CIs [0.22, 0.39]) was stronger than one occurring outside of a project postponement period (effect = 0.20, 95% CIs [0.11, 0.29]). H3 is therefore well supported. All results are marked in **Figure 2**.

DISCUSSION

Drawing on the EST and RFT, this study constructed an impact mechanism model to investigate the relationship between the strength of co-worker presenteeism events and innovative behavior among IT professionals against the background of 996 work regime. The direct effect was tested alongside the indirect effect of promotion focus and the moderating effect of event time in this relationship. An online survey was administered to 374 IT professionals in China. The results showed a positive direct relationship between criticality of co-worker presenteeism event and innovative behavior and an indirect effect of promotion focus in this relationship. Furthermore, the timing of a co-worker presenteeism event during a project delay moderated the relationship between criticality of co-worker presenteeism event and promotion focus, with the effect stronger when co-worker presenteeism events occurred during project delays. These findings have important theoretical and practical implications.

Theoretical Implications

The findings make several contributions to the literature on presenteeism and innovative behavior. First, most studies on the consequences of presenteeism have focused on its negative outcomes, arguing that it is bad for productivity. Relatively fewer studies have examined the positive effects of presenteeism, although several have described presenteeism as a kind of adaptive (Karanika-Murray and Biron, 2019) or organizational citizenship behavior (Miraglia and Johns, 2016) that is beneficial to individual innovation performance (Xu et al., 2016). Based on EST, this study expands the scope of research into the positive impact of presenteeism by suggesting that it can facilitate individual innovative behavior in co-workers.

Second, most studies of presenteeism have focused on individual effects, positive and negative, but few have attended to interpersonal effects, such as whether and how presenteeism on the part of a co-worker can affect the emotions, cognition or behavior of an employee (Luksyte et al., 2015). With the aid of EST (Morgeson et al., 2015), this study extends presenteeism to include co-worker presenteeism, regarded as an event, and explores the influence of the criticality of presenteeism events on the innovative behavior of colleagues from an interpersonal perspective.

Third, studies of the mediation mechanism between co-worker presenteeism and its outcomes have mostly concentrated on discrete emotional responses (Luksyte et al., 2015), which are relatively transient. However, the acts of colleagues can also arouse responses in some relatively stable traits, such as individual self-regulation preference. According to the EST and RFT, each person has a different regulatory focus for coping and responds differently to events occurring at different times. Furthermore, as mentioned in H2 above, the way in which the promotion focus works, in addition to the explanation from the help behavior, may also include

taking advantage of the disadvantaged situation of colleagues or other possible deleterious effects. This study thus expands the research into the mediation mechanism between co-worker presenteeism and employees' innovative behavior from the perspective of self-regulation. In addition, considering the background of the 996 work regime of IT companies during and in the aftermath of COVID-19 pandemic, we discuss the event time boundary conditions for the relationship between criticality of co-worker presenteeism events and a promotion-oriented regulatory focus, specifically in relation to the project delays that are often experienced by IT enterprises. This study thus enriches the theoretical understanding of the mechanism of the positive effect of presenteeism, and it is also an extension of the EST due to the increased mediating factor combined with the RFT.

Finally, research on the antecedents of innovative behavior, such as the attributes of the work, individual personality traits or such situational factors as leadership style and organizational climate, has mostly focused on the stable characteristics of the entities under study and has rarely explored the event-related antecedents. This study thus deepens the innovative behavior antecedents research by adding the perspective of event-related factors.

Managerial Implications

Our findings have two valuable practical implications. First, our results indicated that criticality of co-worker presenteeism events had a direct effect on innovative behavior and an indirect effect *via* promotion focus by eliciting widespread attention and the adoption of a more open attitude to changes and exploratory behaviors. Organizations should be aware of such effects, especially against a macro background of the coexistence of crisis and opportunity as exists during COVID-19, in appropriately exerting a certain degree of work pressure and striving to increase the promotion focus of employees, thereby facilitating their innovative job behavior. In particular, since the negative effects of presenteeism mentioned in the existing studies do exist, although the conclusion of this study is that co-worker presenteeism events are conducive to employees' innovative behavior, it does not mean that organization managers should openly advocate presenteeism, but we should treat the phenomenon of presenteeism more objectively, and not necessarily resist it all at once. Instead, we should formulate corresponding strategies according to the actual needs of the organization. Second, the results shed light on the moderating role of the timing of co-worker presenteeism events by showing that the relationship between criticality of co-worker presenteeism events and promotion focus was stronger when co-worker presenteeism events occurred during project delays. Hence, organizations should take steps to improve employees' promotion focus during periods of project delay.

Limitations and Future Research

There are several limitations to this study. First, the cross-sectional design limits the ability to make causal inference about the proposed relationships. Thus, scholars may consider multi-wave design or dynamic model to examine the corresponding hypotheses in future, and adopt methods, such as longitudinal research to improve the validity of research conclusions. In addition, future research can expand the sample size and increase the representativeness of the sample.

Second, our study used a self-report questionnaire, which can lead to a degree of common method bias (Podsakoff et al., 2003). Although testing of the unmeasured latent methods factor indicated that common method bias did not seriously affect our results, the use of time-lagged, longitudinal and multi-source data would be beneficial in future research. Specifically, two waves of data collection are suggested, with subordinates asked to complete the questionnaire on the criticality of co-worker presenteeism events and promotion focus at Time 1 and supervisors asked to evaluate their subordinates' innovative behavior at Time 2.

Third, whereas this study examined the regulatory focus mechanism of the positive effect of co-worker presenteeism events on innovative behavior, however, the discussion on the possible deleterious effects of promotion focus is not sufficient, and further empirical research and theoretical interpretation can be done in future. We also encourage scholars to test other underlying mechanisms, such as regulatory modes (Li et al., 2018) and emotional mechanisms, that may explain the possible positive effects of co-worker presenteeism events.

Fourth, this study treated the criticality of a co-worker presenteeism event as an important antecedent of employees' innovative behavior. To gain a deeper understanding of the influence of colleague presenteeism events grounded in EST, we suggest investigation of other event-related attributes, such as disruption and novelty, of co-worker presenteeism (Morgeson et al., 2015). In addition, we explored the boundary condition of the timing of co-worker presenteeism events on the relationship between event strength and employees' regulatory focus. Based on EST, event space (origin, spatial dispersion, etc.) might also have individual or collective effects on the entity. For a deeper understanding of the effects of co-worker presenteeism events, the possible boundary conditions of event space should be further explored.

Finally, our study was performed in a single country, China, against the background of the 996 work regime of the IT industry. Because cultural differences have been considered important with respect to innovation (Rosenbusch et al., 2011), they may influence the relationships between co-worker presenteeism events and employees' innovative behavior. We therefore encourage future research in other cultural contexts and cross-cultural research.

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 the Review Board of the First Affiliated Hospital of Xiamen University, China (KYX2016007). 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

TY, RL, and JD originated and designed the study and contributed to the statistical analysis, interpretation of the results, and revision of the manuscript. RL and TY wrote the paper. All authors were involved in editing, reviewing, and providing feedback for this manuscript and have given approval of the final version to be published.

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Understanding the Decision-Making Process Between Presenteeism and Absenteeism

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Due to their impact on various stakeholder groups, research on the global phenomena of sickness presenteeism (working despite illness) and sickness absenteeism (absence due to illness) is constantly growing. Most studies focus on identifying factors associated with the attendance behaviors. In contrast, there have been few theoretical approaches to explain the individual decision-making process for or against working while ill. Moreover, their empirical verification is still pending. In the present study, we refer to expectancy theory to theoretically explain how the decision is made. To empirically test the model predictions we applied experimental vignette methodology in an online survey with working adults. The hypotheses were confirmed in that the calculated and predicted decisions significantly matched the intentionally chosen decisions. The results contribute to a better theoretical understanding of the decision-making process and provide starting points for interventions to manage attendance behavior in organizations.

Keywords: sickness presenteeism, absenteeism, decision-making process, expectancy theory, experimental vignette study, motivation, attendance behavior

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INTRODUCTION

Absence from work because of illness (sickness absenteeism) and presence in spite of illness that would warrant absence from work (sickness presenteeism) have received considerable research attention (Ruhle et al., 2020). Many researchers view these phenomena as connected (e.g., Caverley et al., 2007; Bierla et al., 2013; Deery et al., 2014; Garrow, 2016) not only because of their high statistical correlation (Johns, 2010), but also because both attendance behaviors relate to the employees' health (e.g., Demerouti et al., 2009; Hansen and Andersen, 2009; Janssens et al., 2013; Skagen and Collins, 2016). Further, they have a major economic impact for organizations due to reduced productivity (Collins et al., 2005; Iverson et al., 2010; Warren et al., 2011; Vanni et al., 2017) and disruption of work processes (Gosselin et al., 2013; Strömberg et al., 2017; Miraglia and Johns, 2021).

The majority of empirical studies has focused on the identification of correlates of the attendance phenomena (e.g., Johns, 2011; Miraglia and Johns, 2016, 2021) while little research has been done to understand the individual's psychological processes leading to the decision to attend work or not in case of illness (Gosselin, 2018). Interestingly, sickness absenteeism and sickness presenteeism research has mainly developed along parallel paths although the phenomena are the result of a complex decision-making process that rules out the other alternative (Johns, 2010; Halbesleben et al., 2014; Lohaus and Habermann, 2019). Thus, scholars point to

the imperative of a single theoretical framework that brings both concepts together (Johns, 2010, 2011; Halbesleben et al., 2014; Gosselin, 2018). In accord with this concern, a major aim of this paper is the theoretically founded explanation of the individual's decision process between absenteeism and presenteeism.

Research on the Decision Between Absenteeism and Presenteeism

Within both fields of research, there are theoretical approaches. Their focus lies mainly on factors influencing absenteeism and presenteeism and their effects (e.g., Nicholson, 1977; Aronsson and Gustafsson, 2005; Darr and Johns, 2008; Johns, 2010; Laaksonen et al., 2010; Lu et al., 2013; Miraglia and Johns, 2016, 2021; Zhou et al., 2016). The abundance of variables identified as relevant can be classified into four broad groups, namely factors related to the individual, the work, the organization, and the environment (Lohaus and Habermann, 2019). The theoretical frameworks mostly consider the attendance behaviors separately and do not explain how determinants interact at the point of decision between presence and absence in case of illness (Gosselin, 2018). They name relevant factors, but usually do not address the fact that attendance behaviors occur in contexts that are characterized by social dynamics (Johns, 2010) and thus, for each individual variables influencing the decision combine in a unique way. Therefore, to understand the decision between the mutual alternatives it is more promising to focus on the individuals' psychological process of decision-making rather than the factors influencing the decision (Halbesleben et al., 2014). To our knowledge, there have been only very few approaches to study this attendance dynamic on the micro level (i.e., Halbesleben et al., 2014; Cooper and Lu, 2016).

The model by Cooper and Lu (2016) combines impact factors and psychological mechanisms. The authors draw on Bandura's (1986, 2001) social cognitive theory to explain presenteeism. According to them "perceptions of self-efficacy and outcome expectations figure prominently intentions and goals of work involvement" (Cooper and Lu, 2016, p. 225). In addition to direct effects of self-efficacy and outcome expectations on presenteeism, they posit that intentions and goal systems formed on the basis of efficacy beliefs lead people to expect positive outcomes. These expectations lead to presenteeism, which in turn serves to attain performance. While this approach obviously focuses on the psychological mechanisms in the emergence of presenteeism, it does not address absenteeism, let alone the process how the individual reaches the decision between both attendance behaviors.

Halbesleben et al. (2014) apply dialectical theory (Baxter, 1990) to understand the relationship between employee and supervisor. Dialectical theory surmises that tensions or opposing forces affect social relationships. Dialectical tensions are assumed to emerge from three key contradictions: autonomy-connection, predictability-novelty, and openness-closedness, with the latter relating to power due to the sharing of information. The authors transfer this approach to the work setting and postulate that the decision to attend work or not in case of illness is a means to manage experienced tensions on the side of the employee. These tensions are presumed to result from differing expectations of supervisor and employee. The decision for absenteeism or presenteeism "is a reflection of one's desire to be more or less involved in a relationship with his or her supervisor" (Halbesleben et al., 2014, p. 178). The authors derive different strategies subordinates might employ to deal with these tensions, such as denying that the contradiction exists or compromising between the two poles of a contradiction. The choice of strategy is based on the subordinate's and the supervisor's respective location on a particular continuum. Depending on which strategies employees choose with regard to the various contradictions, either presenteeism or absenteeism will result. The merits of the paper are undeniably to bring both attendance behaviors under one theoretical umbrella and to focus on the motivation that drives the behavior. However, although supervisors have proven to be an influence factor (e.g., Nyberg et al., 2008; Nielsen and Daniels, 2016; Dietz and Scheel, 2017; Schmid et al., 2017), we see a major shortcoming in its restriction to the supervisor-subordinate-dyad. Due to this limitation, the authors focus on a small part of the work-related factors and leave aside other work-related influences as well as factors relating to the person, the organization, and the environment. Thus, it remains unclear how the decision between absenteeism and presenteeism can be explained independently of the supervisor-subordinate-dyad. Further, the model has yet to be tested empirically.

Aims of the Study

Thus, although acknowledging that attendance behavior is "to some extent intentional . . . and grounded in a goal-directed decision process" (Karanika-Murray and Biron, 2020, p. 246) we still do not understand the role motivation plays and the psychological factors driving the decision (Knani et al., 2018). In accord with this concern, this paper has two objectives. First, it demonstrates that one can draw on an established theory for work settings, i.e., Vroom's (1964, 1995, 2005) expectancy theory of work motivation, to explain theoretically the choice of attendance behavior on the micro level. Second, we show empirically that Vroom's theory is appropriate to predict the decision process of employees in an experimental setting. For this, we apply experimental vignette methodology and two different statistical approaches to analyze the data. Benefits of this research are its contribution to theory building thereby unifying absenteeism and presenteeism under one roof to gain the holistic view Ruhle et al. (2020) call for. The better understanding of the decision-making process might enable effective managerial interventions to support and promote occupational health, employee performance, work organization, and organizational productivity.

To achieve the first objective, we begin by describing the basic ideas of Vroom's theory before applying them to attendance behavior. After deriving the hypotheses, the study design is presented with the development of the material. The empirical part serves to achieve the other goal, i.e., to show that the theory is applicable in principle to explain the decision-making process.

Vroom's Expectancy Theory

Scholars agree that although research has established correlates of attendance behavior "the personal account of "why" still needs to be systematically explored, namely, what consequences do people expect for not/coming to work when ill" (Cooper and Lu, 2016, p. 224). It is not yet clear how employees actually reach the decision and especially how they make the compromises between health and motivation to work (Knani et al., 2018; Karanika-Murray and Biron, 2020). Gosselin (2018) stresses the fact that the individual decision process is unique. Also Karanika-Murray and Biron (2020, p. 246) highlight the fact that because employees "will differ in the purpose, functions, and goals that presenteeism serves for them, they will also differ in the ways that their health and performance are further affected as a result of enacting presenteeism."

To investigate a motivationally driven individual decision process in work settings it is obvious to apply the expectancy theory of work motivation (Vroom, 1964, 1995, 2005). It has been rated as one of the most important and scientifically valid theories of organizational behavior (Miner, 2003) and as applicable to diverse settings (Pinder, 2016). In the following, we describe the central assumptions of Vroom's expectancy theory.

The basic tenet of the theory is that the motivational force (MF) behind the intention to achieve a specific goal is the mathematical product of expectancy (E), instrumentality (I), and valence (V; Vroom, 1964, 1995). Because of these main components, the approach has been termed "valence-instrumentality-expectancy theory"; in short "VIE" theory (Pinder, 2016, p. 363; Vroom, 2005, p. 254). The three components are conceptualized as perceptions and beliefs of the individuals that stimulate and direct their behavior. Expectancy involves an action-outcome link, while instrumentality is an outcome-outcome-association (Vroom, 1964, 1995). Pinder gets to the heart of the theory when describing expectancy, instrumentality, and valence in the following way (Pinder, 2016, p. 364):

> 'More specifically, VIE theory proposes that behavior is instigated and directed to the extent that:
> (1) people believe that the behavior will lead to outcomes such as job performance;
> (2) people believe that such outcomes will be rewarded; and
> (3) people value those rewards."

Valence is a preference for a desired outcome (or reward) among various outcomes that represents the person's anticipated value of or satisfaction with achieving this outcome. Vroom posits that people pursue several desired outcomes at a time and their behavior is a result of conscious and rational choices between alternative behaviors due to the maximal motivational force behind the alternative behaviors. These preferences are also termed goals (e.g., Pinder, 2016) or utility judgments, reflecting the attractiveness of the outcomes (Seo et al., 2004; Vroom, 2005). They can be held among different types of outcomes (such as social interactions, monetary rewards, promotion, job security) or different levels of particular outcomes (e.g., a preference for a higher rate of pay as compared to a lower rate of pay, having more leisure time as compared to less). Valences of outcomes are related to the individuals' relatively stable dispositions, i.e., needs and motives (Vroom, 2005).

Instrumentality is a probability belief linking one outcome to another (Pinder, 2016). It represents the subjective perception of how outcomes of individuals' actions are related to their goals and it can be positive or negative. Thus, it asserts the instrumental "power" in attaining a certain goal and satisfying a motive (Vroom, 2005). For example, working overtime holds positive instrumentality for obtaining a promotion while it holds negative instrumentality for spending time with one's family.

Expectancy refers to the individuals' subjective probability, i.e., their degree of certainty to which they assume that a specific action or effort will lead to a certain performance or outcome (result). It depends on the individuals' self-efficacy (Bandura, 1977), i.e., the belief in their capabilities. Expectancy thus depends to a certain extend on the experiences of individuals in their private and work settings.

When it comes to a decision, the essence of the VIE model means that an individual selects from various action options the one(s) with the strongest positive or weakest negative motivational force. Vroom (1964, 1995) elaborated his theory specifically on the goals of occupational choice, job satisfaction, and performance. Since then is has been applied to a variety of settings, such as motivation to take on specific work roles (Barba-Sánchez and Atienza-Sahuquillo, 2017), job satisfaction (Davidescu and Eid, 2017), performance-related behavior (Puplampu and Adomako, 2014; Shweiki et al., 2015) and its perception (Wardayati, 2016), and pro-environmental behavior (Baumhof et al., 2017; Kiatkawsin and Han, 2017). However, to our knowledge, it has not yet been applied to the decision process between presenteeism and absenteeism.

Adapting Vroom's Expectancy Theory to the Context of Absenteeism and Presenteeism

In accord with the first aim of the paper, we transfer Vroom's (1964, 1995) expectancy theory to the context of attendance behavior to understand the individual's decision-making process between presenteeism and absenteeism. We propose that this decision can be explained in the following way: When employees are sick, the question for them is whether to call in sick or work despite illness. These are the two options for action in this specific situation. According to expectancy theory, the choice between the two options depends on which one has greater motivational potential. This motivation potential in turn depends on the probability with which the individuals believe they will be able to achieve their goals by taking one or the other course of action. This assumption is consistent with our knowledge that employees choose attendance behavior with respect to satisfying a number of goals they value (Karanika-Murray and Biron, 2020). However, they cannot attain these goals directly and often solely by their own means, since circumstances and other persons' behaviors normally do come into play. Therefore, they have to strive for intermediate outcomes that they can influence and that they believe to be instrumental for achieving their goals. Further, they

must decide whether presenteeism or absenteeism has a greater likelihood of leading to these intermediate outcomes.

In terms of expectancy theory that means, when employees who are scheduled for work realizes that they are in a medical condition that justifies calling in sick, they will make a conscious decision. They will think about relevant goals in this situation and how highly they value these goals (valences). They will speculate on which outcome is instrumental or detrimental for reaching these goals (instrumentality). Finally, they will reflect on how presenteeism and absenteeism might affect these outcomes (expectancy). They will choose that attendance behavior that – in sum – seems the best trade-off for attaining their goals (motivational force).

We illustrate this with an example. Imagine employees would very much like (valence) to be accepted and feel comfortable in the work team (goal). To attain their goal, they might believe it makes sense (expectancy) to complete their work tasks and thus avoid extra work for their colleagues (result). Further, they might be convinced that it is expedient (expectancy) to protect all employees' health (result). In the first case, they might reason that presenteeism increases the likelihood of avoiding extra work for the other team members, whereas absenteeism seems preferable in order to avoid spreading germs and thus transmitting infection to them. Of course, employees usually do not pursue just one goal, but several at the same time, which may even contradict each other. For example, another goal of the employees that they value highly (valence) could be to stay healthy to ensure their employability. If they choose presenteeism to accomplish their tasks and avoid extra work for their team members (result), they would not be able to recover (result), which would be detrimental (instrumentality) to obtaining good health (goal). Absenteeism would surely (expectancy) give them time to rest and recover (result), furthering (instrumentality) their goal of ensuring good health, but would imply (expectancy) that their colleagues have to fill in for them (result), which could be harmful (instrumentality) for their goal of being an accepted team member.

We apply Vroom's propositions to the context of attendance behavior in case of sickness in the following way: The actions employees have to choose between are presenteeism (p) and absenteeism (a). The employees have i goals (outcomes) that they value in this situation, and they consider j results that should further goal attainment. The decision in favor of presenteeism or absenteeism will depend on which action has a greater total amount of motivational force behind it. The motivational force of an action with regard to one result and one goal comes to the mathematical product of the valence of the goal weighted with the subjective probability that the result will be instrumental for it (instrumentality) and the probability with which the taken action will lead to the result (expectancy). In view of several results and goals that normally would be considered, the total amount of motivational force behind an action is the sum of the possible products of these factors. In mathematical terms the eq. 1:

$$MF = E * I * V \tag{1}$$

has to be split into the eqs. 2 and 3:

$$MF^{p} = \Sigma^{i}(\Sigma^{j} E^{p}_{j} * I_{i,j} * V_{i}) \tag{2}$$

$$MF^{a} = \Sigma^{i}(\Sigma^{j} E^{a}_{j} * I_{i,j} * V_{i}) \tag{3}$$

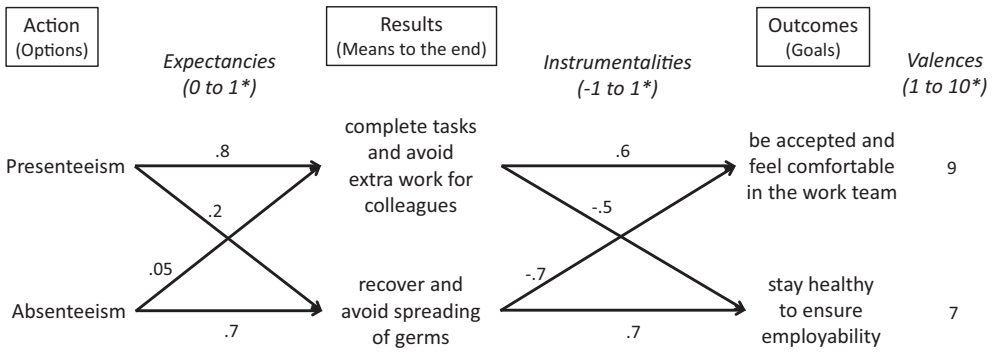
with MF^{p} = motivational force behind action option p (presenteeism), MF^{a} = motivational force behind action option a (absenteeism), E^{p}_{j} = expectancy of action p prompting result j, E^{a}_{j} = expectancy of action a prompting result j, $I_{i,j}$ = instrumentality of result j with regard to goal i, V_{i} = valence of goal i. The comparison between the two motivational forces determines the decision in favor of presenteeism or absenteeism: If MF^{p} is greater than MF^{a} the employees will decide for presenteeism, if it MF^{a} exceeds MF^{p} they will chose absenteeism.

Figure 1 illustrates this relationship for the above example. The values for expectations, instrumentalities and valences are plausible but arbitrarily chosen.

In pursuit of the second aim of the paper, we want to show empirically that expectancy theory is applicable to the decision-making process in case of illness. To test the applicability of the model, we proceed as follows. We create a study context comprising vignettes in which participants are requested to imagine that they wake up in the morning when scheduled for work and realize that they are sick (Gosselin, 2018). We ask them to rate from their point of view valences of goals, instrumentalities, and expectancies in this situation, and finally let them decide whether they would work in spite of sickness or not. These ratings are entered into the abovementioned formulas in order to calculate the motivational forces and determine the accordingly expected decision. To verify the applicability of expectancy theory, we compare the decision chosen by participants with the one calculated. We posit that the VIE calculus represents the considerations underlying the decision between presenteeism and absenteeism and therefore hypothesize:

Hypothesis 1: The degree of correspondence between the decision consciously chosen by the individual and the calculated decision will be significantly above chance level, which is 50%.

Since in this study design the dependent variable is dichotomous (working in spite of sickness or not) it is obvious to apply binary logistic regression analysis (Field, 2018) with the independent variables valence, instrumentality, and expectancy. In applying binary logistic regression, maximizing the log-likelihood value yields the best fit between participants' discretionary decision and the probability that their assessment of the VIE factors will result in presenteeism or absenteeism. In testing the applicability of the VIE theory, we are interested in the goodness of prediction, i.e., the model fit, as it represents the process of decision-making. In assessing the model fit as a whole, the focus is on how well the independent variables in sum contribute to the separation of the dichotomous response alternatives. Our statistical analysis does not focus on the relative influence of the independent variables, which represent content factors that vary by individual and context. Therefore, we derive the following hypothesis to show the applicability of the VIE model:



$MF^P = 0.8 \times 0.6 \times 9 + 0.8 \times -0.5 \times 7 + 0.2 \times -0.7 \times 9 + 0.2 \times 0.7 \times 7 = 1.24$
$MP^A = 0.05 \times 0.6 \times 9 + 0.05 \times -0.5 \times 7 + 0.7 \times -0.7 \times 9 + 0.7 \times 0.7 \times 7 = -0.885$

$MF^P > MP^A$

FIGURE 1 | Example of the application of expectancy theory to attendance behavior. *Higher values represent higher subjective probabilities and valences.

Hypothesis 2: The variables of the VIE model explain statistically significantly the decisions between presenteeism and absenteeism.

MATERIALS AND METHODS

In this section, we describe the development of the study design and material, the procedure, and the data analysis. **Figure 2** gives an overview of the study and depicts how the method of constructing the material relates to the theoretical background and to empirical findings.

Study Design, Development, and Test of Vignettes

Scenarios have previously been used to study attendance behavior, specifically reactions to absenteeism (e.g., Patton, 2011; Addae et al., 2013). We applied this approach following the experimental vignette methodology (EVM) since "EVM allows researchers to include factors that are relevant to the research question while excluding those that might confound the results" (Aguinis and Bradley, 2014, p. 357). A vignette is "a short, carefully constructed description of a person, object, or situation, representing a systematic combination of characteristics" (Atzmüller and Steiner, 2010, p. 128). In the construction of the scenarios we closely followed the recommendations provided by the authors (Atzmüller and Steiner, 2010; Aguinis and Bradley, 2014).

We developed written vignettes in the following steps (see **Figure 3**). First, we wanted to capture aspects broadly covering the four groups of relevant factors as stated in the most comprehensive content model of presenteeism (Lohaus and Habermann, 2019), which are factors related to the individual, the work, the organization, and the environment. Thus, we performed a review of recent empirical studies and reviews on the topics of presenteeism (e.g., Miraglia and Johns, 2016; Knani et al., 2018; Lohaus and Habermann, 2019), absenteeism (e.g., Biron and Bamberger, 2012; Addae et al., 2013; Rostad et al., 2015; Pichler and Ziebarth, 2017), and work-life-balance (e.g., Nilsen et al., 2017; Sirgy and Lee, 2018). That search resulted in 170 items. We clustered them by topic (e.g., health, performance, reward system) and eliminated semantically redundant items. Further, we removed stable characteristics of employees that are not applicable to phrase results and goals (e.g., conscientiousness), leaving a pool of 78 items. We phrased items in a way that makes clear who is the actor (e.g., instead of "risk of higher error rate" → "the risk increases that you make errors") and that they were not associated with either absenteeism or presenteeism (e.g., instead of "it is good for you to work" → "it is good for you to behave in this way"). This resulted in a further reduction of items with similar meanings. Then, to limit complexity of the vignettes, we constructed them to consist of the minimum of two results and two goals. Each vignette was phrased according to the following criteria: (1) In accord with expectancy theory, results must be influenceable by the acting person (the employee) and thus relate to the person in the work context, i.e., performance/productivity or health, while goals refer to the four factor groups (person, work, organization, and environment). (2) The four groups of factors are represented evenly throughout the vignettes and are combined with each other. (3) All combinations of goals and results are realistic and plausible. This resulted in eight vignettes. **Figure 4** depicts the vignettes in separate boxes, each comprising of the two alternative action options (presenteeism and absenteeism) with their respective introductory texts, and the question introducing the assessment of the likelihood of achieving two different results when deciding for presenteeism or absenteeism. Further, you find the introductory question for assessing the instrumentality with which the results will bring forth the two given goals. Directly behind both questions, the factor groups are denoted that the given results and goals belong to.

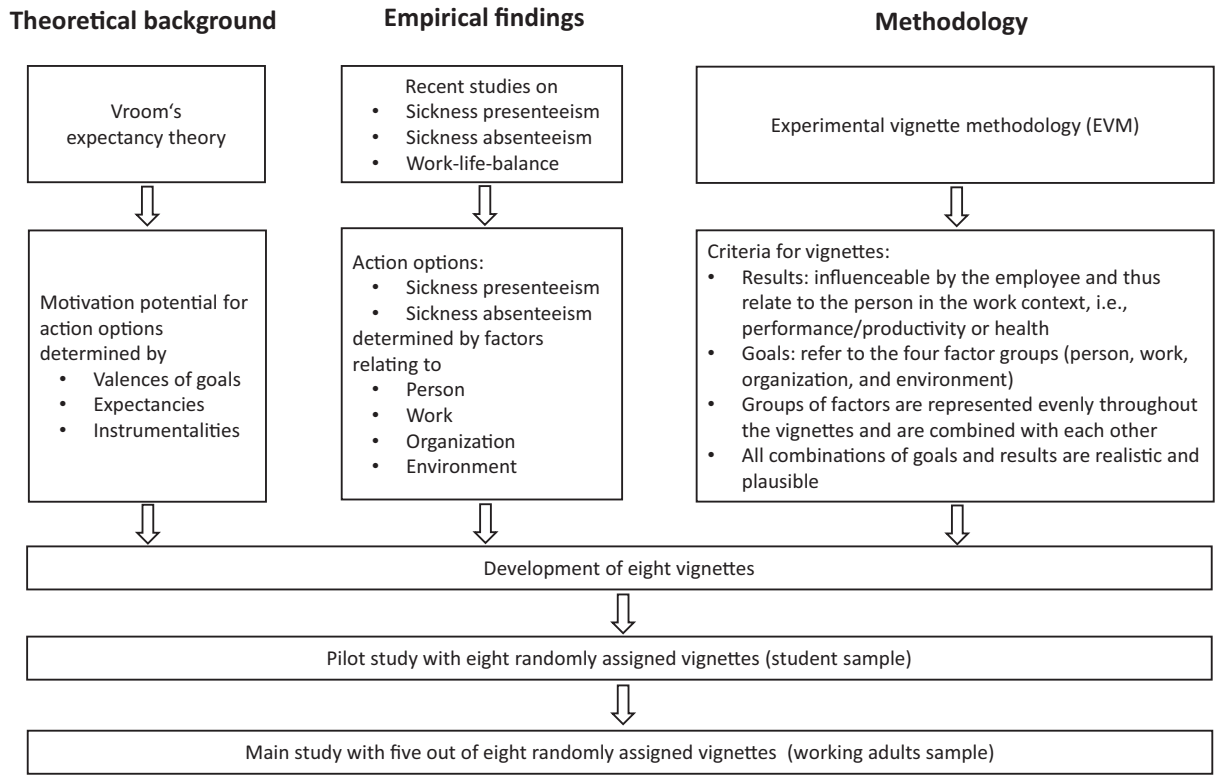


FIGURE 2 | Overview of study.

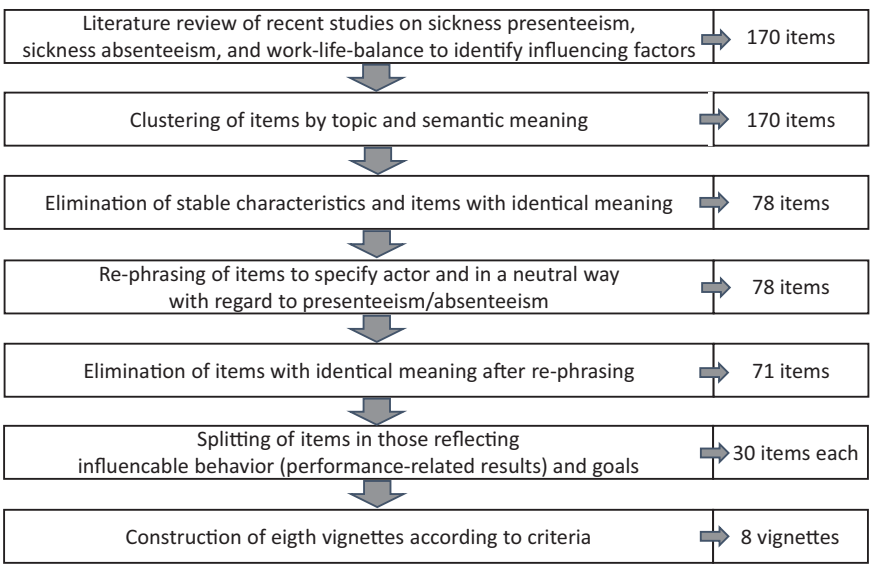


FIGURE 3 | Development of vignettes.

Following the suggestion of Gosselin (2018), each vignette started with the identical phrase: "Imagine that you wake up in the morning of a work day and you realize that you are sick. When deciding whether to work in spite of illness or to call in sick, you take into account the following two aspects" (followed by the two goals of the vignette). Then, participants were required to assess the importance of these goals for them in this situation (valences). Next, they rated the probabilities of performing both presented results when deciding for working in spite of illness or calling in sick (expectancy). Further, they were

Vign. No.	Action option	Introduction to action option	Expectancy	Factor group*	Result	Instrumentality	Factor group*	Goal
1	Presenteeism	Suppose you work despite illness	how likely is the consequence that	P	your health complaints will become less severe	how likely will that lead to	P	maintaining your long-term health
	Absenteeism	Suppose you call in sick		W	you accomplish your work tasks		E	your being happy and content
2	Presenteeism	Suppose you work despite illness	how likely is the consequence that	P	your exhaustion will decrease	how likely will that lead to	O	having opportunities for professional development
	Absenteeism	Suppose you call in sick		W	your performance is high		E	a good relationship with your friends
3	Presenteeism	Suppose you work despite illness	how likely is the consequence that	P	your stress level will reduce	how likely will that lead to	O	receiving a financial bonus from your employer
	Absenteeism	Suppose you call in sick		W	you reach your work goals		E	living in harmony with your family
4	Presenteeism	Suppose you work despite illness	how likely is the consequence that	P	you have time to spend freely	how likely will that lead to	E	you having a high level of life satisfaction
	Absenteeism	Suppose you call in sick		W	you are available for your clients/patients		W	your customers'/patients' satisfaction
5	Presenteeism	Suppose you work despite illness	how likely is the consequence that	P	your health status improves	how likely will that lead to	P	the preservation of your long-term employability
	Absenteeism	Suppose you call in sick		W	you fulfil the performance expectations of your supervisor		W	your supervisor being contented with you
6	Presenteeism	Suppose you work despite illness	how likely is the consequence that	P	you have a medical appointment	how likely will that lead to	P	maintaining your performance capacity
	Absenteeism	Suppose you call in sick		W	your team members have increased work load		W	having a good relationship with your colleagues
7	Presenteeism	Suppose you work despite illness	how likely is the consequence that	P	you have recreational time	how likely will that lead to	O	securing your job
	Absenteeism	Suppose you call in sick		W	you can meet your deadlines at work		W	a high level of autonomy in what you are doing
8	Presenteeism	Suppose you work despite illness	how likely is the consequence that	P	your health problems become less severe	how likely will that lead to	O	receiving an attendance bonus
	Absenteeism	Suppose you call in sick		W	you avoid absences from work		P	sustaining your long-term fitness

FIGURE 4 | Vignettes used in the empirical study (translated by the authors). *P = Person, W = Work, O = Organization, E = Environment; not shown in the questionnaire.

asked to assume that these results occurred and how probable their occurrence would affect their goals (instrumentality). Finally, they had to decide whether to work or call in sick in this situation (decision). Within each group of variables (valences, expectancies, instrumentalities, and decision), items were presented in random order. With the exception of the decision, which was dichotomous, we used sliders for the ratings with their endpoints labeled. Valences ranged from "not important" (1) to "very important" (10); expectancies from "0%" to "100%," and instrumentalities from "100% negatively" to "100% positively" with the scale midpoint labeled "no effect" (see **Figure 5**).

A pilot study with working students showed that all eight vignettes worked; however, processing time for the entire set was very high and led to dropouts. Hence, for the main study, we decided that each participant would receive a random

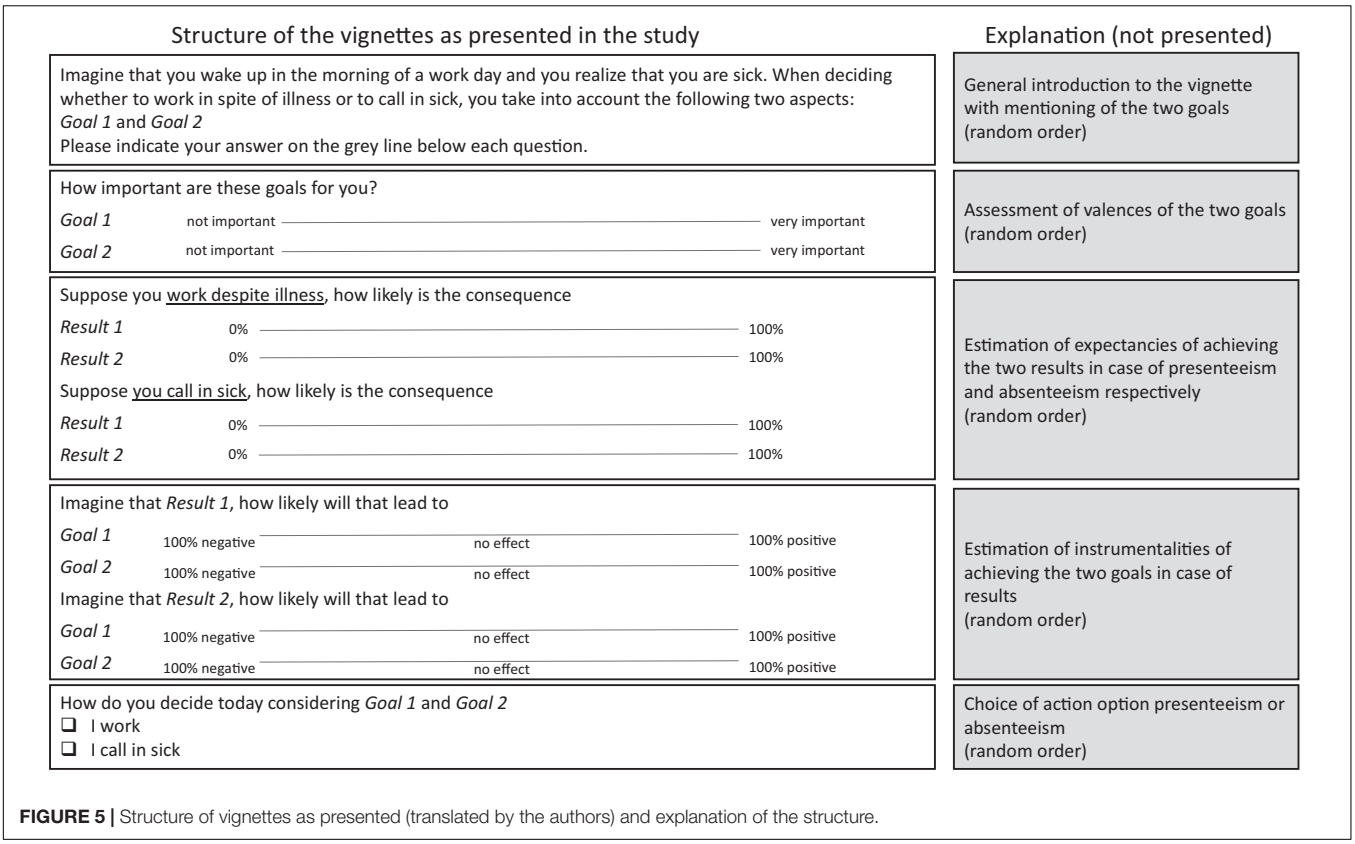


FIGURE 5 | Structure of vignettes as presented (translated by the authors) and explanation of the structure.

set of five out of the eight vignettes (Atzmüller and Steiner, 2010). Although we still expected a long processing time, this procedure was deliberately chosen because it ensured that we incorporated all factor groups in the study that had previously been proven to be relevant.

Procedure

Working adults were invited to the study via social media. As an incentive for participation, the researchers pledged to donate one Euro to a charitable organization for each completed survey. Before starting the survey, we informed participants about the goals of the study and ensured them that they could withdraw their participation from the anonymous survey at any time without incurring any negative consequences. We let them know that they would be asked to give their opinions, and that their data would be collected for scientific purposes only and stored for 10 years. After the participants provided their written informed consent to participate in this study, the survey started. The general instruction informed participants that they would be presented with five different situations, which they should try to image as vividly as possible, and they should answer all questions spontaneously according to their personal opinion. After completing the five vignettes, participants received items concerning their past attendance behavior: (a) how many days during the previous 12 months they had worked despite feeling sick and having a justification for staying home (e.g., Aronsson and Gustafsson, 2005; Pohling et al., 2016) and (b) how many days they had stayed home due to sickness (e.g., Gerich, 2016). The final questions referred to demographic information. The median time for completion was 13.2 min.

Data Analysis

Data analysis was performed using IBM SPSS version 27.0 (IBM SPSS Inc., Chicago, IL, United States). The level of statistical significance was set at $p < 0.05$ in all the analyses conducted.

Frequencies, ranges, means, and standard deviations were determined to describe the sample. We recorded presenteeism days (i.e., presenteeism rate or frequency) as they depend on the number of health events and are an indicator of health status or vulnerability to illness (Gerich, 2016). On this basis, we calculated the sickness presenteeism prevalence as the percentage of participants having shown presenteeism during the 12 month before the survey. Further, sick days were determined as the sum of presenteeism and absenteeism days (Gerich, 2016; Lohaus and Röser, 2019). Sickness presenteeism propensity, which reflects an individual's probability of opting for sickness presence rather than sickness absence in the case of illness (Gerich, 2016), was computed as presenteeism frequency divided by the number of sick days (Biron et al., 2006; Gerich, 2016; Lohaus and Röser, 2019). Thus, it offers information with regard to the decision-making process of the individual.

To test the first hypothesis that the correspondence between chosen decisions and the decisions calculated in accordance with the VIE model is significantly above chance level, we used a *t*-test. We applied binary logistic regression analysis to test the second hypothesis. Linearity was tested assessed using the Box-Tidwell

(Box and Tidwell, 1962) procedure. Bonferroni-correction was applied to all ten terms in the model (Tabachnick and Fidell, 2018). All variables were found to follow a linear relationship. Correlations between predictor variables were low ($r < 0.70$), indicating that multicollinearity was not a confounding factor in the analysis (Schroeder, 1990; Tabachnick and Fidell, 2018). Studentized residuals, leverage values, and Cook distances were considered to identify outliers. No case was consistently identified as an outlier, so all values were included in the analysis (Field, 2018). To test hypothesis 2, we classified chosen versus predicted responses and used *chi*-square with pseudo *R*-square (Nagelkerke) and Cohen's f-square as indicators of effect size. Goodness-of-fit was assessed using the Hosmer-Lemeshow-Test. Since every vignette comprised different factors (independent variables), we performed the analysis for each vignette separately to test the fit of the model.

RESULTS

The results section consists of three parts. First, we report the sample characteristics with their demographics, their health data, and their attendance behavior in the 12 months preceding the study. Then we list the descriptive results of the vignettes before reporting the results of the statistical tests of the hypotheses.

Descriptive Analysis of the Sample

Of 294 people who started the survey, 202 completed it (68.7%). Seven participants were excluded from the analysis due to their employment status (i.e., volunteer worker, other). The remaining sample of 195 participants consisted of 160 employees, 9 self-employed people, 16 civil servants, and 10 trainees. One hundred fifteen participants (59%) were women, and 79 (41%) were men; one person did not indicate the gender. Participants' ages ranged from 19 to 65 years with a mean of 43 years (SD = 12.0). The mean amount of work experience was 19.8 years (SD = 12.1) with a minimum of one and a maximum of 44 years. One hundred forty-five participants (74.4%) reported working full time, 78 (40.0%) had a supervisory position. 26.7% of participants worked in financial, IT, and business services, 22.6% in the industry, 13.8% in civil service and administration, and 12.8% in education, research, and culture. A university degree was held by 70.3% and 13.8% indicated vocational training as their highest educational qualification. Descriptive information about the attendance behavior of the sample during the 12 months preceding the survey is given in **Table 1**.

Descriptive Analysis of Vignettes

Table 2 lists the descriptive results for each vignette. On average, each vignette was rated by 122 participants, with a range of 114 to 132. The different number of participants per vignette results from the random drawing of five out of eight vignettes. The mean percentage of chosen decisions for presenteeism was 32.1 (range: 25.0 to 40.9) and for calculated decisions was 28.3 (range: 15.1 to 57.6). The mean percentage of chosen decisions for absenteeism was 67.9 (range: 59.1 to 75.0) and 71.7 (range: 42.4 to 84.9) for calculated decisions. The agreement of chosen and calculated decisions across vignettes ranged from 53% (vignette 7) to 75.4% (vignette 8) with a mean of 65.4%.

Hypothesis Testing

To test hypothesis 1, participants' ratings of the variables (valences, instrumentalities, and expectancies) were processed for each vignette according to eqs. 2 and 3 in order to determine which decision individuals should have made according to the VIE calculus (calculated decision). Then we computed the percentage of matches between the calculated decision and the respective decision consciously chosen by the participants (chosen decision) across the five vignettes they rated. Results supported hypothesis 1: They showed an average match of 65.4% between the calculated decision and the chosen decision. This result was significantly different from chance and in the expected direction, $t(194) = 8.93$, $p < 0.001$. The effect size was Cohen's $d = 0.64$, which represents a medium to large effect (Cohen, 1988).

To test hypothesis 2, we performed a binary logistic regression analysis for each vignette. Results are displayed in **Tables 3**, **4**. For six of eight vignettes the binary logistic regression model was statistically significant, i.e., the variable model was significantly better than the null model. Improvements by using the variable model compared to the null model ranged from 18% to 44% with an average of 29% (Nagelkerke). Effect sizes calculated as Cohen's f^2 ranged from 0.22 to 0.77 with an average of 0.43, which represent a strong effect (Cohen, 1988). Goodness-of-fit assessments indicated a good model fit for six of eight vignettes. The classification of chosen versus predicted decisions as shown in **Table 4** pictures these calculations. Overall percentage of accuracy in classification was 75.2%. Thus, results supported hypothesis 2.

DISCUSSION

Sickness presenteeism and sickness absenteeism are global phenomena with a high prevalence rate, and they have been stimulating an ever increasing amount of research. While absenteeism has a long research tradition, the study of presenteeism has only gained momentum in the last two decades. Two aspects stand out when reviewing previous research: First, only a minority of studies have examined absenteeism and presenteeism together. Second, they have focused on identifying antecedents and consequences, so comprehensive content models of relevant factors now exist (e.g., Johns, 2010; Miraglia and Johns, 2016, 2021; Lohaus and Habermann, 2019), but individual decision-making has largely been ignored. This study addresses this gap and clarifies the process of decision-making in order to provide a more holistic understanding of the behavior (Ruhle et al., 2020).

Specifically, the paper had two objectives, both of which were achieved. First, we explained how the individual's decision to work or not in case of illness can be pictured by Vroom's expectancy theory (Vroom, 1964, 1995). Second, we

TABLE 1 | Characteristics of the study group with regard to attendance behavior.

Data base	N	Presenteeism rate (days) *M* ± *SD*	Absenteeism rate (days) *M* ± *SD*	Sick days *M* ± *SD*	Presenteeism prevalence (%)	Presenteeism propensity** *M* ± *SD*
Complete sample*						
Including long-term sick participants	179	12.0 ± 38.0	5.9 ± 14.3	17.9 ± 40.7	74.9	
Excluding long-term sick participants	170	4.3 ± 5.0	4.8 ± 5.6	9.2 ± 8.3	74.1	
Subsample of participants reporting sick days						
Including long-term sick participants	162	13.2 ± 39.7	6.6 ± 14.9	19.8 ± 42.3	84.4	0.49 ± 0.35
Excluding long-term sick participants	153	4.8 ± 5.1	5.4 ± 5.6	10.2 ± 8.2	82.4	0.47 ± 0.34

**16 participants did not report their attendance behavior and thus were not included in this analysis.*
***Presenteeism propensity can only be calculated for participants with sickness days > 0 (lower part of the Table).*

TABLE 2 | Descriptive analyses of the vignettes.

		Decision for presenteeism (in %)		Decision for absenteeism (in %)		Consistency of chosen and calculated decision (in %)
Vignette	***N***	**Chosen**	**Calculated**	**Chosen**	**Calculated**	
1	127	30.7	25.2	69.3	74.8	64.6
2	124	25.0	18.5	75.0	81.5	67.7
3	117	31.6	19.7	68.4	80.3	74.4
4	114	37.7	46.5	62.3	53.5	54.4
5	115	31.3	23.5	68.7	76.5	69.6
6	120	30.8	19.2	69.2	80.8	65.0
7	132	40.9	57.6	59.1	42.4	53.0
8	126	28.6	15.1	71.4	84.9	75.4
Average	122	32.1	28.3	67.9	71.7	65.4

TABLE 3 | Fit of the variable model as compared to the zero-model (Omnibus-test) for each vignette and indicators of significance and goodness of fit (binary logistic regression).

	Omnibus test			Effect size		Goodness of fit		
Vignette No.	χ^2	**df**	***p***	***Pseudo* R^2***	**Cohen's f^2**	χ^2	**df**	***p***
1	38.49	10	0.000	0.37	0.58	9.17	8	0.328
2	16.69	10	0.081	0.19	0.23	2.55	8	0.960
3	24.95	10	0.005	0.27	0.37	20.78	8	0.008
4	23.10	10	0.010	0.25	0.33	10.07	8	0.260
5	36.76	10	0.000	0.38	0.62	5.85	8	0.664
6	16.69	10	0.082	0.18	0.22	8.09	8	0.425
7	26.81	10	0.003	0.25	0.33	16.62	8	0.034
8	45.73	10	0.000	0.44	0.77	11.79	8	0.161
Average				0.29	0.43			

**Nagelkerke.*

demonstrated empirically that this approach is able to predict the decision process in an experimental setting. The findings are discussed below.

In summary, the results of the paper show that the application of Vroom's expectancy theory to the decision between sickness presenteeism and sickness absenteeism offers a promising approach to explaining how the decision in question in principle comes forth. Vroom's mathematical calculation scheme predicts the discretionary outcome of the decision-making process with significant strength. Furthermore using binary logistic regression analysis demonstrates that the variables derived from Vroom's expectancy theory are also beyond the mathematical calculation a very good predictor for the chosen action in case of sickness.

Theoretical Contribution

We have identified only one approach that attempts to explain the decision process between absenteeism and presenteeism at the micro level. Halbesleben et al. (2014) refer to dialectical theory to infer the individual's choice. Although they have provided the most detailed explanation to date, they restrict it to the supervisor-employee dyad and do not consider other influencing factors. Furthermore, the authors have limited themselves to

TABLE 4 | Level of correspondence of null model and variable model (binary logistic regression).

	Correspondence (%)	
Vignette No.	**Null model**	**Variable model**
1	69.3	78.0
2	75.0	79.0
3	68.4	77.8
4	62.3	71.9
5	68.7	79.1
6	69.2	70.8
7	59.1	68.9
8	71.4	82.5
Average	67.6	75.2

the theoretical derivation and have not yet empirically tested their assumptions.

To remove these limitations and to extend our knowledge with regard to an employee's decision-making process when ill, with referring to Vroom's expectancy theory, we drew on a more general theoretical approach and tested its assumptions empirically.

First, with regard to the aim to refer to a broader theoretical approach, the application of Vroom's expectancy theory is useful for several reasons: It is a highly recognized theory of motivation for the work context (Miner, 2003), that is continuously applied to study decision-making processes. It has been supported by research in which it was used to make correct predictions of subjectively relevant decisions (e.g., Puplampu and Adomako, 2014; Shweiki et al., 2015; Wardayati, 2016; Barba-Sánchez and Atienza-Sahuquillo, 2017; Davidescu and Eid, 2017). It assumes that personally relevant goals and the subjective assessment of their attainability significantly affect the motivation to act. Thus, it adequately reflects the understanding that attendance behavior is a motivationally driven and goal-directed decision (Steers and Rhodes, 1978; Knani et al., 2018; Karanika-Murray and Biron, 2020). As urged by various researchers (e.g., Halbesleben et al., 2014), it unifies the decision to work or not to work in the event of illness under a common theoretical umbrella. It enables the simultaneous consideration of presenteeism and absenteeism, which are linked by a single decision. Vroom's expectancy theory belongs to the process theories (Steers et al., 2004) and therefore allows describing the weighing of behavioral alternatives without reference to specific goals and influencing factors. Since our approach is not limited to the dyadic system of supervisor and subordinate, it extends the explanation of Halbesleben et al. (2014).

Second, the results of the empirical study supported both hypotheses. The correspondence of the participants' intentionally chosen decisions with the decisions calculated according to the formulas derived from Vroom's expectancy theory was above chance level. It thus demonstrated the latter's applicability in principle. Additional statistical support was gained by employing binary logistical regression analysis. For the majority of the settings tested (vignettes), the statistics using Vroom's expectancy theory variables significantly predicted the choices made and, on average, had medium (Nagelkerke) and strong (Cohen) effect sizes. The successful empirical testing of the theory's applicability to attendance behavior expands our knowledge relative to previous approaches (Halbesleben et al., 2014).

Managerial Implications

"In the contemporary employment-at-will context, employees make a voluntary decision to attend work prior to each working shift." (Halbesleben et al., 2014, p. 189) and this decision is based on a subjective evaluation of their own health status (Johns, 2010; Karanika-Murray and Cooper, 2018). Thus, understanding the individual's decision-making process when choosing between sickness presenteeism and sickness absenteeism is essential, both for the advancement of theory building and for the attendance management in organizations. So far, studies on attendance behavior have only examined a few influencing factors or correlates at a time. In reality, however, a large number of factors that are highly individual always play a role (e.g., Karanika-Murray et al., 2021). These aspects can influence each other and can be contradictory to each other. Vroom's theory takes into account precisely this interaction of factors and their weighing by the individual. As a process theory, it thus offers a framework in which the relevant factors for the individual decision are brought together.

Of course, practitioners responsible for attendance management in organizations, such as HR managers, organizational health managers, and supervisors, cannot change their employees' goals and their importance to them. However, the knowledge of how employees make the decision helps organizational stakeholders control this behavior to mitigate negative economic impacts and health consequences, as well as disruptive effects on work organization. They can influence the instrumentalities, i.e., the links between the behavioral results of their employees and the likelihood that those results will lead to the desired goals. This provides a valuable starting point for actively managing attendance behavior. Research has identified a variety of factors related to attendance behaviors that are under the control of employers. To name just a few, the importance of social support (Saijo et al., 2017; Nielsen et al., 2019; Yang et al., 2019; Aronsson et al., 2020), attendance cultures or climate (Thun et al., 2013; Løset et al., 2018; Mach et al., 2018; Martinez et al., 2018; Ferreira et al., 2019; Ruhle and Süß, 2019), reward systems (Della Torre et al., 2015; Rostad et al., 2017), and working conditions (Gerich, 2014; Jourdain and Vézina, 2014; Yang et al., 2016; Ferreira, 2018) should be noted here. For example, it is reasonable to assume that employees will stay home in the event of illness if they know that their replacement is well arranged (Miraglia and Johns, 2016) and they do not have to fear that their absence will incur the anger of their colleagues. This should apply at least if no other relevant goals of theirs override these considerations.

Consideration of individual goals and their value to the individual also fits well with recently published literature that attendance behavior is used to achieve positive effects (e.g., Demerouti et al., 2009; Giæver et al., 2016; Van den Broeck et al., 2016; Whysall et al., 2018; Gerich, 2020;

Karanika-Murray and Biron, 2020; Lohaus et al., 2021). This is noteworthy in that most studies addressing the consequences of presenteeism refer to its negative effects on the individuals' health (e.g., Bergström et al., 2009; Taloyan et al., 2012; Conway et al., 2014; Skagen and Collins, 2016), work performance and ability (e.g., Gustafsson and Marklund, 2011; Chen et al., 2021), or work attitudes (e.g., Karanika-Murray et al., 2015).

In the aftermath of the Covid-19 pandemic it may be expected that individuals' goals pertaining to the protection of their health gain in importance relative to work-related goals. Whether this may lead to increased absenteeism depends on the individuals' mind set. People who perceive working while ill will have a positive impact on their health and well-being (e.g., Rosso et al., 2010; Van den Broeck et al., 2016; Miraglia and Johns, 2018) will probably exhibit more presenteeism, while those who believe their health will benefit from rest will presumably opt more often for absenteeism.

Strengths, Limitations, and Future Directions

A strength of the study is that it not only theoretically explains the individual decision process between sickness presenteeism and sickness absenteeism, but also empirically tests the applicability of the explanatory model. This study used thoroughly developed stimulus material in an experimental vignette design and in this way strengthened internal validity. However, there are limitations to the procedure. We collected subjective data from a single source, a method likely to introduce common method bias. Yet, it is difficult to devise of a measure of an individual's goals and expectations as to how probable their achievement is that would not use self-report. Furthermore, although Aguinis and Bradley (2014) recommend the experimental vignette methodology to better understand individuals' decision-making processes, especially with regard to work-related behaviors that are not easily observable, there remains a gap between the artificial nature of the situations depicted in the vignettes and real-world circumstances. Describing the situations as realistically as possible helps to increase external validity, but cannot reach the level of non-experimental research. To keep the vignette experiment as simple as possible (Atzmüller and Steiner, 2010), we used only two goals and two results for each vignette. One can imagine that in real life employees consider a greater number of goals and results when deciding about their attendance behavior. Moreover, research has identified a large number of factors influencing attendance behavior. Of these, we systematically extracted relevant and feasible variables. However, of these the eight vignettes represented only a selection. Although we can assume that several of the selected factors were relevant to each participant, they might have mentioned others if asked. In addition, the convenience sample gained via social media was relatively small and not representative of the population.

Thus, further studies should use a design in which participants can state their own goals and outcomes that they would consider when making a decision. Although in terms of the number of independent variables, the sample size was sufficient (Moons et al., 2014; Peduzzi et al., 1996; Pavlou et al., 2015), it would be desirable to obtain a larger sample than the current one for this purpose. That would provide a suitable knowledge base from which occupational health-relevant hypotheses and organizational interventions may be derived to investigate and manage attendance behavior.

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

Both authors contributed to the study conception and design, performed the material preparation, data collection, and analysis, wrote the manuscript, commented on previous versions of the manuscript, and read and approved the final manuscript.

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Valuation of Lost Productivity in Caregivers: A Validation Study

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Objective: This study aimed to: (a) adapt the previously validated Valuation of Lost Productivity (VOLP) questionnaire for people with health problems, to a caregiver version to measure productivity losses associated with caregiving responsibilities, and (b) evaluate measurement feasibility and validity of an online version of the caregiver VOLP questionnaire.

Methods: A mixed methods design was utilized. Qualitative methods, such as reviewing existing questionnaires that measured caregiver work productivity losses and performing one-on-one interviews with caregivers, were used for VOLP adaptation and online conversion. Quantitative methods were used to evaluate feasibility and validity of the online VOLP. The Work Productivity and Activity Impairment (WPAI) questionnaire for caregivers was included to compare its absenteeism and presenteeism outcomes and their correlations with VOLP outcomes.

Results: When adapting the VOLP for caregivers, our qualitative analysis showed the importance of adding three major components: caregiving time, work productivity loss related to volunteer activities and caregivers' lost job opportunities. A total of 383 caregivers who completed online survey were included in our final quantitative analysis. We found small Spearman rank correlations between VOLP and WPAI, observing a larger correlation between their absenteeism [$r = 0.49$ (95% confidence interval: 0.37–0.60)] than their presenteeism [$r = 0.36$ (0.24–0.47)]. Correlations between VOLP outcomes and total caregiving hours were larger for absenteeism [$r = 0.38$ (0.27–0.47)] than presenteeism [$r = 0.22$ (0.10–0.34)]. Correlations between WPAI outcomes and total caregiving hours were smaller for absenteeism [$r = 0.27$ (0.15–0.38)] than presenteeism [$r = 0.35$ (0.23–0.46)].

Conclusion: The study provides evidence of the feasibility and preliminary validity evidence of the adapted VOLP caregiver questionnaire in measuring productivity losses due to caregiving responsibilities, when compared with the results for WPAI and the results from the previous patient-VOLP validation study.

Keywords: caregiver, Valuation of Lost Productivity questionnaire, absenteeism, presenteeism, productivity loss, validity, Work Productivity and Activity Impairment questionnaire

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INTRODUCTION

Studies have consistently demonstrated that chronic conditions have a significantly negative impact on work productivity of patients (Zhang et al., 2016, 2018). However, beyond the direct impact on patients, chronic conditions such as inflammatory bowel disease, dementia, and chronic kidney disease have also been shown to have a significant impact on the work productivity of caregivers who are caring for their family members or friends who have a chronic condition (Ganapathy et al., 2015; Wang et al., 2016; Kahn et al., 2017; Fujihara et al., 2019; Kuenzig et al., 2019). For example, Fujihara et al. (2019) found that among employed family caregivers of people with dementia, the average caregiving time was 2.14 h per day. About 7.91% of their work time were missed in the past week and 35.36% of their productivity while they were working were affected. Kahn et al. (2017) found that caregivers, of a group of pediatric inflammatory bowel disease patients, had an unadjusted 214.4 ± 171.5 annual hours of work loss. This was translated to an annual lost productivity cost of $5243 USD per caregiver. Ganapathy et al. (2015) determined that caregivers of stroke patients, had a monthly mean total lost-productivity cost to be $835 USD, with 72% being attributable to presenteeism.

Many questionnaires have been developed to measure work productivity loss among people with health problems including chronic conditions (Tang et al., 2011b; Zhang et al., 2011a). Work productivity loss due to health problems commonly includes three components: (1) absenteeism (i.e., the number of days missed from work); (2) presenteeism (i.e., the reduced productivity or the productivity loss while at work); (3) employment status (change) including reduced routine work time and stopping work (Zhang et al., 2011a). For example, the Work Productivity and Activity Impairment questionnaire (WPAI) is a commonly used questionnaire to measure the impact of health problems on people's work productivity and the Valuation of Lost Productivity questionnaire (VOLP) is a recently developed questionnaire based on economic theory to measure and value work productivity loss due to health problems in both time and monetary values (Reilly et al., 1993; Zhang et al., 2011b, 2012; Reilly Associates, 2017).

The underlying theory and concepts of work productivity loss (absenteeism and presenteeism) apply to both people with health problems and caregivers when measuring their work productivity loss. The differences of the questionnaire measuring work productivity loss among caregivers include that it needs to capture work productivity loss due to caregiving responsibilities as well as different caregiving responsibilities and the time spent on them among caregivers. Our review revealed relatively few questionnaires that have been developed, adapted or applied to measure work productivity loss due to caregiving responsibilities among caregivers. These include: (1) WPAI; (2) Work Limitations Questionnaire (WLQ); (3) iMTA Valuation of Informal Care Questionnaire (iVICQ); (4) Caregiver Indirect and Informal Care Cost Assessment Questionnaire (CIIQ) (Lerner et al., 2001, 2003, 2015; Giovannetti et al., 2009; Zhang et al., 2010; Tang et al., 2011a; Hoefman et al., 2019; Landfeldt et al., 2019). Each questionnaire has its own strengths and limitations (see details in **Supplementary Appendix**). In addition to incomplete components to measure caregiver responsibilities (WPAI and WLQ) and their impact on work productivity loss of caregivers (WLQ for presenteeism only), the existing questionnaires represent different approaches to measuring absenteeism and presenteeism. A 1-week recall period for absenteeism was used by WPAI and CIIQ compared to a 3-month recall period used by VOLP. Previous studies have compared and discussed the following approaches to measuring presenteeism: direct time measurement (e.g., VOLP), 0–10 scale (e.g., WPAI and CIIQ) and multidimensional measurement (e.g., WLQ) (Zhang et al., 2010, 2011a). The 0–10 scale leads to the largest time loss estimates of presenteeism when compared to direct time and multidimensional measurement methods (Zhang et al., 2010). The higher estimation might be because it captures the quality of life and psychosocial impacts as well (Zhang et al., 2010, 2011a). On the other hand, the direct time measurement provides a direct work time loss estimate that could be converted to productivity loss in monetary value. Furthermore, it is not clear whether existing questionnaires incorporated caregiver partners in their development or adaption. By including caregiver partners as research partners (i.e., patient/caregiver-oriented research), one can utilize their lived-experiences and expertise in the area potentially leading to the development of a more accurate tool that better measures caregiving responsibilities and the resulting productivity losses among caregivers.

Our objectives were to use a caregiver-oriented research approach to adapt a previously validated version of the VOLP questionnaire for people with health problems, to a caregiver version to measure productivity losses due to caregiving responsibilities, and then to develop and evaluate the feasibility and validity of an online version of the caregiver VOLP questionnaire.

METHODS

We used a mixed methods design, where qualitative methods were used for VOLP adaptation and online conversion and quantitative methods for online survey feasibility and validity testing. We defined caregivers as individuals currently caring for a family member or friend living with a chronic condition. There were some differences from the way previous studies defined caregivers (Giovannetti et al., 2009; Ganapathy et al., 2015; Lerner et al., 2015; Wang et al., 2016; Kahn et al., 2017; Fujihara et al., 2019; Hoefman et al., 2019; Kuenzig et al., 2019; Landfeldt et al., 2019), recognizing some studies did not provide a definition (Kahn et al., 2017; Fujihara et al., 2019). Other studies did not specify care recipients having a chronic condition in their caregiver definitions, but review of these studies showed that most of their care recipients had a chronic condition of some type (Giovannetti et al., 2009; Ganapathy et al., 2015; Wang et al., 2016; Kuenzig et al., 2019; Landfeldt et al., 2019). Our intention was to exclude caregiver participants who were caring for some acute conditions or injuries that were expected to have short-term impact on their work productivity.

Valuation of Lost Productivity Questionnaire Adaptation

The research team adapted the VOLP to a caregiver version by reviewing existing questionnaires that measured caregiver work productivity losses (iVICQ, CIIQ and WPAI), followed by discussion among the team, including two caregiver partners, two health economists who mainly developed the VOLP patient version, one person-centered outcome expert, one health economist and potential future user of the VOLP, one clinician and potential future user of the VOLP, and two research assistants. In addition to the two caregiver partners and two health economists who mainly developed the VOLP patient version, we believe it is important to include an expert in person-centered outcome measurement and validation as a research team member because productivity loss has been considered and measured not only as a cost component for economic evaluations (Neumann et al., 2016; Yuasa et al., 2021) but also an important person-centered outcome (Hanemoto et al., 2017; Stewart et al., 2018; Zhang and Sun, 2021). The potential future VOLP users to measure productivity loss among caregivers as a person-centered outcome (a clinician investigator) and cost estimates (a health economist) were also included to ensure that VOLP would meet their research purpose.

The team identified an initial set of concepts would be included in the caregiver questionnaire and developed the first draft. This draft was then improved using one-on-one interviews with 7 caregiver study participants, recruited through existing networks of the Family Caregivers of British Columbia (BC), the BC SUPPORT Unit, and the Centre for Health Evaluation and Outcome Sciences via their social media and newsletters, as well as through posters at medical clinics, doctors' offices, and large social gathering sites, including coffee shops and community centers. The inclusion criteria for caregiver study participants were individuals who were 19 years of age and over; can read and speak English; can provide informed consent; and were caring for a family member or friend with a chronic condition. The interviews focused on work productivity loss concepts, questionnaire flow, and ease of understanding, which was considered as part of feasibility testing of the adapted caregiver VOLP. Once completed, the interview findings were circulated and discussed among the research team (with one caregiver partner) and changes to the draft were made accordingly.

VOLP Questionnaire Online Conversion

We converted this newly adapted VOLP for caregivers to an online format using the Qualtrics application. We studied existing online questionnaires, with a focus on visual aids and other presentation methods, to improve the user-friendliness of the online caregiver VOLP. We then developed and circulated an initial draft of the online questionnaire among the research team for feedback. The online questionnaire was then tested using one-on-one interviews with 6 study participants (3 caregivers for online caregiver VOLP and 3 patients for online patient VOLP) recruited using the same methods mentioned above, aiming to improve the user-friendliness and test the feasibility. The online patient and caregiver VOLP shared similar questions and same online designs were applied. We therefore combined the feedback from both caregiver and patient study participants. The research team then discussed the interview findings and finalized the online questionnaire. The final online survey including the VOLP caregiver questionnaire can be found in the **Supplementary Appendix**.

Feasibility and Validity Testing

To assess the feasibility and validity of the online caregiver VOLP, we administered it to 400 caregivers in Canada, recruited through a market research company (Ipsos), using pre-defined quotas on age, sex, and regions to ensure that our sample had similar distributions to those observed in the survey conducted by Statistics Canada among a general population of caregivers (Sinha, 2012). We also ensured that at least 200 caregivers were currently employed. We focused on two main VOLP outcomes, absenteeism and presenteeism. Two absenteeism outcomes were calculated based on VOLP: (1) the number of days absent from work in the past 3 months due to caregiving (= A); (2) the percent absent work time due to caregiving responsibilities in the past 3 months using the formula: $\frac{A}{A+B} \times 100$ where B = actual number of days worked in the past 3 months. Presenteeism was measured using a percentage time loss while at work in the past 7 days due to caregiving responsibilities, derived from the following formula: $\frac{C-D}{C} \times 100$ where C = total hours they took to complete all work in the past 7 days and D = total hours they would take to complete the same work if they did not have caregiving responsibilities. The 3-month recall period for absenteeism and 7-day recall period for presenteeism were applied in patient VOLP and justified as better recall periods for absenteeism and presenteeism, respectively, in previous studies (Reilly et al., 1993; Revicki et al., 1994; Zhang et al., 2011a). We also looked at absenteeism and presenteeism in volunteer jobs. These values were calculated using the same method, with the exception that for absenteeism, we focused on volunteer hours spent over the past 3 months instead of volunteer days.

We also included the WPAI caregiver version to compare the corresponding main outcomes with VOLP. The WPAI is a commonly used questionnaire to measure work productivity loss due to caregiving responsibilities, using a 7-day recall period. WPAI absenteeism was measured using two methods: (1) the number of hours missed from work in the past 7 days (= E), due to caregiving responsibilities; (2) the percent work time missed due to caregiving responsibilities in the past 7 days using the same formula: $\frac{E}{E+F} \times 100$, where F = actual number of hours worked in the past 7 days. WPAI presenteeism was measured using a percent impairment while working, which was derived from the formula: $\frac{G}{10} \times 100$ where G = the degree that caregiving responsibilities affected productivity while working (measured on a 0 – 10 scale).

In addition, total hours spent on caregiving responsibilities (referred to as caregiving time thereafter) and the severity of the care recipients' condition reported by the caregiver were used

to evaluate known groups/discriminant validity. The caregiving time was determined by the sum of hours spent on 5 categories of caregiving responsibilities: (1) household activities and tasks; (2) personal care; (3) practical support; (4) emotional support; (5) other responsibilities. The question asking for the severity of the care recipients' condition was adapted from the General Social Survey-Caregiving and Care Receiving developed by Statistics Canada (Government of Canada Sc, 2016). The severity included 3 levels, mild, moderate, and severe. If a participant cared for multiple care recipients, the highest ranking was used.

Feasibility was demonstrated by participant understanding of the VOLP questionnaire during the interviews at the stages of VOLP adaption and online conversion, and the median overall time spent on completing the final online survey.

We examined convergent validity by measuring the correlations between the VOLP and WPAI absenteeism and the correlation between VOLP and WPAI presenteeism because they share some similar constructs. We further compared the correlations between VOLP and WPAI outcomes with their correlations with caregiving time and we expected the former to be larger than the latter. Validation methods used and result interpretations were similar to those used for validating the VOLP patient version, including comparisons of Spearman rank correlations between caregiver VOLP outcomes and WPAI outcomes with those between patient VOLP outcomes and WPAI outcomes found previously (= 0.57 for absenteeism and 0.42 for presenteeism) (Zhang et al., 2011b). Additionally, we compared the correlation values between VOLP and WPAI outcomes and caregiving time to those between WPAI overall work impairment outcome, defined by $\left(\frac{E}{E+F} + (1 - \frac{E}{E+F}) \times \left(\frac{G}{10}\right)\right) \times 100$, and caregiving time in a previous caregiver WPAI validation study (= 0.32) (Giovannetti et al., 2009). We used Spearman rank correlations to accommodate the highly skewed nature of the productivity loss data distributions with excess zero productivity loss (absenteeism and presenteeism) being reported (see **Supplementary Appendix Figures 1, 2**). We expected the correlation values in this study to be similar to the correlations observed in the previous studies mentioned above. Our term of comparison for the magnitude of the spearman correlations was based on Hinkle et al. (2003): <0.3 represents negligible, 0.3–0.5 low or small, 0.5–0.7 medium, and ≥0.7 high or large correlation.

Wilcoxon tests were used to determine if VOLP and WPAI outcomes varied between two groups determined by recipients' condition severity (mild and moderate vs. severe) and caregiving time using median as the cut-off. Effect size (Cliff's Delta, due to highly skewed absenteeism and presenteeism outcomes) was used to determine the discriminative ability between two groups. According to Romano et al., an absolute value of Cliff's Delta <0.147 represents trivial, 0.147–0.33 small, 0.33–0.474 medium and ≥0.474 large effect (Romano et al., 2006).

Ethics Statement

This study was approved by the University of British Columbia-Providence Health Care Research Ethics Board (Ethics Certificate No. H19-00329). The interview participants provided their written informed consent to participate in this study. The online survey participants provided their consent online to continue the survey.

RESULTS

VOLP Adaptation Based on Team Discussion and Interviews

The first round of interviews for VOLP adaption involved 7 caregiver participants, while the second round of interviews for online conversion involved 3 caregivers and 3 patients. Participant demographics for the interviews covered a diverse sample, including, but not limited to, varying ethnicities (46% European, 31% Asian, 23% other), age groups (31% 30–39 years, 38% 40–49, 23% 50–59, and 8% 60+), and sex assigned at birth (53% female).

At the first stage of the adaptation of VOLP for caregivers, the research team decided to add three major components to the existing VOLP based on the review of previous questionnaires, research team discussion and interview findings (see details below): caregiving time for different caregiving responsibilities, work productivity loss related to volunteer activities, as well as caregivers' lost job opportunities. Caregiving time for different caregiving responsibilities is captured in the CIIQ. Including caregiving time before asking for the associated absenteeism and presenteeism helps set up the context and scope of what caregiving responsibilities the survey respondents are taking. We adapted caregiving time from four major categories of caregiving responsibilities and their corresponding examples from the CIIQ. These included household activities and tasks; personal care; practical support; and emotional support. However, one additional category was included to reflect additional responsibilities based on our research team discussion. This was defined as "other responsibilities" and included, but not limited to, activities such as attending counseling sessions and planning for their care recipients. In addition to a table including the five categories to capture total caregiving time for each category, we provided an option to use a more detailed table, which participants could use to record their time for each of the examples under each main category. The majority of interview participants preferred this detailed table. They stated that recalling and calculating all of these tasks was already hard enough, and by viewing each example per category, separately, eased their ability to recall their activities in the past week. Please see the supporting quotations in the **Supplementary Appendix**.

We found that although there were many questionnaires that measured work productivity loss from a paid work perspective, there were few that also looked at the productivity loss on individuals' volunteer activities. For many caregivers, volunteering is a major component of their life, and needs to be addressed (Burr et al., 2005). Although the questions regarding work productivity loss from a paid work perspective and a volunteer perspective were very similar, a few key changes were made. The most notable change was the units of time used to measure absenteeism. While we used "days" missed over the past 3 months for paid work absenteeism, we used "hours" missed over the past 3 months for volunteer absenteeism. This suggestion was

made by the research team during the interview process, to make the participants recall process easier. As many of our participants' volunteer work did not follow a strict schedule as paid work, many participants had trouble quantifying their volunteer time in terms of days.

For measuring lost job opportunities, we divided the section into three questions: (1) whether they have declined any job offers or opportunities due to caregiving responsibilities; (2) whether any of these job opportunities would have provided additional income; (3) if yes, then to provide either a monthly or yearly estimate on the additional income (in CAD).

We found that interview participants had little issues with work productivity loss concepts, such as absenteeism, presenteeism and employment status changes. Interview participants had the most difficulty in quantifying the time spent on emotional support, as well as the recall period for their caregiving time. During the interview process, participants had issues quantifying their time spent on emotional support. Some participants felt that they spent much more of their time on emotional support than other responsibility categories but most of the time spent on emotional support concurred with the other responsibilities. This makes it difficult to distinguish the time spent on emotional support from other categories to avoid double counting. Although there were no better change suggestions to address this issue from the research team or interview participants, we should be aware of the potential double counting in our post-hoc data analysis.

One common issue the participants encountered related to our choice of recall period, i.e., looking at the past week at the point of taking the questionnaire, as opposed to looking at an average week. They felt that by only looking at the past week, we were not getting a good representation of the time they spent on their caregiving responsibilities over an average week. However, by taking the past week of all participants we would likely get a snapshot and extremes on both ends, a very busy week or a not busy week. One of the main issues with using an average week comes down to how each individual would measure the average week. It would be impossible for us to know or guarantee the consistency in how each individual calculated said average, whereas using the past week is a consistent measure that should not change from person to person. Also, the past week recall period was consistent with that used to measure work productivity loss in VOLP and WPAI.

Feasibility and Validity Testing

Of the initial 400 online survey participants, we removed 2 individuals who completed the survey in less than 3 min. This value was based on the shortest path required to complete the survey, anything under said limit strongly implied that the participant did not fully read the questionnaire and was less likely to provide meaningful results. We also removed 16 individuals whose reported total hours spent helping their care recipient were deemed too long (assuming the average individual would get 6 h of sleep, anyone whose time reported was over 126 h was removed). This left us with 382 participants. The median overall time spent on completing the online survey was 9.21 min (first quartile: 6.58 – third quartile: 12.23). The completion time

TABLE 1 | Caregiver participant characteristics.

Variables ($N = 382$)	*N*	%
Age (years)		
25–34	75	19.63
35–44	72	18.85
45–54	122	31.94
55–64	110	28.80
Female	203	53.14
Highest level of education completed		
Primary or high school	73	19.11
College or technical/trade	115	30.10
University	132	34.55
Post-graduate or professional designation	59	15.45
Ethnicity[a]		
Aboriginal	15	3.93
African	5	1.31
Hispanic, Latino or Spanish	6	1.57
European	227	59.42
East Asian	55	14.40
South Asian	16	4.19
West Asian	9	2.36
Caregivers who were doing volunteer work	51	12.83
Occupations[b]		
Management	97	25.39
Finance	29	7.59
Natural and applied science	34	8.90
Health	17	4.45
Education, law, social, community and government services	32	8.38
Art, culture, recreation and sports	9	2.36
Sales and service	40	10.47
Trades and transport	7	1.83
Agriculture and manufacturing	7	1.83
Severity of care recipients' chronic conditions		
Mild	57	14.92
Moderate	234	61.26
Severe	77	20.16
Health status of caregivers		
Poor	23	6.02
Fair	61	15.97
Good	138	36.13
Very good	118	30.89
Excellent	41	10.73
Province of residence		
Alberta	46	12.04
Atlantic Region[c]	28	7.33
British Columbia	52	13.61
Manitoba	14	3.66
Ontario	163	42.67
Quebec	72	18.85
Saskatchewan	7	1.83

The count may not add up to 382 because there was a "prefer not to say" option for questions asking participant characteristics or a category having smaller than 5 individuals.

[a] *Our questionnaire allowed multiple choices to be selected for ethnicity.*

[b] *Only applicable to caregivers who were employed.*

[c] *Includes New Brunswick, Newfoundland and Labrador, Nova Scotia and Prince Edward Island.*

for caregivers who were not employed and thus did not answer questions on absenteeism and presenteeism [median = 7.55 min (5.42–11.37)] was shorter than the completion time for caregiver who were employed [median = 9.55 min (7.30–13.23)].

Participant demographics for the feasibility and validity testing survey covered a diverse sample, including, but not limited to, varying ethnicities (59% European, 21% Asian, 4% Aboriginal, 2% Hispanic and 1% African), age groups (20% 25–34 years, 19% 35–44, 32% 45–54 and 29% 55–64), and sex assigned at birth (53% female) (**Table 1**). About 13% were volunteering, and 61% of care recipients' chronic conditions were at moderate level. The average total caregiving time in the past 7 days was 33.64 h (standard deviation = 26.80) and the median was 27.00 h (14.12–43.00). The average total caregiving time in the past 7 days, when excluding emotional support, was 28.47 h (standard deviation = 23.44) and the median was 23.00 h (11.00–37.00).

Based on VOLP, of the 277 (73%) participants who were employed either full time, part time or self employed, only 124 reported absence from work in the past 3 months (absenteeism) due to their caregiving responsibilities, with an average of 10.05 absent workdays (median = 4 days) accounting for 20.63% (median = 7.93%) of their work time (**Table 2**). Of the 232 participants who had worked in the past 7 days, only 81 reported a loss while at work due to their caregiving responsibilities (presenteeism) with an average of 25.36% time loss (median = 20%). Of the 232 participants who had worked in the past 7 days, 155 reported having worked from home. Based on WPAI, the average number of absent work hours was 3.10 h in the past 7 days versus 4.50 absent workdays in the past 3 months from the VOLP. As expected, WPAI provided a much higher presenteeism estimate than VOLP (37.62% versus 8.86%).

Of the 49 participants who were currently volunteering, only 18 reported absence from volunteering in the past 3 months due to their caregiving responsibilities, with an average of 58.14 h (**Supplementary Appendix Table 1**). Of the 28 participants who had volunteered in the past 7 days, only 9 reported a loss while at volunteer work due to their caregiving responsibilities with an average of 43.83% loss. About 26% ($n = 98$) of the participants had declined job opportunities due to caregiving responsibilities and 68 of them reported the declined job opportunities with associated additional average income of approximately $22,000 CAD per year (**Supplementary Appendix Table 2**).

Our correlation analyses revealed relatively small correlations between VOLP and WPAI outcomes as expected. The correlation between their absenteeism [$r = 0.49$ (95% confidence interval: 0.37–0.60)] was larger than the presenteeism [$r = 0.36$ (0.24–0.47)] (**Table 3**). Correlations between VOLP outcomes and total caregiving hours ranged from negligible to small, with a greater correlation for absenteeism [$r = 0.38$ (0.27–0.47)] than presenteeism [$r = 0.22$ (0.10–0.34)]. Due to the potential double counting issue arising from measuring emotional support mentioned above, we repeated the same analysis, removing

TABLE 2 | VOLP and WPAI outcomes.

Variable	*N*	Mean (SD)	Median (Q1–Q3)
VOLP outcomes			
Employed[a]	277		
Absenteeism due to caregiving responsibilities in the past 3 months			
Number of absent workdays	277	4.50 (12.84)	0.00 (0.00–4.00)
Number of absent workdays (absent workdays > 0)	124	10.05 (17.70)	4.00 (2.00–7.00)
% work time absent	249	10.28 (20.75)	0.00 (0.00–7.69)
% work time absent (absent workdays > 0)	124	20.63 (25.55)	7.93 (4.51–25.89)
Caregivers who have worked in the past 7 days	232		
Caregiver who worked from home in the past 7 days	155		
Presenteeism due to caregiving responsibilities in the past 7 days			
% time loss while working	232	8.86 (16.41)	0.00 (0.00–13.41)
% time loss while working (time loss while working > 0)	81	25.36 (18.81)	20.00 (12.50–33.30)
WPAI outcomes			
Caregivers who were working for pay	262		
Absenteeism due to caregiving responsibilities in the past 7 days			
Number of absent workhours	262	3.10 (8.89)	0.00 (0.00–2.00)
Number of absent workhours (absent workhours > 0)	90	9.03 (13.32)	5.00 (2.00–8.00)
% work time absent	235	11.29 (23.55)	0.00 (0.00–8.62)
% work time absent (absent workhours > 0)	90	29.47 (30.27)	14.29 (6.25–50.00)
Caregivers whose actual work hour > 0 in the past 7 days	227		
Presenteeism due to caregiving responsibilities in the past 7 days			
% impairment while working	227	37.62 (28.74)	40.00 (10.00–60.00)
% impairment while working (impairment while working > 0)	186	45.91 (25.03)	50.00 (20.00–70.00)
Overall work impairment	227	40.74 (30.91)	40.00 (10.00–70.00)

VOLP, the Valuation of Lost Productivity questionnaire; WPAI, the Work Productivity and Activity Impairment questionnaire; SD, standard deviation; Q1, the first quartile; Q3, the third quartile.

[a] *Full time, part time, or self employed.*

TABLE 3 | Spearman correlations between VOLP outcomes, WPAI outcomes and caregiving time.

	VOLP absenteeism in days	**VOLP absenteeism in %**	**VOLP presenteeism**
WPAI absenteeism in hours	0.49 (0.37–0.60) ($N = 259$)		
WPAI absenteeism in %		0.49 (0.37–0.61) ($N = 216$)	
WPAI presenteeism			0.36 (0.24–0.47) ($N = 215$)
	VOLP absenteeism in days ($N = 277$)	**VOLP absenteeism in % ($N = 249$)**	**VOLP presenteeism ($N = 232$)**
Total caregiving hours	0.38 (0.27–0.47)	0.39 (0.28–0.49)	0.22 (0.10–0.34)
Total caregiving hours excluding emotional support	0.39 (0.29–0.47)	0.40 (0.29–0.50)	0.23 (0.10–0.35)
Total hours spent on emotional support	0.18 (0.04–0.30)	0.18 (0.05–0.30)	0.18 (0.06–0.30)
	WPAI absenteeism in hours ($N = 262$)	**WPAI absenteeism in % ($N = 235$)**	**WPAI presenteeism ($N = 227$)**
Total caregiving hours	0.27 (0.15–0.38)	0.27 (0.14–0.40)	0.35 (0.23–0.46)
Total caregiving hours excluding emotional support	0.28 (0.15–0.38)	0.28 (0.16–0.40)	0.37 (0.25–0.50)
Total hours spent on emotional support	0.09 (−0.03 to 0.22)	0.07 (−0.07 to 0.21)	0.13 (−0.01 to 0.26)

Values presented as Spearman rank correlation and 95% Confidence Interval using Bootstrapped methods with 1,000 iterations.
VOLP, the Valuation of Lost Productivity questionnaire; WPAI, the Work Productivity and Activity Impairment questionnaire; VOLP absenteeism in days refers to number of absent workdays due to caregiving responsibilities in the past 3 months; VOLP absenteeism in % refers to % work time absent due to caregiving responsibilities in the past 3 months; WPAI absenteeism in hours refers to number of absent work hours due to caregiving responsibilities in the past 7 days; WPAI absenteeism in % refers to % work time absent due to caregiving responsibilities in the past 7 days.

emotional support from total caregiving hours, observing an increase of 0.01 in correlation values. Correlations between WPAI outcomes and total caregiving hours ranged from negligible to small, with a smaller correlation for absenteeism [$r = 0.27$ (0.15–0.38)] than presenteeism [$r = 0.35$ (0.23–0.46)]. After removing emotional support, the correlation values increased by 0.01 or 0.02. The correlation between WPAI overall work impairment and total caregiving hours was small [$r = 0.36$ (0.23–0.48)].

Dividing participants into two groups according to the chronic condition severity of their care recipients, the results for VOLP presenteeism and WPAI absenteeism and presenteeism outcomes were not logical with greater loss estimates in mild/moderate status than severe status (**Table 4**). VOLP absenteeism in % work time absent was statistically significantly larger in caregivers whose care recipients had severe chronic conditions with effect size = 0.20 (i.e., small effect). These results indicated that the VOLP presenteeism and WPAI absenteeism and presenteeism could not discriminate between caregivers whose care recipients had different chronic condition severity levels. The VOLP and WPAI outcomes among caregivers who spent fewer hours on caregiving responsibilities were significantly lower than those among caregivers spending more time. According to the effect size, the VOLP and WPAI could also discriminate between caregivers with less and more caregiving time (small to medium effect size, 0.19 to 0.30 and 0.23 to 0.31, respectively).

DISCUSSION

By applying mixed methods and caregiver-oriented research, we adapted the VOLP patient version for measuring work productivity loss among caregivers. The feasibility was supported by participant understanding of the caregiver VOLP shown in the interviews and the reasonable time spent on completing the final online survey. Our validity testing showed that the correlations between VOLP outcomes and WPAI outcomes were small and the correlation between the VOLP and WPAI presenteeism was weaker than the correlations between their absenteeism outcomes. This weaker correlation reflects differences in how presenteeism was measured: the VOLP using direct time measurement method vs. the WPAI using a 0–10 scale. When assessing presenteeism of patients with osteoarthritis or rheumatoid arthritis, a previous study that compared the 0–10 scale of the WPAI to direct hour estimating method of the Health and Labor Questionnaire found the correlation to be 0.37, which is similar to our results produced (Zhang et al., 2010). The correlations found in our study were slightly smaller than the previous validation results for the VOLP patient version, in which the correlation between VOLP absenteeism and WPAI absenteeism was 0.57 (vs. 0.49 in this study) and the correlation between presenteeism outcomes was 0.42 (vs. 0.36) (Zhang et al., 2011b).

We also found the correlations between the VOLP outcomes and WPAI outcomes were larger than those between the VOLP and caregiving time and condition severity of care recipients. This suggested that VOLP outcomes share more similar constructs to WPAI outcomes than caregiving time and condition severity of care recipients. We noted larger correlations between VOLP absenteeism and caregiving time than WPAI absenteeism. Similarly, VOLP absenteeism had a larger effect size than WPAI absenteeism when discriminating groups with lower and higher caregiving time. These may be attributed to the different recall periods used, with the longer 3-month period being used by the

TABLE 4 | VOLP outcomes and WPAI outcomes between two different caregiver groups defined by the condition severity of care recipients and the median of total caregiving hours.

		Condition severity (mild/moderate vs. severe)	Total caregiving hours
VOLP absenteeism in days, median (Q1–Q3)	Better	0.00 (0.00–3.00) $N = 218$	0.00 (0.00–2.00) $N = 142$
	Worse	1.00 (0.00–4.13) $N = 48$	2.00 (0.00–5.00) $N = 135$
	P-value	0.17	<0.001
	Effect size	0.12 (−0.04 to 0.27)	0.29 (0.17–0.41)
VOLP absenteeism in %, median (Q1–Q3)	Better	0.00 (0.00–7.69) $N = 202$	0.00 (0.00–3.61) $N = 125$
	Worse	4.76 (0.00–9.89) $N = 40$	4.62 (0.00–14.29) $N = 124$
	P-value	0.03	<0.001
	Effect size	0.20 (0.02–0.36)	0.30 (0.17–0.42)
VOLP presenteeism, median (Q1–Q3)	Better	0.00 (0.00–15.42) $N = 184$	0.00 (0.00–3.39) $N = 124$
	Worse	0.00 (0.00–12.50) $N = 38$[a]	0.00 (0.00–25.00) $N = 108$
	P-value	0.82	<0.001
	Effect Size	−0.02 (−0.18 to 0.14)	0.19 (0.06–0.31)
WPAI absenteeism in hours, median (Q1–Q3)	Better	0.00 (0.00–2.00) $N = 206$	0.00 (0.00–0.00) $N = 134$
	Worse	0.00 (0.00–1.00) $N = 46$[a]	0.00 (0.00–3.25) $N = 128$
	P-value	0.73	<0.001
	Effect size	−0.03 (−0.18 to 0.13)	0.23 (0.11–0.34)
WPAI absenteeism in %, median (Q1–Q3)	Better	0.00 (0.00–9.09) $N = 186$	0.00 (0.00–2.44) $N = 117$
	Worse	0.00 (0.00–7.41) $N = 41$[a]	1.22 (0.00–16.96) $N = 118$
	P-value	0.74	<0.001
	Effect size	−0.03 (−0.20 to 0.14)	0.24 (0.11–0.36)
WPAI presenteeism, median (Q1–Q3)	Better	40.00 (10.00–60.00) $N = 181$	20.00 (10.00–50.00) $N = 115$
	Worse	30.00 (10.00–55.00) $N = 39$	50.00 (20.00–70.00) $N = 112$
	P-value	0.76	<0.001
	Effect size	−0.03 (−0.22 to 0.16)	0.31 (0.16–0.44)
Total caregiving hours, median (Q1–Q3)	Better	25.00 (14.00–42.00) $N = 291$	N/A
	Worse	32.00 (16.00–44.00) $N = 77$	N/A
	P-value	0.16	
	Effect size	0.11 (−0.04 to 0.25)	N/A

Better status was defined as mild or moderate or ≤ median (= 27 h) of caregiving hours, and worse status was defined as severe or > median of caregiving hours. VOLP, the Valuation of Lost Productivity questionnaire; WPAI, the Work Productivity and Activity Impairment questionnaire; Q1, the first quartile; Q3, the third quartile; N/A, not applicable.

[a]*Indicates N for non-zero values were ≤15.*

VOLP compared to the shorter 7-day period of the WPAI. Revicki et al. (1994) demonstrated that reporting absent workdays over 3 months was as accurate as those of a month, and the extended time period may itself lead to more stable estimates. This might also reflect the recall issue for caregiving time raised by our interview participants and some of the interview participants might report their caregiving time in an average week in a longer time period instead of the past week as instructed. The weaker correlation seen between VOLP presenteeism and caregiving time and smaller effect size than WPAI presenteeism may again reflect their different constructs used to measure presenteeism. Compared to the findings from the previous caregiver WPAI validation study, the correlation between WPAI overall work impairment and caregiving time in our study was slightly larger (0.36 vs. 0.32) (Giovannetti et al., 2009).

When comparing VOLP and WPAI outcomes and caregiving time by care recipients' condition severity, we noted more illogical trends than logical. The instances of logical trends were seen when comparing VOLP absenteeism and caregiving time. Only VOLP absenteeism as a percent work time absent and caregiving time revealed statistically significant differences between mild/moderate and severe groups. The large number of illogical trends seen, and lack of significant results might be due to the small sample sizes among the subgroups and the highly skewed outcome data with excess zeros. This may also be due to use of a single question, adapted from the General Social Survey-Caregiving and Care Receiving developed by Statistics Canada (Government of Canada Sc, 2016), that involves reliance on caregivers as proxies to assess the severity of their care recipients' conditions. Future studies that use larger sample sizes and link to care recipient self-reported disease severity can investigate this further to determine whether the VOLP and WPAI could discriminate caregivers based on their care recipients' disease severity.

We observed the time spent on emotional support accounting for 15.4% of the total caregiving time. Although our interview participants realized to avoid double counting the time for each category of caregiving responsibilities, they mentioned that it could be challenging to do so for emotional support. Thus, we suggest researchers conducting sensitivity analyses by including and excluding emotional support in their future studies. When testing the convergent validity of VOLP, we found that including and excluding emotional support had minimal effect on our correlation values.

The patient VOLP was developed based on economic theory and applies different measurement methods including a different recall period for absenteeism (3 months vs. 1 week for WPAI and CIIQ) and a direct time measurement approach for presenteeism compared to 0–10 scale used by WPAI and CIIQ and multidimensional measurement by WLQ (Zhang et al., 2011a, 2012). The 3-month recall period for absenteeism has been chosen based on the previous evidence on its accuracy on reporting absent workdays and as it is a common follow-up time point in clinical trials (Revicki et al., 1994; Zhang et al., 2011a). As mentioned above, different presenteeism measurement methods provide widely varied estimates (Zhang et al., 2010). The direct time measurement for presenteeism used by VOLP provides

a direct work time loss estimate that could be converted to productivity loss in monetary value. In addition, the VOLP can be used to measure productivity loss for volunteer work, which is a major component of caregivers' life.

Furthermore, we adapted questions regarding the time spent on different caregiving responsibilities based on CIIQ and examined the questions through interviews with caregivers. We started asking survey participants the questions regarding the time spent on caregiving responsibilities to give them a better understanding of the concepts that would be utilized to answer the related productivity loss questions. CIIQ first asks for absenteeism and presenteeism "due to your relative's disease/condition" by providing some examples of caregiving responsibilities and then asks questions on the time spent on each category of caregiving responsibilities. This way could lead to inconsistencies among these questions. We did not change the order of items in the VOLP questionnaire. The questions within VOLP have been set up in a logic order so that survey participants who are not eligible for certain questions will skip. For example, the question regarding employment status will determine who is eligible for absenteeism questions or not. After absenteeism questions, those who have worked in the past 7 days will be eligible for presenteeism questions. However, we did not randomize the order of VOLP and WPAI, which might lead to order effects bias.

Our study had several additional limitations. Our limited sample sizes made it difficult to produce meaningful statistical results by different caregiver groups, e.g., by care recipients' condition severity. Additionally, many participants reported zero-values especially for VOLP presenteeism or WPAI absenteeism, which requires even larger sample sizes and special considerations on analysis methods in future studies.

Another limitation in our study arose from the period the study was undertaken, as our feasibility and validity testing survey was launched during the height of the COVID-19 pandemic (between May 15, 2020 to June 2, 2020). During that period, social distancing and gathering restrictions were implemented across Canada, which had significant impact on health care service access (related to caregiving time) and work arrangements (related to caregivers' work productivity loss). In response to this, we included a question about whether caregiver responders were working from home and found a two-third of the participants who had worked in the past 7 days, had worked from home. Our findings could be valid only under this situation with more people working from home. However, our findings will still be relevant in a post-COVID-19 caregiving environment if more caregivers can work from home. Furthermore, as the survey was launched in the first few months of dealing with the COVID-19 outbreak, caregivers might have had a hard time adapting their caregiving and working life, which could have been reflected in their reported caregiving time and productivity loss results. However, this would not affect our validation results, as it would have been reflected in both the VOLP and WPAI questionnaires.

In summary, the study provides evidence of feasibility and preliminary validity evidence of the adapted VOLP caregiver questionnaire in measuring productivity losses due to caregiving responsibilities, when compared with the results for WPAI and the results from the previous VOLP validation study among patients. In addition to absenteeism and presenteeism for caregivers' paid employment, researchers could measure their caregiving time, absenteeism and presenteeism for volunteer work, and lost opportunities. Special considerations should be given to the recall period for caregiving time, the potential double counting issue by including emotional support, and the appropriate sample size due to the highly skewed data with excess zeros.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available from the corresponding author upon reasonable request. The data are not publicly available due to ethical restrictions.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by The University of British Columbia-Providence Health Care Research Ethics Board (Ethics Certificate No. H19-00329). The interview participants provided their written informed consent to participate in this study. The online survey participants provided their consent online to continue the survey.

AUTHOR CONTRIBUTIONS

WZ conceived and designed the study. WZ, CL, RS, AP, and AHA were the investigators in funding application. AG and JS were the primary interviewers and analyzed the qualitative data. AG primarily worked on the online conversion using the Qualtrics application, and performed the data analysis of the survey. WZ and RS provided guidance on the data analysis. AG and WZ drafted the manuscript. All authors were involved in developing the adapted caregiver questionnaire and finalizing the questionnaire in both paper version and online version, and involved in editing and reviewing the manuscript and have given approval to the final manuscript.

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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.2021.727871/full#supplementary-material

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Sickness Presenteeism Among the Swedish Self-Employed During the Covid-19 Pandemic

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The present study analyzed the impact of business operations, work and family circumstances, and well-being on the risk of sickness presenteeism for Swedish self-employed workers during the Covid-19 pandemic. It is of great importance to investigate the impact of the pandemic on the self-employed and their enterprises because they are seen as key drivers of economic growth and constitute an expanding group in many countries. Data were obtained from 845 self-employed workers by a web-based survey including questions about background information, work and family circumstances, well-being, sickness presenteeism, and questions about the pandemic. Results were that around 40% of the self-employed introduced new products, processes, and marketing methods, and just over 50% attempted to get new customers during the pandemic. Nearly half of the self-employed people reported that they lost contracts, and 22% judged the risk of bankruptcy to be quite or highly likely. Regression analyses showed that the more the self-employed reported impact on business indicators, increased work hours, a higher level of work-family conflict, and a lower level of mental well-being, the higher the risk of sickness presenteeism. The most common reasons given by the participants for sickness presenteeism during the pandemic were "nobody else can carry out my responsibilities," "I can't afford to take sick leave" and "I enjoy my work." Conclusions are that a critical event such as the pandemic probably adds to an already high workload for the self-employed. Impact on business operations such as developing new products/services and marketing, risk of bankruptcy and increased work hours seems to be important factors for explaining sickness presenteeism among the self-employed. Theoretical contributions from the study suggest that critical events such as the Covid-19 pandemic should be considered as an important environmental factor when studying sickness presenteeism among self-employed.

Keywords: sickness presenteeism, self-employed, COVID-19, working conditions, business operations, well-being, work-life balance, presenteeism reasons

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INTRODUCTION

The Covid-19 pandemic has brought about the largest global economic crisis in modern working life (Blundell and Machin, 2020). One of the responses to the pandemic in many countries has been extensive governmental actions to assist the self-employed. These include income protection, expansion of paid sick leave, adjustment support, and financial turnover support

(Tetlow and Dalton, 2020). In Sweden, support for businesses has primarily centered on central government schemes to subsidize rent for those enterprises most affected by the crisis (Tetlow and Dalton, 2020). Other business support in Sweden has come in the form of social security contributions, income support measures for individuals and households, tax deferrals, bank loans for micro- and small-sized enterprises, capital injections in strategically important companies and support for the start-up of micro-sized enterprises (Tetlow and Dalton, 2020). However, many self-employed people have not sought governmental support because they perceive that they do not fulfill the roles for applications or they are not sure whether they are eligible (Blundell and Machin, 2020; Eib and Berhard-Oettel, 2020). It is important to understand the impact of the pandemic on the self-employed and their enterprises because they are seen as key drivers of economic growth and constitute an expanding group in many countries (Eurofound, 2017). Some 15% of the European labor market is comprised of the self-employed, with an increase in the share of self-employed people that do not have any employees (Eurofound, 2017). In Sweden, the number of self-employed people (including enterprises with and without employees) is around 96% of the total number of enterprises (Swedish Agency for Growth Policy Analysis, 2019).

A large portion of the self-employed are likely to have been heavily hit by the pandemic because they often have fewer in-house resources (personnel, human resources, and economic) compared to large enterprises, they face a high risk of income loss, and they have difficulties working with customers due to restrictions on mobility (Shafi et al., 2020; Stephan et al., 2020a). Recent studies during the first phase of the crisis show that European self-employed reported significantly higher job insecurity and a worse domestic financial situation compared to employees (Eurofound, 2020a). In addition, the reduction in hours and income for the self-employed contributed to a deterioration of subjective well-being compared to waged workers (Yue and Cowling, 2021). It is likely that reduction in work hours and income for the self-employed are a consequence of societal restrictions, which negatively influence their customer relations. Around 50% of the Swedish self-employed reported a deterioration in the profitability of their businesses due to reduced demands for their products and services, and problems with the supply chain and reaching customers (Salesforce, 2021). Another study from the first phase of the pandemic showed lower scores given for well-being among Swedish self-employed people compared to scores prior to the pandemic (Eib and Berhard-Oettel, 2020). A mixed-method study of managers in Swedish micro-sized enterprises, which are common among the self-employed, showed significantly worse scores for well-being outcomes compared to small-sized enterprises. The study also showed that the managers reported increased workload with extended work tasks during the pandemic (Vinberg and Danielsson, 2021). However, it is important to remember that the self-employed are a diverse group with some becoming more profitable during the pandemic due to increased demand for their products and services (Blundell and Machin, 2020).

For the self-employed, sickness presenteeism (or presenteeism) (SP) is a current phenomenon related to well-being and health outcomes. SP refers to "the phenomena of people turning up for work despite medical complaints and ill-health that would normally require rest and absence from work" (Aronsson and Gustafsson, 2005). SP is important because it can negatively impact both individuals' health (Skagen and Collins, 2016) and organizational productivity (Johns, 2010). Research shows that employees who go to work when ill tend to commit errors more frequently (Niven and Ciborowska, 2015) and report lower levels of performance and productivity (Robertson and Cooper, 2011). Studies in the United States indicate greater losses in productivity and higher costs for SP than for sickness absenteeism (Collins et al., 2005). Another study of the macro-economic impact of presenteeism showed that the annual cost of presenteeism to the Australian economy was estimated to be nearly four times the cost of absenteeism (Econtech, 2008). Concerning small enterprises and the self-employed, the economic consequences of SP may be experienced more acutely than in larger organizations due to the size and structure of the enterprises (Cocker et al., 2013).

Research shows that the self-employed have a high pace of work and work many and irregular hours, indicating that it can be problematic and frustrating for them to stay at home due of illness (Nordenmark et al., 2019). In addition, the self-employed can be viewed as a group that has low replaceability, which can lead to high SP (Kinman and Wray, 2018). It can be assumed that the outbreak of Covid-19 added to an already high workload for self-employed people. According to Knani et al. (2018), SP in small enterprises, where the self-employed often work, remains understudied. In addition, research points to the need for more studies concerning presenteeism related to specific contextual factors such as occupational groups and their working conditions (Ruhle et al., 2020) and environmental factors at a societal level (Lohaus and Habermann, 2019).

The aim of this study was 2-fold. First, we aimed to analyze whether the impact on business indicators, work and family circumstances, and well-being has increased the risk of SP for Swedish self-employed workers during the Covid-19 pandemic. The second aim was to investigate reasons for SP in this group during the pandemic.

BACKGROUND

Work-Family Circumstances and Well-Being Among the Self-Employed

The majority of self-employed people are either sole traders, such as independent contractors (Gallagher and Sverke, 2005), or have micro-sized (up to 10 employees) and small (up to 50 employees) businesses. Research into working conditions for the self-employed shows that they often are exposed to demanding psychosocial working conditions, high levels of pressure, high work demands, many responsibilities, and long and irregular working hours (Nordenmark et al., 2012; Legg et al., 2015; Hagqvist et al., 2016; Stephan, 2018). However they have high job control and the freedom to decide what work tasks to do and how to perform them (Stephan and Roesler, 2010; Nordenmark et al., 2012; Stephan, 2018). Some researchers characterize the work of the self-employed as "active jobs" (Karasek and Theorell, 1990; Stephan, 2018) entailing a combination of high work demands

and high job control. The majority of European self-employed workers, with and without employees, report that they have a high level of work quality and well-being, but around one fifth report that they are self-employed out of necessity with little autonomy, and a worse level of work quality and well-being (Eurofound, 2017). This heterogeneity is confirmed by another study of European self-employed workers, which identified distinct profiles among the self-employed that were associated with significant differences in work-related variables and well-being (Bujacz et al., 2020).

A large number of studies have verified that self-employed people are healthier, happier, and more satisfied at work than employed workers (e.g., Andersson, 2008; Stephan and Roesler, 2010; Sevä Johansson et al., 2016). Reasons suggested for these results are that the self-employed have high levels of autonomy and flexibility, and a strong feeling of pursuing their goals (Shir et al., 2019). Other reasons suggested by some researchers are related to selection bias aspects, that particular types of individuals are more likely than others to pursue self-employment, for example stress-resistant individuals (Stephan et al., 2020b). However, a study in the United Kingdom showed that individuals with poorer mental health were more likely to change from employment to self-employment (Stephan et al., 2020a). Other studies indicate that the self-employed have worse well-being (e.g., Parslow et al., 2004; Gunnarsson et al., 2007) or that there are no differences in well-being compared to organizational employees (Andersson, 2008). According to Stephan (2018), high uncertainty, great responsibility for their businesses and employees, and time pressure over longer periods can result in mental and physical disorders. Mental health and well-being are important for the self-employed because research shows they are associated with organizational performance and entrepreneurship (Wincent et al., 2008).

In terms of issues outside work, many studies into work-life balance show that work has a greater negative impact on the private lives of self-employed people (with and without employees) compared to organizational employees (Bunk et al., 2012; Sevä Johansson and Öun, 2015; Annink et al., 2016; Hagqvist et al., 2016). Although self-employed people report having more autonomy in their work than employees do, they also experience greater conflict between work and family life and lower satisfaction with family life (Parasuraman and Simmers, 2001). However, research also indicates that self-employed people are able to manage the competing demands of work and family (Prottas and Thompson, 2006; Sevä Johansson and Öun, 2015) through work flexibility (Prottas and Thompson, 2006).

Sickness Presenteeism in General and Among the Self-Employed

SP is an important factor in health and well-being given the assumption that it is problematic for self-employed people to stay at home when they are sick as nobody else can do their jobs. Comprehensive research shows that a large number of individual and organizational factors can cause SP. Investigations into SP have been criticized for their limited theoretical approaches (Johns, 2010). However, during recent years some models have been developed with key variables associated with SP. In one model, Johns (2010) classified potential determinants of SP into factors related to organizational policies (e.g., sick pay and attendance control), job design (e.g., job demands, ease of replacement and teamwork), and presenteeism cultures (e.g., SP attitudes). The results of a meta-analysis of significant causes of SP (Miraglia and Johns, 2016), showed that there were prominent correlates with general ill health, job insecurity, job demands, stress, lack of job and personal resources, negative relational experiences, and positive attitudes. These researchers proposed a conceptual model including absenteeism constraints, job demands, job resources, and personal resources as factors that directly or indirectly influence SP. Lohaus and Habermann (2019) developed a similar model that consisted of personal, work-related, and organizational variables. However, they also introduced environmental factors into the model such as a poor economic climate and organizational downsizing. According to a systematic review of longitudinal studies, most studies found that SP at baseline was a risk factor for future sickness absence and decreased self-rated health. However, the findings highlight that no consensus has yet been reached in terms of physical and mental health (Skagen and Collins, 2016).

Work factors such as job demands and job control are significantly related to SP. Job demand factors can be grouped into role demands (e.g., role ambiguity, heavy workload, and supervisory duties), time demands (e.g., overtime, time pressure, and long working hours), and global or overall demands (Miraglia and Johns, 2016). Several studies have found positive associations between these factors and SP (e.g., Hansen and Andersen, 2008; Kinman and Wray, 2018). In addition, financial pressures and job insecurity have also been shown to be important reasons for individuals working despite being ill (Karanika-Murray and Cooper, 2018). When it comes to the self-employed, it is likely that job demand factors are of particular importance since research shows that they have a high working pace and work long hours (e.g., Nordenmark et al., 2012; Hagqvist et al., 2016). In a study of European self-employed workers (Nordenmark et al., 2019), results showed that the self-employed reported a higher level of SP than employees, and that indicators of time demands (working hours, work in the evenings, and work in free time) were significantly associated with the risk of SP. This result is in line with a study showing that self-employed people were more likely to exhibit SP than paid workers, and that working condition variables in particular seemed to affect SP among self-employed workers (Kim et al., 2014). A Danish study by Hansen and Andersen (2008) confirmed that there was a higher risk of SP among self-employed people than employees.

Although job control is considered to have a weaker correlation to SP than job demands, some studies show that job control and SP are related. For example, Biron and Saksvik (2009) found that a lack of control was a determinant of SP. Other factors that are relevant to SP among the self-employed are personal resources, different health outcomes, optimism, conscientiousness, work engagement, and job satisfaction (Miraglia and Johns, 2016). Job satisfaction and work engagement have been shown to be a predictor of

SP, although not all studies support a positive relation to SP (Karanika-Murray and Cooper, 2018). Difficulties in finding replacement staff has been shown to be associated with higher levels of SP (Aronsson and Gustafsson, 2005; Widera et al., 2010).

Work-family conflict has been shown to be positively associated with SP (Miraglia and Johns, 2016). Work-family conflict may be a symptom of excessive workload or long working hours, which may cause conflict at home as employees may need to take work home and thus reduce family time, and/or force attendance at work even when sick (Miraglia and Johns, 2018). Some studies have also shown that family-work conflict are positively related to SP (Miraglia and Johns, 2016). In summary, extensive research shows that on the one hand, the self-employed have demanding psychosocial working conditions, but on the other hand, they have great job control and flexibility in their work. Most studies indicate that the self-employed have better self-rated health and life satisfaction compared to employees. However, research results are contradictory in this field. One explanation behind these results might be the differences in motives for self-employment, sector, and company size amongst the self-employed. Proposed models for studying SP include a large number of variables related to individual-, work-, organizational- and environmental factors of relevance for the self-employed. Multiple levels of determinants of SP operate together rather than in isolation, and it seems that work-related factors are particularly important in determining individuals' decisions to go to work while ill (Karanika-Murray and Cooper, 2018). A comprehensive review that integrated 109 samples including nearly 17 000 participants and 55 variables reported on the associations between determinant variables and SP (Miraglia and Johns, 2016). They found positive correlations of presenteeism with several variables of relevance to our study; e.g., absenteeism, personal financial difficulties, job insecurity, workload, time demands, work hours, work-family conflict, and job satisfaction. Examples of negative correlations were also found, for instance health and ease of replacement.

Based on the above-described theoretical aspects of determinants associated with SP our study focuses on individual, work, organizational and environment-related variables (Lohaus and Habermann, 2019). In our study, job satisfaction, work-family conflict, family-work conflict, mental well-being, and sickness absenteeism can be seen as individual-related variables. Work-related variables includes business indicators and an increase in work hours as work-demand factors. In addition, the business indicators used (loss of contract and risk of bankruptcy) can be seen as related to organizational variables (e.g., job insecurity and under-staffing) and environmental variables (e.g., economic climate). The focus of the present study is to consider business indicators as work demand factors among the self-employed, and to investigate their association with SP when controlling for indicators of work-family circumstances, well-being and background characteristic variables.

MATERIALS AND METHODS

Data Sources and Sample Selection

The quantitative methodology used in this research was based on an e-survey used by Eurofound to capture the immediate impact of the Covid-19 pandemic on the way people in Europe live and work (Eurofound, 2020a). Most of the questions are based on Eurofound's European Quality of Life Survey (EQLS) and European Working Conditions Survey (EWCS), while some questions are new. The EQLS and EWCS use validated questions and thorough procedures for questionnaire construction, sampling and interviewing when comparing individuals in European countries (Eurofound, 2020b). Permission has been granted for us to use these questions. Additional questions concerning reasons for SP have been used in other studies in Norway and Sweden (Hansen and Andersen, 2008). The questionnaire consisted of 76 questions divided into four clearly differentiated blocks including background information, working conditions, work-life balance, and well-being, as well as questions about the Covid-19 pandemic. We used a panel platform (Cint) that included different sub-panels related to occupational groups (owners/managers in small companies in our study) provided by Netigate, an organization specialized on on-line research (https://Netigate.net/). The survey was distributed between 18 March and 12 April 2021 to self-employed people in companies with fewer than 50 employees. The sample is a non-probability sample, however it was selected based on the characteristics of self-employed people and based on the objective to study self-employed people in companies with <50 employees. The self-employed represented eight common sectors [agriculture (7%), industrial manufacturing (9%), construction (15%), transport (11%), finance (15%), retail (23%), education (9%), and health (11%)] in the Swedish small-business labor market, and almost all Swedish regions were included. According to the Swedish Agency for Growth Policy Analysis (2018), the most common sectors among the Swedish self-employed are agriculture, industrial manufacturing, retail and the service sectors, such as finance, education, and health.

The total sample group consisted of 845 self-employed workers including owners (62%) and/or CEOs/managers (22%) and, in some cases, those who combine business with employment (16%). After removing incomplete surveys, the final sample consisted of 814 self-employed workers.

Indicators and Variables

Based on the survey questions, variables were established for indicators of business, work and family circumstances, and well-being. *Sickness presenteeism* was used as an outcome variable and measured by the single-item question "During the last 12 months have you worked even though you were sick?" The response alternatives were 1 or 2 (1 = no, 2 = yes).

The index for the *Impact on business operations* included four questions about whether new or changed products, processes or marketing methods had been introduced, or whether efforts had been made to find new customers. The scale was 1 or 2 (1 = no, 2 = yes) and Cronbach's alpha was 0.72. *Risk of bankruptcy* was measured by the single-item question "How likely or unlikely is it that your business will go bankrupt within 3 months?" The scale was 1–5 (1 = very unlikely, 2 = quite unlikely, 3 = neither likely nor unlikely, 4 = quite likely, 5 = highly likely). *Loss of contracts* was measured by the single-item question "During the Covid-19 pandemic have you lost your job(s)/any contract(s)?" The

scale was 1 or 2 (1 = no, 2 = Yes, permanently or temporarily). *Increase in work hours* was measured by the single-item question "During the Covid-19 pandemic have your working hours…?" The scale was 1–5 (1 = decreased a lot, 5 = increased a lot). *Job satisfaction* was measured by the question "In general, are you satisfied, not particularly satisfied, or not at all satisfied with your working conditions?" The scale was 1–4 (1 = not at all satisfied, 4 = very satisfied). The index for *Work-family conflict* included three questions about the extent of worry about work after the working day, whether tiredness after work hinders housework and whether work reduces time for family activities. The scale was 1–5 (1 = never, 5 = always) and Cronbach's alpha was 0.77. The index for *Family-work conflict* included two questions about difficulties in concentrating on work because of family responsibilities and family responsibilities preventing time for work. The scale was 1–5 (1 = never, 5 = always) and Cronbach's alpha was 0. 81. *Mental well-being* consisted of five items including whether the respondent felt calm and relaxed, felt happy and positive, felt active and energetic, felt fresh and rested, and that life was of interest over the last 2 weeks. The mental well-being index had a 6-point response scale (1 = never, 6 = all the time) and the calculated Cronbach's alpha was 0.71. Mental well-being is a broad concept widely studied by the World Health Organization's Well-Being Index (WHO-5), a 5-item index assessing subjective psychological well-being (Topp et al., 2015). *Sickness absenteeism* was measured by the single-item question "How many days have you been away from work during the last 12 months due to sick leave or health-related absence?" The variable was constructed as 1–2 (1 = 1–7 days, 2 = more than 7 days) in accordance with other studies (Taloyan et al., 2012). The background factors used were *age* (years), *gender* (1 = man, 2 = women), *level of education* (1 = compulsory or 9 years, 2 = upper secondary school or 12 years of education, 3 = University education) and company size (1= 0 employees, 2 = 1–9 employees, 3 = 10–19 employees, 4 = 20–49 employees).

Statistical Analyses

A cross-sectional study was conducted. Statistical analyses consisted of descriptive statistics for background variable data calculated using means and percentages. For variables related to indicators of business, work and family circumstances, and well-being, numbers and percentages were calculated. For indices measuring impact on business operations, work-family conflict, family-work conflict, and mental well-being, Cronbach's alpha values were computed in order to estimate the internal reliability. Correlation coefficients between the variables were analyzed using the Pearson correlation coefficient. Logistic regression analyses were carried out in four phases. Logistic regression is an appropriate method to use when the dependent variable is dichotomous, which is the case in this study. The reason for performing the analyses in four separate models is that it makes it possible to control for different categories of variables in different steps. Model 1 shows the result of an analysis of the relationship between business indicators and the risk of SP. Model 2 controlled for indicators of work and family circumstances, Model 3 controlled for both indicators of work and family circumstances and well-being, and finally, Model 4 included background characteristics variables. Odds ratios (ORs) are presented as measures of the relative risk of SP. All statistical analyses were carried out using IBM SPSS Statistics 27.

RESULTS

Descriptive Statistics

Of all the self-employed included in the study, 38% were women, the mean age was 41.2 years, 53% had a University education, 66% were married or cohabitated, and 47% had children living at home. The business size distribution was 0

TABLE 1 | Descriptive data of study variables (*N* = 814).

Business indicators	*n* (%)	*N*
Impact on business operations		
- New products or services have been introduced (yes)	296 (39)	760
- New processes have been introduced (yes)	318 (42)	760
- New marketing methods have been introduced (yes)	270 (36)	760
- Attempt to get new customers (yes)	407 (54)	760
Loss of contract (yes)	365 (47)	781
Risk of bankruptcy		759
- Highly likely	74 (10)	
- Quite likely	90 (12)	
- Neither likely or unlikely	185 (24)	
- Quite unlikely	115 (15)	
- Very unlikely	295 (39)	
Indicators of work-family circumstances		
Job satisfaction (satisfied/very satisfied)	592 (76)	781
Increase in work hours (somewhat/a lot)	227 (29)	781
Work-family conflict		776
- Worry about work after the working day (always/most of the time)	297 (38)	
- Tiredness after work hinders housework (always/most of the time)	212 (27)	
- Work reduces time for family activities (always/most of the time)	165 (21)	
Family-work conflict		776
- Difficulties concentrating at work due to family responsibilities (always/most of the time)	139 (18)	
- Family responsibilities hinder time at work (always/most of the time)	163 (21)	
Indicators of well-being		
Mental well-being		768
- Felt calm and relaxed	293 (38)	
- Felt happy and positive (always/most of the time)	262 (34)	
- Felt active and energetic (always/most of the time)	225 (29)	
- Felt fresh and rested (always/most of the time)	214 (28)	
- Daily life consists of interesting things (always/most of the time)	287 (37)	
Sickness absenteeism (> 7 days)	203 (27)	761
Sickness presenteeism (yes)	337 (44)	761

Internal failures of 33–55 for different questions.

employees (30%), 1–9 employees (45%), 10–19 employees (17%), and 20–49 employees (8%).

Table 1 presents descriptive data for the indicators and variables used. Around 40% of the self-employed introduced new products, processes, and marketing methods, and just over 50% attempted to get new customers during the pandemic. Hardly 50% of self-employed people reported that they lost contracts, and 22% judged the risk of bankruptcy within 3 months to be quite or highly likely. Nearly one third of the self-employed experienced an increase in work hours.

Three out of four self-employed people reported that they were satisfied or very satisfied with their jobs. When it comes to work-family conflict variables, the highest score was reported for the question on worry about work after the working day (38%). For family-work conflict questions, the highest score was reported for the question on family responsibilities hinder time at work (21%). Around one quarter (27%) of the self-employed reported sickness absenteeism of more than 7 days, and around one third of self-employed workers gave high scores for questions related to mental well-being. Around four out of ten self-employed people reported that they had experienced SP, i.e., that they had worked despite being sick during the last 12 months.

The first two columns in **Table 2** present the means and standard deviations for all study variables used. The correlations between SP and variables for business indicators, and indicators of work and family circumstances and well-being are all significant in the expected direction. The higher the values for impact on business operations, loss of contract, risk of bankruptcy, and increase of work hours, the higher the risk for SP. Correlations were highest between work-family conflict and family-work conflict (0.80) and between loss of contract and risk of bankruptcy (0.50). There was no significant relationship between SP and age, gender, and education of the self-employed worker. There was also no significant relationship between SP and company size (not shown in the table). The correlations were not sufficiently strong to suspect multi-collinearity, which would be the case if the correlation coefficients were ∼0.8 or higher (Shrestha, 2020).

To analyze the risk of SP among the self-employed, multiple regression were carried out to estimate the odds ratios (OR) for variables related to business, work and family circumstances, and well-being indicators. Model 1 in **Table 3** shows that the variables impact on business operations (OR = 2.41) and risk of bankruptcy (OR = 1.32) are significantly associated with SP. The more that self-employed workers dealt with implementing new products, services, processes, and marketing, and made efforts to get new customers, the higher risk of SP. In addition, the more they perceived that there was a risk of bankruptcy, the higher the risk of SP. When controlling for variables related to indicators of work and family circumstances in model 2, the variables impact on business operations, risk of bankruptcy, increase in work hours, and work-family conflict were significantly related to a higher risk of SP. The same pattern was present in model 3, wherein mental well-being was also significantly related to a lower risk of SP.

Model 4 also included variables related to background characteristics. In this phase of the analysis the variables impact on business operations (OR = 1.74), loss of contract (OR = 1.41), risk of bankruptcy (OR = 1.15), increase in work hours (OR = 1.41), work-family conflict (OR = 1.45), and mental well-being (OR = 0.86) were significantly related to a higher risk of SP. Therefore, the more the self-employed reported impact on business indicators, increased work hours, a higher level of work-family conflict, and a lower level of mental well-being, the higher the risk of SP. The variable sickness absenteeism was not significantly associated with SP. None of the background characteristic variables were significantly related to SP. The Nagelkerke R-squared in the final model was 0.21.

Table 4 shows that the most common reasons given by the participants for SP during the pandemic were "nobody else can carry out my responsibilities," "I can't afford to take sick leave," and "I enjoy my work."

DISCUSSION

The aim of this study was to contribute to knowledge about how business, work and family circumstances, and well-being indicators have increased the risk of SP among the

TABLE 2 | Means, standard deviations, and correlations (Pearson) between sickness presenteeism and indicators of business, work and family and well-being.

	M	SD	1	2	3	4	5	6	7	8	9
1. Sickness presenteeism	0.44	0.49									
2. Impact on business operations	1.42	0.36	**0.25**								
3. Loss of contract	1.47	0.50	**0.20**	**0.40**							
4. Risk of bankruptcy	2.38	1.36	**0.27**	**0.44**	**0.50**						
5. Job satisfaction	2.99	0.82	**−0.09**	**−0.09**	**−0.28**	**−0.24**					
6. Increase in work hours	2.93	0.82	**0.22**	**0.15**	–0.05	**0.20**	0.02				
7. Work-family conflict	2.94	0.98	**0.28**	**0.41**	**0.32**	**0.41**	**−0.14**	**0.10**			
8. Family-work conflict	2.60	1.04	**0.24**	**0.33**	**0.28**	**0.40**	**−0.10**	**0.16**	**0.80**		
9. Mental well-being	3.76	1.11	**−0.12**	–0.04	**−0.15**	**−0.13**	**0.39**	**0.08**	**−0.31**	**−0.18**	
10. Sickness absenteeism	11.8	36.4	**0.08**	**0.13**	**0.17**	**0.18**	**−0.14**	–0.06	**0.13**	**0.12**	**−0.08**

Figures in bold: $p < 0.05$.

TABLE 3 | Logistic regression.

Independent variables	Model 1	Model 2	Model 3	Model 4
Constant	0.082	0.021	0.032	0.015
Business indicators				
Impact on business operations	2.416***	1.680*	1.753*	1.739*
Loss of contract	1.246	1.383 (*)	1.369 (*)	1.410 (*)
Risk of bankruptcy	1.324***	1.160*	1.155*	1.149 (*)
Indicators of work-family circumstances				
Job satisfaction		0.960	1.028	1.043
Increase in work hours		1.400***	1.421***	1.406***
Work-family conflict		1.556**	1.442*	1.448*
Family-work conflict		0.948	0.968	0.981
Indicators of well-being				
Mental well-being			0.860 (*)	0.858 (*)
Sickness absenteeism			1.173	1.187
Background characteristics				
Age				1.000
Gender				0.996
Education				1.191
Company size				1.105
Nagelkerke R square	0.125	0.193	0.199	0.210

Indicators of business factors, work-family factors, well-being factors and background characteristics by sickness presenteeism (Odds Ratios).
****p < 0.001, **p < 0.01, *p < 0.05, (*) p < 0.10.*

TABLE 4 | Description of reasons for presenteeism among the self-employed ($n = 337$).

Reasons	*n*	%
I do not want to burden my colleagues	80	23.7
Nobody else can carry out my responsibilities	198	58.7
I enjoy my work	132	39.2
I can't afford to take sick leave	140	41.5
I do not want to be considered lazy	65	19.3
I am too pride to take sick leave	77	22.8
I do not want to be suspected of cheating	36	10.7
Going to work was beneficial for my health	63	18.7
I want to maintain my social network	38	11.2
I am worried about losing my job	45	13.4

Reasons for presenteeism add up to more than 100%, because several reasons could be selected.

Swedish self-employed during the Covid-19 pandemic. The main result was that the business indicators were significantly associated with SP, even when controlling for indicators of work-family circumstances, well-being and background indicators. In addition, the variables increase in work hours and work-family conflict were significantly associated with SP. When self-employed workers also reported that a main reason for SP was that no one else could do their job, it is likely that the pandemic has added to an already high workload, which has increased the risk of SP.

Extensive research shows that SP in individuals is a risk factor for future deterioration of health and loss of productivity in organizations (Johns, 2010; Ruhle et al., 2020). It is of great relevance to study the self-employed in relation to the pandemic because of their relevance in working life, and because studies have shown that this group may be negatively affected by the pandemic in several ways. The pandemic might influence their businesses negatively resulting in income loss, and lead to increased workload and worse well-being. Due to the low replaceability of the self-employed, SP is a prevalent health-related outcome in this group and there is a need for more studies of SP among the self-employed. SP is a particular challenge for the self-employed, who most often work in small companies where the personal and economic consequences of SP can be more acutely felt than in larger enterprises (Cocker et al., 2013).

The results of this study show that 44% of self-employed workers reported SP during the last year, which is slightly lower than a study of European self-employed people in which 52% reported SP (Nordenmark et al., 2019) and another study of different occupational groups in Sweden in which 56% reported SP (Johansen et al., 2014). One explanation behind this result might be that in our study the mean age was relatively low, and the number of male self-employed workers was relatively high. Therefore, this comparison must be made with caution. Participants indicate that the main reason for SP is that "nobody else can carry out my responsibilities." This is in line with another study of SP in Norway and Sweden, which found that among the self-employed, the factor "nobody else can carry out my responsibilities" was significantly related to SP in regression analyses (Johansen et al., 2014). Research has also shown that low replaceability is a factor related to SP for individuals in leading positions (Aronsson and Marklund, 2018).

The fact that the variables impact on business indicators and increase in work hours during the pandemic are significantly associated with SP in the final regression model can be an expression of increased work tasks and workload for the self-employed. In addition, the variable risk of bankruptcy may lead to self-employed people increasing their efforts to handle different work tasks. This result is in line with earlier research showing that job demand factors are important predictors of SP (Miraglia and Johns, 2016; Lohaus and Habermann, 2019; Ruhle et al., 2020). Extensive research shows that a wide range of job demands and stress-related features at the workplace increase the occurrence of SP (Miraglia and Johns, 2016). Factors such as a heavy workload, understaffing, and overtime are prominent correlates that can contribute to ill-health, which can be seen as a mediating factor between negative workplace features and SP (Pohling et al., 2016). A study of the self-employed in Northwestern Europe (Nordenmark et al., 2019) confirms that time-demand factors, including the level of working hours, work in the evenings, and work in free time, are predictors of SP. It is likely that the pandemic has led to a high workload and concern about business survival among the participants, which has also contributed to SP.

The fact that work-family conflict is significantly associated with SP in the regression analyses is in line with earlier research (Miraglia and Johns, 2016). Work-family conflict may be an expression of a high level of workload and long work hours, which can cause conflict at home because it reduces time

for family activities (Miraglia and Johns, 2018). According to Schjoedt (2021), long work hours and coping with the challenges of starting and managing a business can lead to work-family conflict for the self-employed. The finding that family-work conflict is not significantly associated with SP is not in line with earlier research (Miraglia and Johns, 2016).

The results showing that the determinant variable mental well-being reduces the occurrence of SP (with a p-level <0.10) are in accordance with earlier research that shows relationships between SP and different physical and mental health outcomes, and risks of future ill health and future absenteeism (e.g., Aronsson and Gustafsson, 2005; Bergström et al., 2009; Gustafsson and Marklund, 2011; Miraglia and Johns, 2018; Ruhle et al., 2020). The results in the final regression model showing that the background variables age, gender, education, and company size do not contribute significantly, are supported by some earlier studies showing that these variables have low explanatory values for SP (Aronsson and Marklund, 2018).

Although, research into the positive consequences of SP is limited, during recent years researchers have identified positive consequences for individuals and organizations (e.g., Karanika-Murray and Biron, 2020). For instance, SP can be positive for individuals in that being committed to work can shift their attention away from illness (Miraglia and Johns, 2018). In a study investigating the positive consequences of SP (Lohaus et al., 2021), significant positive associations were found between SP and variables related to economic orientation, financial advantages, and participants' perception that their health benefited from working. When self-employed workers and their businesses are negatively affected by the pandemic, it is understandable that they are forced to try to find solutions for the company to survive. To that end, SP can be a necessary strategy for work tasks related to governmental financial aid, employee support, and the development of new products and services. Although SP can be positive for the business during a critical event such as the pandemic, it is important for the self-employed to consider the risk of future ill-health.

Established models describing the emergence of SP incorporate variables related to individuals, working conditions, organizational factors, and the environment (e.g., societal, economic, and cultural context aspects) (Miraglia and Johns, 2016; Lohaus and Habermann, 2019). Although several studies have studied SP in different sectors and occupations, there is still a need for more knowledge about the effects of sector-specific work environments on SP. Our study provides theoretical contributions suggesting that critical events such as the Covid-19 pandemic should be considered as an important environmental factor, and that the self-employed constitute an important occupational group related to the individual and work.

LIMITATIONS AND STRENGTHS

The individuals included in this study are not part of a randomly selected sample. However, they represent the self-employed within different business sectors and regions in Sweden, in companies with fewer than 50 employees. As the data were cross-sectional, we cannot draw conclusions on causality and causal tendencies. This is perhaps most problematic in terms of the variables measuring work-family conflict and well-being, which are factors that theoretically can be seen as causes of SP as well as consequences of SP. This should be considered when interpreting these results. Measuring SP through a single-item question might also be considered as a limitation, however this measure has been used in other studies measuring SP (Ruhle et al., 2020). One strength of the study is that the survey used has also been used in other European studies (Eurofound, 2020a) with validated questions and indices. The indices in our study show satisfactory Cronbach's alpha values (0.71–0.81). This study contributes to knowledge concerning SP among a major group in working life which is seldom studied in terms of different health outcomes.

CONCLUSIONS AND IMPLICATIONS

Several conclusions can be drawn from this study. Many self-employed people were affected by the Covid-19 pandemic in a number of ways that are related to impact on business operations and income loss. It is likely that a critical event such as the pandemic adds to an already high workload for the self-employed with many work tasks. Impact on business operations such as developing new products/services and marketing, risk of bankruptcy, increased work hours and work-family conflict appear to be important factors for explaining SP among the self-employed. Self-employed people report that low replaceability is the main reason for their decision to work even though they are ill, and it is likely that a critical event such as the pandemic forces them into SP for the survival of their businesses.

The results of the study highlight that it is important for the self-employed to receive support for handling SP and their health, as well as extended work tasks related to strategies for developing their businesses. When considering working conditions and health issues, consultants such as those in occupational health services can be a beneficial resource for the self-employed. For business development, governmental bodies and business networks can be valuable for supporting the enterprises to generate ideas about how to find new solutions, products, and services for their businesses. For future research, both qualitative and quantitative longitudinal studies in larger samples of the self-employed in different sectors will be valuable. Future research into SP among the self-employed will need to consider both negative and positive consequences of SP behavior. In addition, there is a need to develop and study individual and workplace-oriented interventions to reduce SP among the self-employed.

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 The Ethics Review Authority (Dnr 2020-05223). The

patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

SV designed and developed the survey, analyzed the data, wrote the original manuscript, and revised the manuscript. MN provided data analysis ideas, checked the analyses, and revised the manuscript. BL and ÅT contributed to the analyses and writing of the manuscript. All authors contributed to the article and approved the submitted version.

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Remote Work Decreases Psychological and Physical Stress Responses, but Full-Remote Work Increases Presenteeism

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Introduction: Remote work was widely promoted in 2020, as a result of the COVID-19 pandemic. However, the effects of remote work on psychological and physical stress responses and presenteeism of workers remain unclear. This research aims to provide empirical evidence of the implications for people and organizations of this new scenario of working from home.

Methods: A two-wave panel survey of before and after the pandemic was performed to investigate the effects of remote work on these aspects among office workers. A total of 3,123 office workers from 23 tertiary industries responded to a questionnaire. Participants were surveyed about their job stress conditions and sleep practices in both 2019 and 2020, who had not done remote work as of 2019 were included in the study. The effects of remote work on psychological and physical stress responses and presenteeism were analyzed by multivariate analysis, with the adjustment of age, gender, overtime, job stressors, social support, and sleep status.

Results: The multivariate logistic regression analysis demonstrated that remote work was associated with the reduction of psychological and physical stress responses independently of changes of job stressors, social support, sleep disturbance, and total sleep time on workdays. On the other hand, remote work of 5 days a week (full-remote) was associated with the reduction of work productivity.

Conclusion: Promoting remote work can reduce psychological and physical stress responses, however, full-remote work has the risk of worsening presenteeism. From the viewpoint of mental health, the review of working styles is expected to have positive effects, even after the end of the COVID-19 pandemic.

Keywords: occupational & industrial medicine, job stress, remote work, occupational mental health, presenteeism, COVID-19

INTRODUCTION

COVID-19 has been continuing to spread across the world, with more than 170 million confirmed cases worldwide, and more than three million deaths as of June 2021. The "Stay at home" policy has been promoted to control and mitigate the pandemic, which would reduce the burden on national healthcare systems and entire economies (Anderson et al., 2020). Working from home, also known as remote work, telework, or mobile work, is expected to reduce the risk of COVID-19 infection (Di Domenico et al., 2020; Kawashima et al., 2020), and has been widely implemented as part of the "Stay at home" policy. In fact, in the US, 35.2% of its workforce worked entirely from home in May 2020, up from 8.2% in February (Saltiel, 2020). Also, remote work became more common in Europe (Eurofound, 2020) and in Japan, the rate of implementation of remote work increased from 10% in March to 17% in June 2020 (Okubo, 2020).

The benefits of remote work remain controversial. Remote work enables a better balance of home and work life, increased flexibility and autonomy, reduction in commuting time, increased productivity, and higher morale and job satisfaction (Tavares, 2017). A meta-analysis found that there is a small positive association between remote work and organizational outcomes, such as increased productivity, employee retention, and organizational commitment (Martin and MacDonnell, 2012). On the other hand, remote work can result in social isolation and marginalization, which increases the stress of workers (Di Martino and Wirth, 1990), and a literature review reported that there was little clear evidence that remote work increases job satisfaction and productivity (Bailey and Kurland, 2002). Moreover, a research group in Europe also concluded that working from home was associated with work productivity loss caused by sickness (Steidelmüller et al., 2020), which is also known as presenteeism (Aronsson et al., 2000).

Presenteeism is particularly a concern in the fields of economics and public health, and has a greater cost than that of treatments for physical and mental illness (Loeppke et al., 2009) or absenteeism (Burton et al., 2004). Furthermore, before the COVID-19 pandemic, remote work, working from home, and telecommuting are options that some companies have been offering for the advantages described above, and eligible workers could choose their workstyle by themselves (Lapierre et al., 2016). At present, with the COVID-19 pandemic, this remote work practice has become more widespread owing to company and government regulations aiming at social distancing, and has been associated with negative effects on stress levels, mental health, and health behaviors (Czeisler et al., 2020), such as substance use (Pfefferbaum and North, 2020). As the context of remote work has changed between before and after the start of the pandemic, reexamination of the effects of remote work on mental health is required.

Not only the effects of the remote work during COVID-19 pandemic, but also the condition of the workplace is a crucial factor associated with mental health and presenteeism in the workplace. A systematic review has supported the proposition that work can be beneficial for an employee's mental health, particularly if good-quality supervision is provided and workplace conditions are favorable (Modini et al., 2016). Additionally, as another important personal factor, sleep status is strongly associated with psychological and physical stress reactions (Åkerstedt et al., 2002; Miyama et al., 2020) and presenteeism (Furuichi et al., 2020; Ishibashi and Shimura, 2020) in the workplace, and may be affected by the COVID-19 pandemic (Rajkumar, 2020; Wang et al., 2020). Some studies have assessed the associations between the COVID-19 pandemic and mental health, the working environment (Galanti et al., 2021), and home conflicts (Freisthler et al., 2021), and the advantages and disadvantages of remote work, and one study reported the positive effects of remote work on stress reactions during the pandemic (Darouei and Pluut, 2021).

To date and as far as we know, there is no single study that has analyzed the differences in the effects of remote work on stress reactions and presenteeism between before and after the start of the pandemic, and moreover, how job stressors and work environments should be adjusted. We hypothesized that remote work itself is beneficial for workers' mental health, and the controversial results of the previous studies were owing to the lack of adjustment of important confounders, such as job stressors, social support, and personal factors, such as sleep. Therefore, to analyze the effects of remote work on stress reactions and presenteeism, we performed a two-wave study of before and during the COVID-19 pandemic, analyzing job stressors, social support, and sleep status.

SUBJECTS AND METHODS

Participants and Ethical Considerations

In 2019, before the COVID-19 pandemic, 40 companies comprising 6,855 workers participated in a survey program and agreed to the academic use of their data. The participants were recruited during the annual mental health checkup program. In 2020, 17 companies with a total of 2,336 participants withdrew from the survey program. The remaining 23 companies, which were tertiary industries located in Japan, in the areas of information technology, finance, broadcasting, music, consulting, public office, chemical industry, healthcare, fashion, printing, movie, trading, restaurant, travel agency, patent agency, and temp agency, remained in the survey. Of the remaining participants, 3,359 provided valid answers to the same questionnaire again, whereas 967 participants had missing answers, and 193 participants gave invalid answers. Among the participants who provided valid answers, the data of 3,123 participants who had never engaged in remote work in 2019 were analyzed.

This study was performed in accordance with the Helsinki Declaration, and was approved by the Tokyo Medical University Medical Ethics Review Board (study approval no.: SH3652). All the participants provided informed consent online, and data were completely anonymized.

Measurements

We asked first participants for their demographic characteristics (age and gender), as well as their working and time conditions (frequency of the remote work performed per week, average

overtime worked per month; the total additional work time that exceeded 40 h a week).

Secondly, we used validated scales to examine job environment, psychological and physical stress responses, social support, sleep status, and presenteeism as below.

Brief Job Stress Questionnaire

To evaluate job stressors and stress responses, the BJSQ (Shimomitsu, 2000; Ando et al., 2015) was used. The BJSQ is a 57-item self-reported Likert scale questionnaire that measures job stressors (Area A), psychological and physical stress responses presented as psychosomatic symptoms (Area B), and social support (Area C). In Area A, there are 17 items asking about job stressors consisted of quantitative job overload, qualitative job overload, physical demands, job control, skill utilization, interpersonal conflict, poor physical environment, job suitability, and meaningfulness of work (item example: "I have an extremely large amount of work to do"). In Area B, there are 29 items to evaluate psychological and physical stress responses appeared as psychosomatic symptoms consisted of vigor, irritability, fatigue, anxiety, depression, and physical complaints (item example: "I have been inwardly annoyed or aggravated"). In Area C, there are 9 items asking about social support consisted of support from the supervisor, support from colleagues, and support from family members and friends (item example: "How reliable are the co-workers when you are troubled?"). A higher score in the BJSQ indicates a more stressful job environment (Area A), severer psychological and physical stress response (Area B), and less social support (Area C). The rest 2 items are additional questions which asked the work and life satisfactions and are not used in the calculated score.

Pittsburgh Sleep Quality Index and Sleep Schedules

The PSQI (Buysse et al., 1989; Doi et al., 1998) was used for assessing sleep disturbance and their sleep schedules. The PSQI is a self-reported questionnaire consisting of 18 standardized questions asking the past month sleep status, and has the following seven components: C1, sleep quality; C2, sleep latency; C3, sleep duration; C4, habitual sleep efficiency; C5, frequency of sleep disturbance; C6, use of sleep medication; and C7, daytime dysfunction. C1, C6, and C7 are Likert scales [item example: "How would you rate your sleep quality overall? (C1)," "How often have you had trouble staying awake while driving, eating meals, or engaging in social activity? (C7)"], C5 is calculated from the sum of 9 subcomponents, which are Likert scales [item example: "How often have you had trouble sleeping because you wake up in the middle of the night or early morning? (C5b)"], and C2, C3, and C4 are calculated from habitual sleep schedules [item example: "When have you usually gotten up in the morning?"]. A higher score of each component and total score (global score) indicates severer sleep disturbance.

Work Limitations Questionnaire

To measure presenteeism, the short form of the WLQ (Lerner et al., 2001; Takegami et al., 2014) was used. Among the methods of measuring presenteeism, WLQ has the most reliable correlation with actual variations in work performance (Gardner et al., 2016). The short form of the WLQ consists of four components, i.e., physical demands, time management, mental-interpersonal demands, and output demands. Each component of the short form of the WLQ consists of 2 Likert scale questions. In this study, the WLQ %productivity loss score was used as an index of presenteeism. Item example: "Sit, stand or stay in one position for longer than 15 min while working: able all of the time." The WLQ %productivity loss score is calculated by those answers and interpreted as the percentage of productivity loss in the past 2 weeks due to presenteeism relative to a healthy benchmark sample.

Statistical Analysis

First, to analyze baseline differences and to clarify 1 year changes, one-way ANOVA was performed with groups categorized by frequency of remote work. Then, logistic regression analysis was performed setting the worsening of psychological and physical stress responses and presenteeism as dependent variables, and the status of remote work and adjusting factors, such as age, gender, overtime work, job stressors, social support, and sleep status as the independent variables. Worsening of psychological and physical stress responses was defined as an increase in the score of BJSQ area B, and worsening of presenteeism was defined as the increase in the WLQ %productivity loss score. A $p < 0.05$ was considered to indicate a statistically significant difference between groups. Statistical analysis was performed using IBM SPSS Statistics ver. 26 software.

RESULTS

Of the 3,123 participants (1,773 males and 1,350 females; mean age: 37.3 ± 10.9 years), 1,440 participants (46.1%) had not engaged in remote work in 2020. Among the other participants, 713 people (22.8%) had engaged in 1 or 2 days a week of remote work, 728 people (23.3%) had engaged in 3 or 4 days a week of remote work, and 242 (7.7%) people had engaged in 5 days a week of remote work, referred to as "full-remote" (**Table 1**). Dropped-out ($N = 967/4,519$; 21.4%) included various reasons, such as simply not answering the questionnaire again, job retirement, miswriting of their anonymized id, or withdrawal of the agreement of data use or informed consent. A comparison between participants who were followed up and those who dropped out is shown in **Table 2**. Slight but statistically significant differences were detected in several baseline variables between the participants who were followed up and those who dropped out. The correlation matrix and Cronbach α of each questionnaire are shown in **Table 3**.

Table 4 compares the baseline values and the changes in the values of each group categorized by the frequency of remote work. There were significant differences at baseline in age ($F = 29.60$, $p < 0.001$), overtime work ($F = 9.70$, $p < 0.001$), job stressors ($F = 46.85$, $p < 0.001$), and total sleep time on free days ($F = 3.65$, $p = 0.012$). No difference was found at baseline for social support, total sleep time on workdays, and psychological and physical stress responses. Regarding 1 year changes, job stressors ($F = 5.42$, $p = 0.001$), total sleep time on workdays ($F = 15.08$, $p < 0.001$), total sleep

TABLE 1 | Study sample and correlations with the variables.

		Frequency of remote work (2020)	Psychological and physical stress response (2019)	Presenteeism (2019) %
	***N* (%)**	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**
Remote work in 2020				
Total sample	3,123 (100%)	1.56 (1.77)	57.6 (13.7)	6.09 (4.53)
0 days/week (None)	1,440 (46.1%)	0 (0.00)	57.69 (13.49)	6.20 (4.64)
1–2 days/week	713 (22.8%)	1.48 (0.50)	57.31 (13.96)	5.80 (4.32)
3–4 days/week	728 (23.3%)	3.60 (0.49)	57.35 (13.73)	6.11 (4.39)
5 days/week ("full-remote")	242 (7.7%)	5.00 (0.00)	57.96 (14.04)	6.27 (4.81)
Demographics				
Male	3,461 (61.4%)	1.58 (1.78)	55.8 (13.5)	6.13 (4.63)
Female	2,171 (38.5%)	1.54 (1.75)	59.8 (13.6)	6.05 (4.39)
	Mean (SD)	**Pearson's r correlation with**		
Age (years)	37.3 (10.9)	−0.147**	−0.095**	−0.152**
Job status (baseline: 2019)				
Overtime work (hours/month)	22.2 (27.0)	−0.099**	0.077**	0.093**
Job stressors	40.3 (6.7)	−0.208**	0.536**	0.405**
Social support	19.6 (5.4)	−0.017	0.359**	0.259**
Outcomes (baseline: 2019)				
Psychological and physical stress response	57.5 (13.7)	0.002	–	0.537**
Presenteeism (productivity loss) (%)	6.09 (4.53)	0.000	0.537**	–
Sleep (baseline: 2019)				
Sleep disturbance	6.45 (2.75)	0.007	0.562**	0.387**
C1: Sleep quality	1.44 (0.74)	0.042*	0.485**	0.254**
C2: Sleep latency	1.11 (0.98)	0.046**	0.316**	0.193**
C3: Sleep duration	1.54 (0.82)	−0.053**	0.186**	0.112**
C4: Habitual sleep efficiency	0.20 (0.57)	−0.024	0.147**	0.125**
C5: Frequency of sleep disturbance	1.03 (0.52)	−0.016	0.362**	0.208**
C6: Use of sleep medication	0.11 (0.49)	0.010	0.153**	0.085**
C7: Daytime dysfunction	1.02 (0.77)	0.005	0.483**	0.478**
Total sleep time on workdays (hours)	6.10 (1.11)	0.045*	−0.196**	−0.134**
Total sleep time on free days (hours)	8.14 (2.00)	0.056**	0.060**	0.038*
Change from baseline (2020–2019)				
ΔOvertime work (hours/month)	0.00 (45.05)	−0.026	−0.041*	−0.055**
ΔJob stressors	−0.30 (5.51)	−0.045*	−0.218**	−0.172**
ΔSocial support	0.18 (4.36)	0.003	−0.117**	−0.096**
ΔPsychological and physical stress response	−0.31 (11.02)	−0.040*	−0.417**	−0.193**
ΔPresenteeism (%)	−0.12 (4.22)	0.018	−0.147**	−0.470**
ΔPSQI global score	−0.06 (2.31)	−0.008	−0.145**	−0.101**
ΔTotal sleep time on workdays (hours)	0.14 (1.05)	0.118**	0.043*	0.052**
ΔTotal sleep time on free days (hours)	−0.11 (1.93)	−0.046**	−0.006	−0.005

*Job stressors, Social support, psychological, and physical stress response were measured by using the Brief Job Stress Questionnaire; higher scores indicate a less favorable job environment, less social support, or severer psychosomatic symptoms. Presenteeism was estimated by using the Work Limitation Questionnaire. Sleep disturbance was measured by using the Pittsburgh Sleep Quality Index; higher scores indicate poorer quality sleep. Significant at *$p < 0.05$, **$p < 0.01$.*

time on free days ($F = 2.784$, $p = 0.039$), and psychological and physical stress responses ($F = 4.249$, $p = 0.005$) were identified as variables showing a significant difference between the two groups.

Table 5 shows the results of logistic regression analysis, setting the worsening of psychological and physical stress responses as the dependent variable. In model 1, in which only the frequency of remote work was included in the logistic regression, a tendency of improvement in mental health was observed, but the statistical significance was ambiguous [odds ratio (OR) = 0.654–0.950, $p = 0.003$–0.571]. In model 2, in which demographic variables, baseline status of job environment, and sleep was added to the analysis, the frequency of remote work had a significant negative association with the worsening of psychological and

TABLE 2 | Study participants: followed-up and dropped-out participants.

	Followed-up participants	Missed participants	Comparison
	***N* (%)**	***N* (%)**	
Total sample	3,552	966	
Gender			
Male	1,949 (54.9%)	423 (43.8%)	$\chi^2 = 37.865^{***}$
Female	1,598 (45.0%)	542 (56.1%)	
	Mean (SD)	**Mean (SD)**	
Age (years)	37.4 (11.0)	35.8 (11.3)	$t = 3.804^{***}$
Job status (baseline: 2019)			
Overtime work (hours/month)	21.2 (26.7)	17.2 (27.1)	$t = 4.099^{***}$
Job stressors	39.7 (6.6)	40.8 (7.2)	$t = -4.373^{***}$
Social support	19.5 (5.3)	20.0 (5.5)	$t = -2.952^{**}$
Outcomes (baseline: 2019)			
Psychological and physical stress response	57.2 (13.7)	59.6 (15.5)	$t = -4.789^{***}$
Presenteeism (productivity loss) (%)	5.9 (6.7)	6.6 (5.0)	$t = -2.984^{**}$
Sleep (baseline: 2019)			
Sleep disturbance	6.44 (2.78)	6.75 (3.17)	$t = -2.954^{**}$
C1: Sleep quality	1.43 (0.74)	1.47 (0.78)	$t = -1.296$
C2: Sleep latency	1.12 (0.99)	1.25 (1.01)	$t = -3.492^{***}$
C3: Sleep duration	1.53 (0.82)	1.48 (0.86)	$t = 1.497$
C4: Habitual sleep efficiency	0.20 (0.55)	0.27 (0.68)	$t = -3.333^{**}$
C5: Frequency of sleep disturbance	1.03 (0.53)	1.08 (0.55)	$t = -2.372^{*}$
C6: Use of sleep medication	0.12 (0.51)	0.16 (0.61)	$t = -2.282^{*}$
C7: Daytime dysfunction	1.02 (0.77)	1.05 (0.83)	$t = -1.105$
Total sleep time on workdays (hours)	6.12 (1.09)	6.19 (1.18)	$t = -1.683$
Total sleep time on free days (hours)	8.17 (1.97)	8.40 (1.85)	$t = -3.237^{**}$

*Job stressors, Social support, psychological, and physical stress response were measured by using the Brief Job Stress Questionnaire; higher scores indicate a less favorable job environment, less social support, or severer psychosomatic symptoms. Presenteeism was estimated by using the Work Limitation Questionnaire. Sleep disturbance was measured by using the Pittsburgh Sleep Quality Index; higher scores indicate poorer quality sleep. Significant at *p < 0.05, **p < 0.01, ***p < 0.001.*

TABLE 3 | Correlation and reliability scales.

	Pearson's *r* correlation with (2020/2019)					Cronbach α (2020)
	1	**2**	**3**	**4**	**5**	
1. Job stressors		0.616**	0.504**	0.405**	0.311**	0.786
2. Psychological and physical stress response	0.529**		0.420**	0.327**	0.234**	0.930
3. Social support	0.359**	0.332**		0.502**	0.292**	0.871
4. Sleep disturbance	0.268**	0.548**	0.247**		0.414**	0.735
5. Presenteeism	0.390**	0.571**	0.263**	0.405**		0.852
Cronbach α (2019)	0.779	0.929	0.876	0.733	0.858	

*Correlations for scales surveyed 2019 are shown above the main diagonal. Correlations for scales surveyed in 2020 are shown below the main diagonal. Crombach α for scales surveyed in 2019 are displayed in the horizontal axis, and for the year 2020 in the vertical axis. Job stressors, Social support, psychological, and physical stress response were measured by using the Brief Job Stress Questionnaire; higher scores indicate a less favorable job environment, less social support, or severer psychosomatic symptoms. Presenteeism was estimated by using the Work Limitation Questionnaire. Sleep disturbance was measured by using the Pittsburgh Sleep Quality Index; higher scores indicate poorer quality sleep. Significant at *p < 0.05, **p < 0.01.*

physical stress responses [adjusted ORs (aORs) = 0.525–0.803, $p = < 0.001$–0.021]. In model 3, in which 1 year changes in the variables were added, the statistical significance of the baseline factors disappeared, and 1 year changes in the variables became statistically significant. Finally, in model 4, the statistically significant variables identified in model 3 were included in the analysis with the frequency of remote work to control for confounding factors, and indicated that remote work significantly associated with decreasing of psychological and physical stress response (1–2 days/week: aOR = 0.782, *p*

TABLE 4 | Comparison of variables at baseline and their changes from 2019 to 2020.

	Total		Remote work frequency (/week): mean (SD)								*F*-value
			0 days (None)		1–2 days		3–4 days		5 days ("full-remote")		
Baseline (2019)	**Mean**	**(SD)**	**Mean**	**(SD)**	**Mean**	**(SD)**	**Mean**	**(SD)**	**Mean**	**(SD)**	
Age (years)	37.30	(10.86)	38.32	(11.87)	38.84	(10.97)	34.97	(8.49)	33.76	(8.47)	29.60***
Overtime work (hours/month)	22.21	(26.97)	24.27	(30.25)	22.40	(25.09)	20.34	(22.52)	15.08	(21.95)	9.7***
Job stressors	40.32	(6.67)	41.66	(6.48)	40.07	(6.34)	38.77	(6.69)	37.75	(6.88)	46.85***
Social support	19.58	(5.42)	19.74	(5.54)	19.57	(5.13)	19.13	(5.30)	19.99	(5.82)	2.54
Psychological and physical stress response	57.55	(13.70)	57.69	(13.49)	57.31	(13.96)	57.35	(13.73)	57.96	(14.04)	0.25
Presenteeism (%)	6.09	(4.53)	6.20	(4.64)	5.80	(4.32)	6.11	(4.39)	6.27	(4.81)	1.41
Sleep disturbance	6.45	(2.75)	6.42	(2.81)	6.55	(2.77)	6.37	(2.58)	6.60	(2.73)	0.87
Total sleep time on workdays (hours)	6.10	(1.11)	6.04	(1.14)	6.12	(1.12)	6.17	(1.06)	6.15	(1.12)	2.34
Total sleep time on free days (hours)	8.14	(2.00)	8.04	(2.11)	8.15	(1.82)	8.25	(1.94)	8.43	(1.94)	3.65*
Change											
ΔOvertime work (hours/month)	0.00	(45.05)	1.57	(60.44)	−0.77	(24.78)	−2.14	(24.45)	−0.66	(28.88)	1.22
ΔJob stressors	−0.30	(5.51)	0.03	(5.46)	−0.78	(5.35)	−0.22	(5.70)	−1.14	(5.53)	5.42**
ΔSocial support	0.18	(4.36)	0.19	(4.45)	0.07	(4.27)	0.24	(4.39)	0.22	(4.04)	0.22
ΔPsychological and physical stress response	−0.31	(11.02)	0.20	(11.05)	−1.03	(10.59)	−0.03	(11.49)	−2.06	(10.34)	4.25**
ΔPresenteeism (%)	−0.12	(4.22)	−0.16	(4.24)	−0.14	(4.07)	−0.12	(4.30)	0.23	(4.33)	0.60
ΔSleep disturbance	−0.06	(2.31)	−0.02	(2.25)	−0.16	(2.38)	−0.03	(2.33)	−0.12	(2.39)	0.73
ΔTotal sleep time on workdays (hours)	0.14	(1.05)	0.04	(1.11)	0.10	(0.93)	0.28	(1.03)	0.43	(1.05)	15.08***
ΔTotal sleep time on free days (hours)	−0.11	(1.93)	−0.05	(2.10)	−0.05	(1.73)	−0.20	(1.83)	−0.38	(1.78)	2.78

*Job stressors, Social support, psychological, and physical stress response were measured by using the Brief Job Stress Questionnaire; higher scores indicate a less favorable job environment, less social support, or severer psychosomatic symptoms. Presenteeism was estimated by using the Work Limitation Questionnaire. Sleep disturbance was measured by using the Pittsburgh Sleep Quality Index; higher scores indicate poorer quality sleep. Significant at *p < 0.05, **p < 0.01, ***p < 0.001 (ANOVA).*

TABLE 5 | Logistic regression analysis of risk factors for worsening psychological and physical stress responses.

Independent variables	**Model 1**		**Model 2**		**Model 3**		**Model 4**				
	OR	***p***	**aOR**	***p***	**aOR**	***p***	**aOR**	**95% CI**			***p***
Remote work											
1–2 days/week	0.783	0.008	0.737	0.001	0.869	0.178	0.782	0.662	–	0.922	0.003
3–4 days/week	0.950	0.571	0.803	0.021	0.916	0.409	0.833	0.707	–	0.982	0.030
5 days/week ("full-remote")	0.654	0.003	0.525	<0.001	0.681	0.021	0.611	0.456	–	0.819	<0.001
Gender: (0 = Female, 1 = male)			1.031	0.700	1.041	0.642					
Age			0.989	0.003	0.994	0.163					
Baseline overtime work (hours/month)			0.997	0.027	0.997	0.060					
Baseline job stressors			0.963	<0.001	1.011	0.150					
Baseline social support			0.982	0.015	0.989	0.239					
Baseline sleep disturbance			0.953	0.004	0.997	0.881					
Baseline total sleep time on workdays (hours)			0.977	0.564	0.992	0.877					
Baseline total sleep time on free days (hours)			0.976	0.214	0.997	0.912					
ΔOvertime work (hours/month)					1.000	0.746					
ΔJob stressors					1.164	<0.001	1.160	1.139	–	1.181	<0.001
ΔSocial support					1.063	<0.001	1.068	1.047	–	1.089	<0.001
ΔSleep disturbance					1.265	<0.001	1.268	1.215	–	1.323	<0.001
ΔTotal sleep time on workdays (hours)					1.167	0.003	1.179	1.079	–	1.289	<0.001
ΔTotal sleep time on free days (hours)					1.036	0.179					

Job stressors, Social support, psychological, and physical stress response were measured by using the Brief Job Stress Questionnaire; higher scores indicate a less favorable job environment, less social support, or severer psychosomatic symptoms. Presenteeism was estimated by using the Work Limitation Questionnaire. Sleep disturbance was measured by using the Pittsburgh Sleep Quality Index; higher scores indicate poorer quality sleep. OR, Odds ratio; aOR, adjusted OR; 95%CI, 95% bootstrap Confidence Interval.

TABLE 6 | Logistic regression analysis of risk factors for worsening presenteeism.

Independent variables	Model 1		Model 2		Model 3		Model 4				
	OR	*p*	OR	*p*	OR	*p*	OR	95%CI			*p*
Remote work											
1–2 days/week	0.914	0.329	0.892	0.219	1.008	0.937	0.999	0.825	–	1.209	0.990
3–4 days/week	1.053	0.570	0.989	0.908	1.092	0.388	1.076	0.890	–	1.301	0.452
5 days/week ("full-remote")	1.189	0.214	1.092	0.542	1.422	0.024	1.421	1.064	–	1.896	0.017
Gender: (0 = Female, 1 = male)			1.078	0.337	1.160	0.079					
Age			0.993	0.052	0.999	0.895					
Baseline overtime work (hours/month)			0.999	0.673	1.001	0.712					
Baseline job stressors			0.990	0.160	1.004	0.633					
Baseline social support			0.994	0.425	1.004	0.686					
Baseline psychological and physical stress responses			0.992	0.043	1.009	0.058					
Baseline sleep disturbance			1.024	0.204	1.024	0.282					
Baseline total sleep time on workdays (hours)			1.026	0.526	1.005	0.922					
Baseline total sleep time on free days (hours)			1.008	0.685	1.035	0.171					
ΔOvertime work (hours/month)					1.001	0.250					
ΔJob stressors					1.038	<0.001	1.036	1.019	–	1.053	<0.001
ΔSocial support					1.033	0.002	1.033	1.014	–	1.053	<0.001
ΔPsychological and physical stress responses					1.053	<0.001	1.049	1.039	–	1.058	<0.001
ΔSleep disturbance					1.106	<0.001	1.080	1.042	–	1.118	<0.001
ΔTotal sleep time on workdays (hours)					1.048	0.340					
ΔTotal sleep time on free days (hours)					1.042	0.102					

Job stressors, Social support, psychological, and physical stress response were measured by using the Brief Job Stress Questionnaire; higher scores indicate a less favorable job environment, less social support, or severer psychosomatic symptoms. Presenteeism was estimated by using the Work Limitation Questionnaire. Sleep disturbance was measured by using the Pittsburgh Sleep Quality Index; higher scores indicate poorer quality sleep. OR, Odds ratio; aOR, adjusted OR; 95%CI, 95% bootstrap Confidence Interval.

= 0.003. 3–4 days/week: aOR = 0.833, $p = 0.030$; 5 days/week: aOR = 0.611, $p < 0.001$), with adjustment of the increase in job stressors (aOR = 1.160/points, $p < 0.001$), reduction of social support (aOR = 1.068/pt, $p < 0.001$), worsening of sleep disturbance (PSQI) (aOR = 1.268/pt, $p < 0.001$), and increased total sleep time on workdays (aOR = 1.179/h, $p < 0.001$).

Table 6 shows the results of logistic regression analysis, in which worsening presenteeism was set as the dependent variable. When putting only the frequency of remote work (model 1) and adding the demographic variables (model 2), the baseline status of job environment, psychological and physical stress responses, and sleep to the analysis, there was almost no significant difference between the two models. In model 3, when 1 year change was added as a variable, remote work of 5 days, changing job stressors, social support, psychological and physical stress responses, and sleep disturbance were found to be significant factors for worsening presenteeism. Finally, in model 4, the significant variables detected in model 3 were put into the analysis with the frequency of remote work to control for confounding factors, and shown that 5 days a week of remote work (full-remote) was a significant factor for worsening presenteeism (aOR = 1.421, $p = 0.017$) with the adjustment of increasing job stressors (aOR = 1.036/pt, $p < 0.001$), reduction of social support (aOR = 1.033/pt, $p < 0.001$), worsening of psychological and physical stress responses (aOR = 1.049/pt, $p < 0.001$), and worsening of sleep disturbance (PSQI) (aOR = 1.080/pt, $p < 0.001$).

DISCUSSION

This empirical study provides evidences that remote work decreases psychological and physical stress responses when controlling the confounding factors such as for job stressors, social support, and sleep status as personal intervening factors. On the other hand, the effects of remote work on presenteeism were limited, although full-remote work was found to have a negative effect on presenteeism.

Although information technology, which assists remote work has remarkably advanced in recent years and it is slightly hard to apply in this circumstance directly, there are some previous reports in the literature that assessed the effects of remote work on mental health, work productivity, and presenteeism, but the conclusions were inconsistent (Di Martino and Wirth, 1990; Bailey and Kurland, 2002; Martin and MacDonnell, 2012; Baert et al., 2020; Steidelmüller et al., 2020). This inconsistency may be a result of the lack of consideration of confounding factors. As remote work is just one of the factors affecting workers' mental health and productivity, the effects of job stressors, the surrounding environment, and personal factors, such as sleep, should be adjusted when discussing the effects of remote work on workers' mental health and productivity (Furuichi et al., 2020). Moreover, these factors, particularly support or conflict

within the family, play important roles in how well a worker adapts to remote work (Darouei and Pluut, 2021). For example, working while taking care of children, working in a noisy home environment, or loneliness during remote work may affect stress reactions and work productivity.

The results of the present study showed a weak and unstable statistical significance before adjusting for these factors, indicating the importance of controlling them, and suggested strategies to reduce stress responses and to improve work productivity of remote work. Independently from remote work status, an increase in job stressors, decrease in social support, and worsening of sleep were risk factors of worsening stress reactions and loss of work productivity.

Higher productivity and less stress reactions while performing remote work may be possible by improving job environments, such as quantitative/qualitative job load, physical demands, job control, skill utilization, interpersonal conflict, physical environment, job suitability, and meaningfulness of work. Furthermore, maintaining and promoting social support between workers and their supervisors, colleagues, family, and friends, and sleeping well, which will be possible by improving sleep hygiene (Stepanski and Wyatt, 2003; Shimura et al., 2020), such as avoiding night-cap, avoiding the use of electronic devices in bed, exposing oneself to sunlight in the morning, keeping to regular mealtimes, and eating a sufficient amount of vegetables are also important. Some of these factors are the responsibility of the companies, and some must be done by the workers themselves as a self-care.

As a measure against COVID-19, keeping a social distance is a public health requirement, and improving workers' mental health is also simultaneously required (Fingret, 2000). Remote work could be a useful tool to balance them, although there are few studies to date assessing effective methods for improving occupational mental health (Richardson and Rothstein, 2008). More than one-third of firms that had employees switch to remote work during the COVID-19 pandemic believe that remote work will remain more common at their company even after the pandemic ends (Bartik et al., 2020).

The results of this study are thought to help organizations in deciding whether to continue remote work or not. Meanwhile, the exact mechanism and the path between remote work and psychological and physical stress responses and presenteeism were not clarified in this study. There are various hypotheses and factors involved in this association, such as being able to work in a relaxing room environment, not being distracted by the gaze of surrounding people in the office, no need to commute, and so on (Bailey and Kurland, 2002; Martin and MacDonnell, 2012). Whereas, partial-remote work did not affect work productivity, full-remote work was shown to reduce work performance. There is a possibility that workers with illnesses or in poor condition, such as with a cold or any severe health disfunctions, are unable to go to work but can still keep working remotely, and this may apparently worsen presenteeism.

As a limitation, firstly, this study was a survey of only tertiary industries in a limited regional area. Therefore, generalization of the results should be performed with caution. Secondly, this was an observational study of only 2 years. A follow-up study investigating the effects of switching back to normal work from remote work, or the intervention studies, such as randomized controlled trials, are needed in the future to analyze the exact effects of remote work on workers' mental health and presenteeism. Thirdly, as mentioned above, other factors that substantially affect stress reactions and presenteeism, such as having opportunities to relax, a noisy home environment, not being distracted by the gaze of surrounding people in the office, having to care for young children, or commuting time and method, were not assessed in this study, and should hence be analyzed in a future study. Fourthly, we could not follow up all of the participants who initially joined the study in 2019. The drop-out rate was 21.4%, which is higher than the average annual job retirement rate of about 15% (Male 13%, Female 17%) in Japan (Ministry of Health Labour, and Welfare, 2020). This may be a result of survivorship bias, in which workers who could not adapt well to remote work might have dropped out of the study.

CONCLUSION

Remote work can reduce psychological and physical stress responses. The effects of remote work on presenteeism is limited, although full-remote work can result in presenteeism. From the viewpoint of occupational mental health, the review of working styles is expected to be beneficial, even after the end of the COVID-19 pandemic.

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 Tokyo Medical University Medical Ethics Review Board. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

AS: conceptualization, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, and writing—original draft. KY: formal analysis, data curation, and writing—original draft. YI: validation, formal analysis, and writing—review and editing. YA: conceptualization, resources, data curation, and writing—review and editing. TI: conceptualization, validation, investigation, writing—review and editing, and supervision. All authors contributed to the article and approved the submitted version.

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COVID-19, Telecommuting, and (Virtual) Sickness Presenteeism: Working From Home While Ill During a Pandemic

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This study explored (virtual) sickness presenteeism in the context of the COVID-19 pandemic. Using qualitative data from 505 members of the German working population, it investigates how working from home, which rapidly increased because of the COVID-19 outbreak, is perceived with regard to the pandemic. The study explored how this development affects the decision to show absence or presence in case of illness. More than 1,300 responses to different open-end questions by presenteeists and non-presenteeists were analyzed. The findings suggest that many previously identified reasons for deciding for or against presenteeism are still applicable. However, noteworthy differences with regard to both telecommuting and the pandemic occurred. Virtual sickness presenteeism seems to be strongly encouraged by the possibility to adjust working conditions at home. Additionally, COVID-19 has affected the perceptions of health at work. The study contributes to a more in-depth understanding of (virtual) sickness presenteeism during a global pandemic. Six propositions for future research are developed, and the importance of context for the consequences of virtual sickness presenteeism is discussed.

Keywords: presenteeism at work, COVID-19 pandemic, telecommuting, telework, remote work, qualitative analysis

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INTRODUCTION

The COVID-19 outbreak has led to many changes in the workplace for millions of workers. Notable among them is that the threat of contagious viral disease has impacted feelings of security and health (Ahorsu et al., 2020), thereby changing the behavior of individuals. In addition, many individuals had to move away from a central office to work from home on an unprecedented scale (Kniffin et al., 2020). Organizations and employees barely had time to prepare for these changes (De' et al., 2020). Both changes have impacted individuals in terms of their attendance behavior at work, as perceptions of health and illness changed and telecommuting was suddenly allowed even where it was previously forbidden.

This is especially important for research on presenteeism, defined as the behavior of working in the state of ill-health (Ruhle et al., 2020), as it impacts what attendance behavior can be considered acceptable. Before the pandemic, attending work while fighting a cold was often accepted. However, research has found that major changes in the workplace caused by affective events (Mignonac and Herrbach, 2004) or changes in social norms (van Kleef et al., 2019) can impact perceptions of acceptable behavior. Although knowledge regarding the formation of

presenteeism is steadily increasing (Johns, 2010; Miraglia and Johns, 2016; Lohaus and Habermann, 2019), our understanding of presenteeism during a pandemic, particularly while telecommuting, is lacking.

Therefore, understanding the impact of the COVID-19 pandemic and the respective changes in the perceptions of acceptable presenteeism behavior is necessary because some of the changes the pandemic has caused will only be partially reversed, and the transition back to a potential new "normal" will be slow (Rigotti et al., 2021). For example, forecasts suggest that, after the pandemic, 25–30% of the workforce will continue to telecommute multiple days per week (Global Workplace Analytics, 2021). In addition, employees who work from home show presenteeism more frequently than employees who work on-site (Steidelmüller et al., 2020), but the mechanisms that underpin this effect remain unclear. Furthermore, little is known about how the pandemic has impacted the decision process that (telecommuting) employees undertake when they are ill. The choice between virtual sickness presenteeism, "regular" sickness presenteeism, and sickness absenteeism might depend on the experience of individuals with the crisis, where they work, and how these two factors interact.

In approaching this issue, we focus on three major research questions (RQ). First, we ask how telecommuting affects the decision to show absence or presence in case of illness (RQ1). Given that physically attending work is currently and often no longer mandatory or possible, we seek to determine how individuals decide for one behavior and the consequences that may result from such. Second, we analyze how the COVID-19 pandemic affects the perception of sickness presenteeism (RQ2). Third, we examine how these perceptions, in combination with telecommuting during the pandemic, impact individuals and organizations (RQ3). Clarifying the changes in the understanding of individuals and organizations of acceptable behavior can be useful for organizations that must deal with both workers who work from home and those who return to the workplace.

This research contributes to the field of presenteeism at work, especially regarding the perceptions of sickness presenteeism and its legitimacy or norms in combination with the role of telecommuting and the impact of the pandemic. First, we aim to gain a deeper understanding of the mechanisms that might explain why individuals choose presenteeism over absenteeism when working from home while ill (Ruhle et al., 2020; Steidelmüller et al., 2020). Second, we contribute to explaining how sickness presenteeism may be a dangerous behavior during a pandemic (Eisen, 2020). As sickness presenteeism is evident during this time (van Der Feltz-Cornelis et al., 2020), we provide, to the best of our knowledge, the first analysis of the role of the pandemic in the decision to choose sickness presenteeism over absenteeism. Third, we provide avenues for future research, especially concerning the consequences of virtual sickness presenteeism. Furthermore, we look into the link between telecommuting and health-related behaviors, a topic that is still under-researched (Allen et al., 2015).

CONCEPTUAL BACKGROUND

Sickness Presenteeism

Miraglia and Johns (2016) merged the increasing research on sickness presenteeism into a dual-path model. They systematized and described two avenues that impact the decision to choose sickness presenteeism over sickness absenteeism, namely, individual health, which decreases sickness presenteeism, and job satisfaction, which promotes sickness presenteeism. However, the formation is more complex, as both contextual and individual antecedents must be considered (Johns, 2010). The distinction between the decision process of individuals and their respective health-related vulnerability must also be considered. While the decision process encompasses various reasons for presenteeism, health problems may affect the probability of having to choose between absence and presence (Ruhle et al., 2020) since ill-health creates decision-making situations more often among those who are relatively ill than it does among those who are relatively healthy. Consequently, reasons frequently reported for sickness presenteeism are multilayered and interrelated. It is beyond the objectives of this study to describe the various causes of presenteeism in general, which can be found elsewhere (Johns, 2010; Lu et al., 2013; Knani et al., 2018; Lohaus and Habermann, 2019; Ruhle et al., 2020). Instead, we focus on *job demands*, such as heavy workload, understaffing, or overtime, *working arrangements*, such as shift work or excessive working hours along with *job resources*, such as job design, job control, and interpersonal factors that impact sickness presenteeism and are relevant for virtual sickness presenteeism (Ruhle et al., 2020). These aspects are highly relevant for the decision to show sickness presenteeism in the workplace (Miraglia and Johns, 2016). Furthermore, the extant research on sickness presenteeism has asked for qualitative research that can help to clarify the path dynamics in choosing presenteeism vs. absenteeism, especially the tradeoffs that individuals consider when they make this decision (Miraglia and Johns, 2016), for which the selected aspects provide a fruitful starting point.

In addition, the nature of the consequences of sickness presenteeism has recently been challenged. While sickness presenteeism is negatively related to self-reported productivity loss (Schultz and Edington, 2007; Zhang et al., 2010) and a downturn in health (Skagen and Collins, 2016), Karanika-Murray and Biron (2020) proposed the need for a more fine-grained understanding of the consequences of sickness presenteeism. For example, based on the conservation of resources theory, they proposed that functional presenteeism could allow for an ideal adjustment of health-related constraints in relation to performance demands, which would not automatically result in productivity loss or health impairment. They proposed that sickness presenteeism is a process of adaptation in which individuals draw on available resources, such as job control and adjustment latitude, to balance health and performance (Karanika-Murray and Biron, 2020).

Telecommuting

One way for individuals to enrich their resource pool is telecommuting (also referred to as telework or remote work). It

is a work arrangement that allows at least a portion of the job of a worker to be accomplished away from a central workplace, typically from home, using technology to interact with others (Allen et al., 2015). Thus, there is no need to commute to the central workplace to work. However, telecommuting is more complex, as arguments for telecommuting as both a job resource and a job demand should be considered.

On the one hand, telecommuting may function as a job resource. As a major benefit, the ability of telecommuters to adjust their working activities and time to meet their own needs and desires may increase (Golden and Veiga, 2005; Gajendran and Harrison, 2007). In particular, the literature is spurred by the notion that telecommuting may provide individuals with the flexibility they need to address the demands of both work and family (Allen et al., 2015). Meta-analytic evidence has supported this notion and suggested the beneficial effects of telecommuting on work-related outcomes like organizational commitment, job satisfaction, job performance, turnover intention, and role stress (Gajendran and Harrison, 2007; Harker Martin and MacDonnell, 2012; Allen et al., 2013).

On the other hand, telecommuting may also function as a job demand. The same flexibility that allows telecommuters to adjust their work enables them to extend their work into non-work time and non-work spaces, which are normally reserved for private life (Schlachter et al., 2018; Schmoll, 2019). In addition, extensive telecommuting has the potential to increase professional isolation and reduce the relational life of an individual (Buomprisco et al., 2021). Telecommuting also enables work to be relocated from an office desk to non-ergonomic workstations like a couch or a bed (Davis et al., 2020). These issues may have detrimental implications for the health of teleworkers in the long run (Buomprisco et al., 2021).

Sickness Presenteeism, Telecommuting, and the COVID-19 Pandemic

Against the backdrop of these developments, the COVID-19 outbreak forced a rapid change in both the perceptions of illness and the availability and, in some cases, enforcement of telecommuting (Kniffin et al., 2020). While there was very little evidence on the relationship between sickness presenteeism and telecommuting before the pandemic, research on the decision of individuals between absence and presence during a pandemic is non-existent. The few studies that have linked sickness presenteeism and telecommuting have shown that the probability of showing sickness presenteeism increases with the intensity of telecommuting (Steidelmüller et al., 2020). The authors speculate that this might be related to the circumstances in which the individual no longer has to commute to work, has no way to infect others at work, or has increased adjustment latitude. Furthermore, virtual sickness presenteeism can be considered self-endangering (Steidelmüller et al., 2020).

However, how telecommuting impacts the decision to work from home despite illness, that is, virtual presenteeism, remains unclear. Some motives for sickness presenteeism might differ significantly or might no longer be applicable when an individual telecommutes. For example, being perceived as hard-working (Simpson, 1998) might be more difficult when one is not present in the workplace, while the potential for adjustment might be greater, as the time and place of work might be partially in the hands of the employee (Steidelmüller et al., 2020). Other aspects of work, such as social support (Chen et al., 2021) or attendance pressure (Aronsson and Gustafsson, 2005) might change only slightly and be equally important.

MATERIALS AND METHODS

Data Collection

We asked workers in the German working population about working while ill as part of a larger online survey named "working conditions during a pandemic." Data collection took place in September and October 2020. During this period, there were no legal restrictions regarding the place of work. Participation for the study was solicited through an email message that was sent to the diverse contacts of the authors, including employees of a large university and employees of a trade union confederation. The study was approved by the data protection officer of the faculty. Conformity with the General Data Protection Regulation (GDPR) has been confirmed. A data protection declaration was presented to everyone before participation. Permission to process data was obtained from all participants. Of course, participation in the study was voluntary.

In sum, 625 individuals participated in the study, and we differentiated between 303 presenteeists, namely, those who had worked at least once while ill in the last 3 months, either virtually or on-site, and 322 non-presenteeists, particularly those who had been absent when sick or had not been sick at all. The respondents were not forced to answer every question. As a result, not all participants answered all questions, which resulted in missing data. Overall, 505 individuals commented on at least one of our questions, with 33.9% of the individuals being male, 65.1% being female, and 1% indicating "other" as their gender. One hundred ninety-nine of them were presenteeists and 306 were non-presenteeists. They spent an average of 13 working hours telecommuting and 23 h on-site and reported an average of 4.4 health events in the last 3 months. From these participants, we received 1,377 text segments with more than 30,498 words (in German).

Presenteeists answered the following open-end questions regarding their decision to choose presenteeism (P1): "Please describe why you decided to work while sick. What were the reasons for this? How did this behavior differ from your behavior before the pandemic?" We also asked about the context (P2): "Where were you working at home, the office, or somewhere else? What were the hours of work? Were there any special circumstances?" Finally, we asked about the role of other individuals and the organization in the decision of the participants (P3): "Please describe the extent to which COVID-19 has led your organization to address employee attendance and absences in the event of illness. Briefly state whether you have been treated differently in the context of working with an illness then you were before the crisis? If so, how?"

The open-end questions of the non-presenteeists addressed their perceptions of illness in the organization (N1): "Please

describe the extent to which COVID-19 has impacted perceptions of illness in your organization. Do you or others behave differently than before the pandemic? How do you and your colleagues deal with illness?" We also asked them about changes in rules related to absence and presence that were due to the pandemic (N2): "To what extent were changes in the rules about attendance and absence communicated by your employer during COVID-19? What was communicated as the 'correct' behavior in case of illness? Were there any changes in this regard compared to before the pandemic?" Finally, we asked what a (fictional) decision regarding attendance would look like (N3): "Imagine feeling sick on a morning when you are supposed to be working from home. How do you deal with that? How would this choice differ from days when you would have to go into the office?"

Data Analysis

Our analytical approach consisted of a deductive approach (P1 and P2) and an inductive approach (P3, N1–N3). Following the recent recommendations from Aguinis and Solarino (2019) and Pratt et al. (2020), we used structural coding for the first coding cycle. Because our questions provided a structure for the categories, we grounded our deductive analysis on that structure. We used pattern coding for the second coding cycle, which allowed us to pull a considerable amount of qualitative data together to more meaningful units (Saldaña, 2015). We coded seven main and 28 specific categories that we defined *ex-ante* based on conceptual (Lohaus and Habermann, 2019) and meta-analytic results on presenteeism (Miraglia and Johns, 2016). Furthermore, following Creswell et al. (2007), we used this information to offer propositions based on the three research questions.

First, we categorized 10% of the material, reaching intercoder reliability of 81–95% for the deductive categories. Due to this, we adjusted them only slightly (e.g., adding an "other" category). More specifically, for the deductive part of the analysis, we analyzed the reasons for showing presenteeism using the main categories, namely, *constraints on absenteeism*, *job demands*, *job resources*, *health status*, *collegial support*, *attitudes*, *reason related to telecommuting*, and *other*. To grasp the context of presenteeism, we coded the workplace as *telecommuting*, *on-site*, *both*, *mobile*, or *other* and the working time as *normal*, *flexible*, *more than usual*, or *less than usual*. **Table 1** shows the themes, specific categories, and coding rules. For the deductive part of the analysis, the authors coded independently.

For the inductive part of the analysis, we first conducted structural coding using the categories *dealing with presenteeism changed* (Yes/No), *decision differs between telecommuting and on-site* (Yes/No), *rules and regulations have changed* (Yes/No), and *presenteeism behavior differed from pre-pandemic* (Yes/No). The second part of coding was inductive and focused on the research questions. As we had no theoretical grounding, we used an open coding procedure to retain as much information as possible by discussing the answers of participants and extrapolating the respective categories. For this step, the authors coded simultaneously and collaboratively. **Table 2** shows the structural codes, specific categories, and coding rules used for the first cycle of inductive coding.

We conducted the analysis using MAXQDA10 (Kuckartz and Rädiker, 2019). Following the discussion of Levitt et al. (2017) regarding the transparency and comprehensibility of qualitative research, we calculated Cohen's kappa when appropriate (i.e., for deductive categories) (Banerjee et al., 1999) or provided clear reasoning for using simultaneous collaborative coding and discussed the results (Kuckartz and Rädiker, 2019). The intercoder reliability of the coding of the deductive categories averaged 88% for the codes of working time and 80% for context. For the first cycle of structural coding, Cohen's kappa ranged between 0.86 for *decision differs between telecommuting and on-site* and 0.61 *for changes in rules and regulations,* which can be considered satisfactory to perfect agreement (Burla et al., 2008). For the sake of transparency, we translated the extracts displayed from German into English and used the abbreviation P### for presenteeists and N### for non-presenteeists, which are displayed in brackets after any quotation.

FINDINGS

Sickness Presenteeism in the Context of Telecommuting

Workplace. Our analysis of the contextual conditions of presenteeism showed that 171 individuals who reported sickness presenteeism provided us with information on the workplace, 117 (68.4%) stated that the sickness presenteeism happened while telecommuting, while 47 (27.5%) reported that it happened on-site. Only four (2.3%) reported that it happened while partially telecommuting and partially on-site and three (1.8%) were neither at home nor on-site (e.g., external meeting with a customer). It should be noted that, during the time of the data collection, there were no legal restrictions that forced individuals to work from home.

Working time. One hundred twenty-two of the 303 presenteeists provided information regarding their working time for the last day they showed presenteeism. Sixty-six (54.09%) reported a "normal" working time, while 22 (18.03%) reported a flexible work time [e.g., "*Flexible working hours (in total ∼6 h, spread over ∼10 h), with plenty of time to rest in between*" (P689)]. With regard to the volume of work, 34 individuals (27.87%) reported that they worked *less than usual*, and only one individual (0.82%) reported *more work than usual* [e.g., "*Because of weekly deadlines, I even worked on Sunday evening […]*" (P584)].

Reasons Reported for Sickness Presenteeism

Constraints on absenteeism. The most prevalent constraint of absenteeism that the presenteeists reported was the ease of replacement. For our coding, this was defined as the awareness that individuals are not easily replaced at their jobs and that work piles up until their return (Aronsson et al., 2000). This antecedent of presenteeism was unaffected by virtuality, which was to be expected, as the fundamental nature of work was

TABLE 1 | Themes, specific categories, and coding rules for deductive coding.

Main themes	Specific categories	Coding rule Individual reports…
Constraints on absenteeism	Absence policies	absence policies as reason for presenteeism.
	Job insecurity	job insecurity as reason for presenteeism.
	Income	fear of losing income as reason for presenteeism.
	Ease of replacement	work has to be made up upon return to work.
Job demands	Role demands	workload, understaffing, supervisory duties as reason for presenteeism.
	Time demands	overtime, work hours, time pressure, or shift work as reason for presenteeism.
	Work-to-family conflict	work-to-family conflict as reason for presenteeism.
	Family-to-work conflict	family-to-work conflict as reason for presenteeism.
Job resources	adjustment latitude	the ability to adjust the work to the health impairment as reason for presenteeism.
	Decision authority	the need to make an important decision as reason for presenteeism.
	Work significance	the importance of one's job as reason for presenteeism.
Collegial support	colleagues support	that colleagues offer support in case of illness at work.
	Relationship with colleagues	that he/she would not like to endanger the relationship with colleagues by absence.
	Supervisory support	that supervisors offer support in case of illness at work.
	Relationship with supervisor	that he/she would not like to endanger the relationship with the supervisor by absence.
	Organizational support	that the organization (unspecific) offers support in case of illness at work.
	Relationship with organization	that he/she would not like to endanger the relationship with the organization by absence.
Attitudes	Job satisfaction	satisfaction with the job (overall).
	Affective commitment	commitment toward an object (individual, team, supervisor, job, customer, etc.).
	Work engagement	their own work role.
	Organizational justice	to avoid unfairness.
Workplace	Telecommuting	working from home.
	On-site	working on-site.
	Mobile	mobile working.
	Other	other working arrangement.
Working time	"Normal"	regular working hours.
	Flexible	flexible working hours.
	More	more working hours than usual.
	Less	less working hours than usual.

Not all initially created categories were found in the data.

unaffected for most workers even though the circumstances around their work had changed. As one participant described it, "*I oversee my area completely on my own, so work that I don't do just piles up higher and higher and there's no one to do it but me*" (P517). Only scattered remarks on other restrictions were made, which is interesting with regard to the pandemic. For example, we expected an increase in the importance of job insecurity because of the insecurity that the pandemic has created (Wilson et al., 2020), but that was not the case for the vast majority of our participants. While only four participants mentioned rules and regulations, the policies related to absence were important predictors of the attendance decision in these cases, tipping the decision in favor of presenteeism, even as avoiding presenteeism and the importance of health was omnipresent during the pandemic: "*In our company, there is a time deduction for illness [absence], which makes you think twice [about calling in sick]*" (P413).

Job demands. Individuals reported a wide range of demands related to their roles that justified presenteeism. In line with previous results, these role demands were rooted in the careers of the participants ["*There is a lot of career pressure and you can't just stop working*" (P525)], in their role in the organization ["*As a manager, I have a high level of responsibility for a relatively large team and feel that I have a duty to continue working in the event of minor health restrictions (like a cold)*" (P218)], or in caring for other groups ["*My patients would have been less well-cared for otherwise*" (P915)]. Interestingly, these role demands were not further justified by the workplace or the pandemic situation. Participants seemed to perceive these demands as valid reasons for presenteeism, even during a pandemic.

Job resources. As proposed by previous sickness presenteeism research, job resources were also identified in the answers of presenteeists about the reasons for presenteeism. The reason named most frequently was related to adjustment latitude. This adjustment was predominantly described with regard to the opportunity to take breaks when needed ["*I can always do (my work) at my own pace and freely arrange my break times*" (P835)]. However, other kinds of adjustment were also described, such as not being forced to work at a desk, using tools to

TABLE 2 | Structural codes, specific categories, and coding rules for the first cycle inductive coding.

Structural codes	Specific code	Coding rule
		individual reports…
Dealing with presenteeism changed	Yes	dealing has changed.
	No	dealing has not changed.
Decision differs between telecommuting and on-site	Yes	different decision.
	No	same decision.
Rules and regulations have changed	Yes	rules and regulations have changed.
	No	rules and regulations have not changed.
Presenteeism behavior differed from pre-pandemic	Yes	different behavior.
	No	same behavior.

Structural codes were inductively analyzed in a second coding cycle.

decrease feelings of being unwell, or being able to stop working quickly when feelings of being unwell reached a certain level. As one participant mentioned, "*The advantage was that I could always rest in between and have enough tea, and I didn't have to meet anyone in person and risk infecting them, and I could dress comfortably*" (P189). It is important to note that none of the on-site individuals reported having such an adjustment latitude, highlighting that telecommuting is related to a different way of adjusting, which will be further evaluated below. On-site presenteeists reported aspects of the significance of work as a reason, such as the personal importance of the work ["*It was for an exciting project in whose progress I had a great interest*" (P51)].

Health status. Another widespread cause reported for presenteeism was health events. Aspects of a health condition like the level of impairment ["*I felt only moderately affected*" (P178)], the perception that the health condition contained no risk of infecting others ["*Not a contagious disease*" (P130)], or that the combination of the health status and telecommuting allowed the person to work ["*Because I was telecommuting, I was able to work despite my broken foot*" (P952)] were described. Thus, the nature of the health status is an important aspect in the decision between absence and presence (Johns, 2010). However, the quality of this calculation might depend on the health literacy of the individual (Berkman et al., 2010), as we also found examples where considering a health condition without consulting a physician could be problematic, especially during a pandemic. For example, one individual reported choosing sickness presenteeism, as "*the illness was not serious (cold and headache)*," but there was almost no way to separate these symptoms from common COVID-19 symptoms like cough, fever, and shortness of breath (Paules et al., 2020).

Collegial support. Three main aspects of support were reported as reasons for sickness presenteeism. First, some individuals did not want to strain their relationships with colleagues by being absent and losing support. These arguments were presented both in a positive notion, particularly as a form of wanting to support the team ["*I'm working on a very important project, and I have a great team that I still wanted to support*" (P404)], and with some using a more negative tone ["*There is a low tolerance on the team for absences or delays related to illness*" (P584)]. Second, the same strain should not be put on the relationship with the supervisor. Here, we only found negative examples ["*(I worked because) the mood between my supervisor and me was already very bad*" (P581)]. Third, some individuals reported these reasons on a more general level, referring to their relationships with the organizations ["*I consider it a privilege not to have to worry about my job and to be able to telecommute*" (P952)] or the goodwill ["*as a young employee who still wants to find her way professionally in the company, I would not like to accumulate sick days to avoid attracting negative attention*" (P100)] of the organization. However, we found only positive remarks when individuals reported that work itself was a reason for showing sickness presenteeism, as in such cases it was a "*distraction from being sick*" (P940) or "*that [working] is the second-best way for me to get out of my own head*" (P326).

Attitudes. Finally, we found only scattered evidence for work engagement as an attitudinal reason for choosing sickness presenteeism and no evidence for affective commitment, justice, or job satisfaction as reasons. While this result may be surprising, especially as job satisfaction is one major mediator in the dual-path model (Miraglia and Johns, 2016), this lack of evidence might be connected to the nature of satisfaction as a latent construct that is important only in the back of people's minds. As a global concept that includes various facets like salary, promotion, colleagues, supervisors, and the work itself (Judge et al., 2020), job satisfaction might not be a salient reason for sickness presenteeism.

Reason for Sickness Presenteeism Related to Telecommuting

As most of the participants reported working from home while in poor health, some of the reasons for choosing sickness presenteeism were directly linked to telecommuting. However, both positive and negative aspects of telecommuting were mentioned and inductively coded.

In addition to the aspects mentioned above, *positively perceived aspects* of telecommuting could be identified. As there is no need to commute to the central workplace, it was a little surprising that this context-specific reason was mentioned frequently. Telecommuting removes the need to commute to work when one does not feel well. This benefit of working from home was reported to be a major reason for showing sickness presenteeism, as it allowed the individuals to remove a burden from their workday. As one participant put it, "*The reason was that I felt too sick to go out, commute, and work in the office, but not so sick that I couldn't work at home*" (P814).

Presenteeists also mentioned reasons related to an increased adjustment latitude while telecommuting frequently. For some telecommuters, increased temporal flexibility was an important reason for showing virtual sickness presenteeism, as "*while telecommuting, you can schedule your own time and take short breaks if you get tired, which would not be possible on-site*" (P543). Likewise, a health-related adjustment was reported, such as the possibility "*to withdraw if you don't feel well*" (P451) or to "*do the most important work from bed with a hot-water bottle and pills, which would not have been possible without telecommuting*" (P573).

Rather *negatively perceived aspects* of telecommuting were related to implicit expectations and increased opportunities to show sickness presenteeism. While implicit expectations refer to the perceived pressure to work from home while one is ill, as one works at home anyway and should be able to handle at least some work ["*I had the feeling that there was a subliminal expectation to take sick leave while telecommuting only in very serious cases since you are at home anyway*" (P584)], another aspect encompasses the self-endangering behavior that has been assumed to be relevant by previous research (Steidelmüller et al., 2020). For example, "*Calling in sick while telecommuting is a bigger barrier [. . .] because I can arrange the work schedule more freely. So if I normally woke up with a migraine, I would have called in sick. Now I work the time off in the evening instead*" (P491).

Differences in Sickness Presenteeism Behavior Based on the Pandemic Context

To determine whether the sickness presenteeism behavior during the pandemic differed from the pre-pandemic decision, we asked our participants whether they would have chosen differently before the pandemic. We found individuals who reported having made a different decision before the pandemic and individuals who reported that their decision was unaffected by the pandemic.

While many of the presenteeists did not explain why their decision to show sickness presenteeism was *unaffected*, we were able to identify some patterns. Participants reported that, despite the pandemic, their situation was unchanged, and sickness presenteeism was an acceptable behavior that had been shown previously: "*I've always worked [. . .] when I felt slightly limited in health, so nothing has changed here compared to before the crisis.*" (P730), up to the point that showing sickness presenteeism was described as normal ["*This behavior is normal for me*" (P1000)]. Others reported that there was no difference in their behavior, as telecommuting was already their preferred way of dealing with sickness presenteeism, and the pandemic did not negatively impact this decision: "*Before the Corona crisis, I made the same [decision] if I didn't feel well: I could still work*" (P248).

The participants who reported that their decision was affected by the pandemic centered their reasoning around two major arguments. Despite choosing sickness presenteeism, most individuals reported that their decisions differed in that they decided to choose virtual sickness presenteeism instead of going to work, which would also have been their decision before the pandemic: "*Normally, if I had a common cold, I would go to the office and work normally, but because of the corona pandemic, I chose to work from home*" (P743). Those participants described the COVID-19 pandemic as a major barrier that prohibited working on-site but not working in general. When a participant had a health impairment that was not related to the pandemic, the pandemic presented additional opportunities for presenteeism. For example, one individual reported taking part "*in important video conferences despite torn ligaments. I probably wouldn't have done that otherwise, since I didn't have the option to telecommute before Corona*" (P461). As telecommuting was accepted in circumstances that had not been common in many organizations, taking part in meetings that otherwise would have been impossible in person was now possible. Overall, the COVID-19 pandemic increased opportunities for showing virtual sickness presenteeism.

The Decision Process for Virtual Sickness Presenteeism

The following results are based on the data we received from non-presenteeists. The hypothetical question concerning the decision process helped us include the perspective of individuals who had not chosen sickness presenteeism and identify the underlying mechanisms of the decision to choose virtual sickness presenteeism.

Relationship Between Sickness Presenteeism and Telecommuting

We found that the participants differed concerning their understanding of whether sickness presenteeism and telecommuting are related. Some had the view that presenteeism while telecommuting is a viable *alternative to keep working* as "*in the past, you were simply sick and stayed at home. Those who are not well while telecommuting are now less likely to call in sick*" (N993). These participants reported that, if they would be sick while telecommuting, they would show *hidden sickness absenteeism*: "*I would go back to bed or rest. If I had to go to the office, I would call in sick, but I would rather not call in sick while telecommuting. Presenteeism at home is an alternative to sick leave*" (N441). Others had the view that there would be no difference between telecommuting and working on-site concerning sickness presenteeism: "*Despite working from home, I would call in sick [. . .]. If the condition worsened, I would go to the doctor. Conclusion: I would not behave differently*" (N442).

In line with the idea that presenteeism is an adaptive behavior, individuals who perceived sickness presenteeism while telecommuting as an acceptable behavior reported that they would adjust their productivity not based on their health status but based on the expected productivity, and that was the factor that shaped their decision: "*If I can still perform, I would work from home. Only if I can no longer perform would I call in sick*" (N385). In contrast, some reported that their health is the most important predictor of their behavior and that sickness presenteeism would be an intermediate solution: "*I would telecommute and wait and see how my illness developed. If it got worse, I would go to the doctor*" (N128). This heterogeneity highlights the importance of both a person-centered approach to sickness presenteeism and the health literacy of individuals in reducing the risk of unhealthful and dysfunctional behavior.

Reasons for Virtual Sickness Presenteeism

The decisions of participants differed based on three major arguments related to adjustment latitude, commuting, and health status. First, participants stated that an increased adjustment latitude would allow them to opt for sickness presenteeism instead of calling in sick. *Temporal flexibility* would give them the ability to "*arrange […] working hours completely freely*" (N115) and "*take work breaks more frequently*" (N73) to suit their individual needs when they were ill.

In addition to the ability to adjust work schedules and take breaks, telecommuting also allowed participants to *adjust work volume.* Participants reported that they would be able to adjust the amount they work. If they would decide to work from home while ill, they "*would then work fewer hours*" (N772). Whether the participants would compensate for this reduced volume later or intensify their work to be more productive in less time remains unclear.

The third argument, *health-related adjustment*, reflected the perception of individuals that working from home has the benefit of taking care of health problems as they occur: "*When I feel unwell, I can take care of my health condition in parallel [to work]*" (N209). These participants would make their decision based on the possibility that they could handle light tasks and adjust their work according to their symptoms. Related to that reason was the *adjustment of the work environment* according to the needs of the individuals. As one participant described it, "*I would do some easy tasks and adapt my situation to the symptoms by, for example, using a heat cushion and lots of chamomile tea for stomach problems, taking a rest in the bathtub, or working on the couch with a blanket*" (N492). Thus, anything the individual perceives as a burden while ill, such as having no opportunity to rest, having to dress accordingly, meeting other people, and so forth, does not apply to telecommuting. Taken together, the increased adjustment latitude that telecommuting offers also led some non-presenteeists to conclude that the "*telecommuting environment is better for enduring illness than the office environment*" (N155).

While the role of health in sickness presenteeism is evident, as a health event is part of the definition of presenteeism, its role in the decision process is less clear. Many participants explained in detail that, "*depending on how sick I felt, I would likely still work while telecommuting, even if I would have called in sick on-site with the same symptoms*" (N104). The level of illness was also an important aspect of the decision as, if an illness of a participant was contagious, he or she would opt for sickness presenteeism from home: "*As long as the symptoms do not affect me too much (e.g., fever), I would probably work from home, whereas I would be more likely to call in sick at the office*" (N391). Of course, what constitutes "too much" is highly subjective.

Sickness Presenteeism During the COVID-19 Outbreak

Changes in Dealing With Presenteeism

As expected, how people and organizations dealt with sickness presenteeism concerns during the pandemic differed. On the one hand, participants reported no change in behavior, which we coded as *unchanged dealing with sickness*. On the other hand, participants reported that the consideration of sickness presenteeism had changed, which led to categories related to the *nature of changes.*

Concerning the unchanged dealing with sickness presenteeism, it is surprising that some non-presenteeists reported having perceived no general changes related to sickness. They reported that neither their organizations nor the workers changed how they dealt with sickness presenteeism: "*No confrontation with that at all. No, I was not treated differently*" (N818). Others included the COVID-19 pandemic in their responses, which nonetheless did not suggest changes: "*COVID-19 has not led to any new insights from my organization [regarding dealing with presenteeism]*" (N896). Others reported only a few changes unrelated to presenteeism, often regarding minor modifications like disinfecting hands and contact surfaces: "*No change in behavior, except in compliance with hygiene rules (distance, no handshaking)*" (N794). Finally, in the few cases that reported no changes, dealing with sickness presenteeism was already in the measures that had been taken before the pandemic: "*Before COVID-19, my supervisor already mandated that individuals who felt ill should stay home and, if necessary, continue to work while telecommuting if they felt well-enough*" (N858).

Those who reported changes in dealing with sickness presenteeism reported changes that we attributed to various mechanisms. We found that some people reported an increased sensitivity to illness in light of COVID-19. While it is not surprising that the pandemic had an impact on how employees perceived illness at work, we found that individuals, teams, and whole organizations became more aware of the symptoms related to COVID-19: "*employees as a whole are classified as sick more quickly, and all symptoms that could be related to COVID-19 are taken more seriously*" (N591). As such, especially when on-site, sickness presenteeism was often behavior that was no longer acceptable. In some cases, the awareness of health in the workplace even encompassed areas that are not directly related to COVID-19, which we considered evidence of a higher sensitivity to health (impairment) in general: "*The topic of illness and disease has gained in importance. There is more talk about preventive health care and more is being done about it*" (P796).

Many participants reported measures related to COVID-19, which ranged from small measures like enforcing hand-washing and mask-wearing up to massive interventions like changes in who was allowed to be present on-site: "*Many of the workgroups now work in shifts, and masks are worn throughout the building. Not too many people are in a room at the same time, so the building generally appears to be emptier, and care is taken to maintain spacing*" (N272). These aspects of health protection were often directly linked to reducing the risks of infection and preventing the further spread of the pandemic. In some cases, even the absence and presence norms were reflected and communicated more clearly than previously as "*illness was more strongly considered a legitimate reason for not showing up*" (N574). These kinds of changes established new standards regarding attendance, which were also reflected in changes in rules and regulations.

Rules and Regulations

As we sought to determine how organizations dealt with the COVID-19 outbreak, we also analyzed changes in the communication of rules and regulations with regard to attendance behavior. For *changes in rules and regulations*, 130 participants reported that no changes were communicated. A deeper analysis of these statements revealed three major themes. For one group, the attendance regulations were strict from the beginning, such that, even before the COVID-19 outbreak, attending work while ill was unwanted and strictly prohibited or frowned upon, so any change in the rules and regulations was unnecessary. As one participant reported, "*The correct behavior has remained the same. Everything has been communicated, and nothing has changed*" (N448). Another group reported that, while the rules did not change, the pandemic influenced how employees dealt with the rules: "*As in most companies, there was a directive to stay home if there were even the slightest symptoms. I think that this was already in place beforehand, but it was not taken seriously by me or by most people. That changed during the crisis*" (P773). This insight has value, as prior research has shown that dealing with rules and regulations with regard to absence and presence is related to the perceived legitimacy of these rules (Johns, 2010). Therefore, the thread of the pandemic seems to have changed the perceived importance of following organizational rules concerning calling in sick. The third group did not receive any information regarding the correct behavior if they were ill and had no existing rules and regulations to draw on: "*No rules and regulations were given regarding the correct type of [attendance] behavior. Employees have to judge on their own if it would make sense to stay home*" (N457). Some participants complained that the organization was clueless and did not deal with the phenomena well, which resulted in a lack of clarity for employees: "*The organization has no strategy. There is just no information policy*" (P249). When we collected this information from the participants, the pandemic could no longer be considered a new and unforeseen threat. Thus, such missing communication was problematic for the health and safety of employees.

When a *change in rules and regulations* was reported, the participants reported that, in contrast to the pre-pandemic situation, presenteeism was no longer accepted either in general, without a reference to symptoms related to COVID-19 ["*It was clearly pointed out that you should stay at home if you feel unwell*" (N718)], or in those who have symptoms specifically related to the symptoms of COVID-19, sometimes with explicit referral to organizational actors that would help ["*In case of symptoms related to COVID-19, individuals are asked to stay at home and wait for the symptoms to disappear. If the symptoms persist and/or fever and suspected COVID-19 infection occur, consult a company physician (Betriebsarzt) beforehand and, if necessary, take a SARS-CoV-2 test*" (N847)]. Urging employees to stay at home when they have any signs of illness was the most common change because of the pandemic nature of COVID-19 and the fear of contagion.

Some organizations have even gone further and changed rules and regulations regarding office occupancy in general, such as: "*Our company increased the time window for presence in the office. The offices are to be staffed with only one person because of COVID-19. The other colleagues then work from home. According to the employer, anyone who feels ill should stay at home and see a doctor after 3 days at the latest*" (P646).

DISCUSSION

The results gave us evidence to answer our research questions. In the following section, we discuss our results and develop six propositions. Further research on these propositions is needed to clarify the nature and consequences of virtual sickness presenteeism.

RQ1: How Does Telecommuting (e.g., Virtual Work) Affect the Decision to Show Sickness Presenteeism?

We found that the reasons reported for virtual sickness presenteeism were in line with previous results for on-site sickness presenteeism (Johns, 2011; Miraglia and Johns, 2016). Constraints on absenteeism, job demands, job resources, collegial support, and health status were all described for both virtual sickness presenteeism and regular sickness presenteeism. Many aspects of presenteeism are not based on the setting, as role demands might not differ much based on whether the work is done virtually or in person. Also, the perception that working in a state of ill health is perceived as beneficial for a career (Johns, 2010) might not change based on the context of sickness presenteeism. While a systematic comparison of these reasons from the theoretical and empirical perspectives is necessary to determine the relative importance of specific reasons, general transferability can be assumed.

> *Proposition 1*: Many reasons that have been identified as influencing the decision to choose on-site sickness presenteeism can be transferred to virtual sickness presenteeism.

In addition to these known antecedents, we found differences between the decision to choose on-site sickness presenteeism and the decision to choose virtual sickness presenteeism. Whereas on-site workers can decide only whether to go to work or call in sick, the decision-making possibilities for individuals who can choose whether to work from home or on-site are expanded, as they can decide whether to call in sick, work from home while ill, or work on-site while ill. Sometimes, the decision is not between calling in sick or on-site sickness presenteeism, but between virtual and on-site sickness presenteeism. If the decision is between absenteeism and being present on-site (e.g., you have to work on-site and telecommuting is not allowed), many would choose sickness absenteeism. However, if it is possible to work from home, they would choose virtual sickness presenteeism.

For this decision, both presenteeists and non-presenteeists reported that several context-specific aspects of adjustment latitude are particularly relevant to their choice of virtual sickness presenteeism. Telecommuting provides more opportunities to adjust the environment according to individual health demands. More specifically, some telecommuters can alter their typical temporal work patterns, such as adjusting the timing and

volume of work. We found indications that telecommuting makes those with temporal flexibility more likely to adjust their schedules and work breaks to suit their health condition. These findings reflect thoughts from the telecommuting literature that working remotely increases the ability of employees to adjust their work to meet personal needs (Golden and Veiga, 2005; Gajendran and Harrison, 2007) and contribute to explaining why individuals choose virtual sickness presenteeism over absenteeism (Ruhle et al., 2020; Steidelmüller et al., 2020). This finding also contributes to the telecommuting research that calls for considering temporal flexibility as an important contextual factor (e.g., Allen et al., 2015). Second, working from home reduces the burden of going to work on-site, which includes the effort of preparing to go to work and commuting that might be particularly burdensome when one is ill. The omission of commuting seems to be particularly relevant to the choice of virtual sickness presenteeism, as many people have to commute large distances to work on-site (Calderwood and Mitropoulos, 2021). Therefore, being able to avoid a long journey to work is perceived as a special benefit of working from home even when one is not sick.

Proposition 2: The decision to choose virtual sickness presenteeism is heavily impacted by perceptions of adjustment latitude, especially regarding the latitude to adjust the environment of an individual to meet health-related needs, to adjust temporal work patterns, and to avoid commuting.

RQ2: How Does the COVID-19 Pandemic Impact the Perception and Formation of Sickness Presenteeism?

We contribute to our understanding of how sickness presenteeism is perceived during a worldwide pandemic and whether this perception will impact sickness presenteeism in the future. As with the reported reasons for virtual sickness presenteeism, we found that previously identified reasons for sickness presenteeism can be transferred to sickness presenteeism during a health crisis. However, two major themes emerged due to the COVID-19 pandemic, namely, the *importance of health* and the *role of rules and regulations*.

While we would not go as far as to state that the COVID-19 pandemic had positive effects, increased awareness regarding health in the workplace can have positive effects. This includes not only an awareness of sickness presenteeism, where health competencies might help to avoid a downward spiral of health but also for health promotion in general, as the health locus of control is an important predictor for taking part in health promotion programs (Rongen et al., 2014). For most organizations, health and health competencies have been in focus during the pandemic. Being able to differentiate between a minor health event and a dangerous infection has been an important aspect of attendance behavior at work (Rongen et al., 2014). Overall, the COVID-19 outbreak, its accompanying protective behaviors, and the health education programs that have sought to improve disease-specific knowledge have impacted the health awareness of employees (Lüdecke et al., 2020). Our participants also reported a change in their perception of health as their interest in the health-related programs and actions taken by their organizations increased. As such, it can be expected that, in the future, employees will expect ongoing discussions about health in the workplace. Plausible changes, such as strict policies regarding protective behaviors (e.g., no longer shaking hands), will not be easily revoked when the pandemic is over, especially if employees perceived them as valuable. As such, expectations regarding the role of the workplace as a healthful environment might carry over after the pandemic.

Proposition 3: The COVID-19 outbreak has impacted the perceptions of sickness presenteeism and health in organizations that are likely to carry over into the future because of the increased health awareness of employees.

While we found that most individuals reported no change in rules and regulations, none of those who reported choosing sickness presenteeism stated that those rules and regulations affected their decisions. Furthermore, official rules and regulations were not mentioned in the course of answering questions about a fictitious decision process. This result fits with previous results that have shown that official rules and regulations about absence and presence are, in particular, seldomly successful in influencing absences because of illness, but are more closely related to the absence of work-related motivation (Dalton and Mesch, 1991). Although such a lack of motivation was not the focus of this study, the pandemic might have impacted the perceptions of the rules and regulations related to the correct behavior of sick employees in the future, as some organizations have heavily communicated the importance of following organizational guidelines concerning health. Therefore, employees may now understand better than before that such rules and regulations benefit all members of the organization even when an individual believes that his or her health impairment is manageable, regardless of how this previously led to presenteeism (Miraglia and Johns, 2016). Employees reported that a clear understanding of the rules and regulations helped them to conform. However, future research on the effectiveness of absence policies after the pandemic should determine whether such changes are sustained.

Proposition 4: While rules and regulations related to sickness presenteeism tend to be ineffective, the ongoing communication regarding the worth of health-related rules and regulations could serve to reduce sickness presenteeism.

RQ3: How Does the Connection Between Telecommuting and Virtual Sickness Presenteeism During a Pandemic Impact Individuals and Organizations?

Finally, we found evidence for interactions among the pandemic, telecommuting, and sickness presenteeism. Being "forced" to refrain from on-site sickness presenteeism resulted in virtual sickness presenteeism, which often changed the perception of what it means to be at home. Before the pandemic, being sick at home was perceived as a time when one was unable to work. On the other hand, participants reported that, when they were telecommuting, co-workers expected

them to work even when they were ill. Consequently, both telecommuting and the pandemic impacted how sickness presenteeism is perceived in organizations. Although we know of no explicit research on the norms of virtual presenteeism, studies on presenteeism have found that it can lead to extra-time valuation (i.e., the perception that the career of an individual depends on daily working hours), a distrust of supervisors, and competitiveness with co-workers (Ferreira et al., 2015). All of these can be transferred to a virtual work setting. Specifically, aspects such as hidden (virtual) sickness absenteeism, which means not calling in sick and pretending to work virtually, or unobserved sickness presenteeism could create perceptions of distrust, thereby shifting the perceived legitimacy of sickness absenteeism and presenteeism (Ruhle and Süß, 2020) because of the pandemic. For example, the current behavior of being more careful has resulted in an abrupt decline in respiratory disease rates in Germany (Buchholz et al., 2020), which might impact future employees when they consider whether they should work on-site while ill. Overall, both the pandemic and widely expanded telecommuting have impacted the perceptions of norms and, consequently, are likely to change future behavior.

Proposition 5: Attendance norms created during the pandemic have impacted virtual sickness presenteeism, (hidden) sickness absenteeism, and on-site presenteeism.

While the possibility of adjusting health-related needs, temporal work patterns, and the volume of work may seem to be only positive changes for the individual, such adjustments could also be detrimental to health based on the context. In addition to results from previous research that highlighted a complex relationship concerning virtual sickness presenteeism, we found evidence for specific phenomena in our sample. For example, employees need *adequate working conditions* when telecommuting, which is not always a given. Non-ergonomic workplaces (e.g., working in bed) increase the risk of several disorders (Buomprisco et al., 2021) and are often prevalent when employees work from home (Davis et al., 2020). Particularly when working from home while ill, our participants reported very specific behaviors to adjust their work to their health, i.e., working in bed or other unusual places to deal with the consequences of the illness. Therefore, even when adequate working conditions are available, virtual sickness presenteeism might be a self-endangering behavior in otherwise favorable working conditions. In addition, especially when virtual sickness presenteeism is undertaken in pursuit of flexibility, employees often use it to push to meet their work goals even if these goals are all but unreachable without the employees being in good health. The outcomes might be negative in terms of creating stress, reducing opportunities to rest adequately, and ultimately prolonging an illness (Dettmers et al., 2016). The notion that employees often opt for sickness presenteeism because they think they are sufficiently robust to deal with the consequences (Lohaus et al., 2020) might be stimulated by the opportunity to work from home.

However, such effects may also depend on the *nature of the health event*. More specifically, the symptoms of some health events that would have led to sickness absenteeism might be related only to issues associated with mobility or being in public but are otherwise unproblematic. In such situations, presenteeism can have positive consequences (Karanika-Murray and Biron, 2020). Therefore, choosing virtual sickness presenteeism might be especially advantageous as it can prevent work from piling. For other kinds of illness, virtual presenteeism might even be beneficial by distracting employees from their illness. Therefore, we propose:

Proposition 6: Virtual presenteeism impacts the future health of individuals, but whether this effect is positive or negative depends on the working condition of an individual, the level of adjustment, and the nature of the health event.

LIMITATIONS

Our study has some limitations that should be taken into account when interpreting the findings. First, our results should be considered in light of their origin in Germany. While there is evidence that the decision to choose sickness presenteeism is rooted in the individual, cross-cultural research on sickness presenteeism has revealed large differences in attendance behavior across countries (Ferreira et al., 2019; Reuter et al., 2019). However, aside from general cultural differences that might impact what is perceived as a legitimate reason for absence and presence and the differences in the rules and regulations on the national level, how countries dealt with COVID-19 differed (Hopman et al., 2020; Papageorgiou and Melo, 2020), especially in terms of voluntary and forced telecommuting and the shut-down of workplaces. These differences should be considered (Ruhle et al., 2020), but we are optimistic that our propositions will hold in other cultures. Second, we did not ask additional questions to clarify responses to our open-ended questions or discuss the results and their interpretation with the participants, which is a major strength of qualitative research (Saldaña, 2015). Despite this, it was a limitation rooted in our data-generation process. Therefore, results might be biased by the subjective interpretation of the two authors, although we described our procedures, used adequate measures of reliability when possible, and included various quotations to make our results as transparent as possible. Third, in the group of non-presenteeists, we were unable to separate between individuals that did not have any health events and those that did not choose presenteeism, which might have generated further interesting results. Finally, to avoid overburdening the participants, we asked presenteeists and non-presenteeists different questions. While this approach allowed us to create a broader database, as presenteeists were asked about their behavior and non-presenteeists were asked about a fictitious decision process, we could not compare the results between these two groups. Their answers were closely connected, but we cannot exclude the possibility that the decision processes differed between these two groups.

CONCLUSION

The main purpose of this qualitative study was to explore (virtual) sickness presenteeism in the context of the COVID-19 pandemic. We found evidence related to the decision process in choosing virtual sickness presenteeism during a global pandemic and explored the current perceptions of telecommuting and sickness presenteeism. The results of this study indicate that the COVID-19 pandemic and telecommuting have impacted the decision to show absence or presence. The study expands our understanding of virtual sickness presenteeism as a neglected issue in research on attendance behaviors in organizations. We derived propositions that future research could use in examining the consequences of the increase in telecommuting and other consequences of the COVID-19 pandemic. We showed that virtual sickness presenteeism is considered a viable alternative to on-site sickness presenteeism and suggest that future research may analyze the positive and negative consequences of virtual sickness presenteeism.

DATA AVAILABILITY STATEMENT

The datasets presented in this article are not readily available because the qualitative data includes identifying information that will not be shared with interested researchers. Requests to access the datasets should be directed to Sascha Alexander Ruhle, Sascha.Ruhle@hhu.de.

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

SR and RS contributed to the conception, design of the study, and analyzed the data. SR organized the database and performed the computation of the reliability. All authors contributed to the manuscript, its revision, and approved the submitted version.

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How Presenteeism Shaped Teacher Burnout in Cyberbullying Among Students During the COVID-19 Pandemic

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The pandemic caused by SARS-CoV2 has had an impact on the education sector, and its stakeholders, such as teachers who had to do remote work from their home, despite many constraints. These professionals tried to perform their teaching functions, despite having to deal with adverse situations, such as cyberbullying among their students, as well as their difficulties related to presenteeism and burnout. In this context, this study aimed to understand whether observing cyberbullying among students can be associated with teachers' productivity loss due to presenteeism and burnout. This study also proposed to examine the role of productivity loss due to presenteeism in the relationship between observing cyberbullying situations among students and teacher burnout. A random sample of 1,044 (*Mage* = 51.05, *SD* = 7.35; 76.6% female) middle school and high school teachers answered an inventory about their experience working at home during the COVID-19 pandemic, specifically with regards to cyberbullying incidents they observed among their students, their productivity loss due to presenteeism, and their burnout levels. Results from structural equation modeling revealed that observing students engaging in cyberbullying situations was positively associated with productivity loss due to presenteeism and teacher burnout. Also, teacher's productivity loss due to presenteeism mediated the relationship between observing cyberbullying incidents among their students and their burnout levels. Specifically, the effect of productivity loss due to presenteeism explained the effect of observing cyberbullying incidents on teachers' burnout levels. These results are innovative and shed light on the importance of teacher wellbeing at their job in the midst of a pandemic, namely, when they observe their students engaging in hostile situations, which may lead them to greater levels of burnout.

Keywords: presenteeism, cyberbullying, burnout, teacher bystanders, COVID-19 pandemic

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INTRODUCTION

The pandemic caused by SARS-CoV2 forced most sectors to go through a process of adaptation to emerging situations in a context that generated uncertainty (Flores et al., 2021). The emergency situation inevitably affected the education sector and those involved in the learning/teaching process (Joshi et al., 2020). Teachers performed their functions, despite the difficulties in

adapting to and managing the situation. This adaptation process unleashed a series of harmful psychosocial risks which may have impaired the physical and psychological wellbeing of teachers (Prado-Gascó et al., 2020). In the work context, these risks refer to social, organizational, and work management aspects that can cause physical and/or psychological harm to individuals, such as stress, burnout, or depression (European Center for Disease Prevention and Control, 2020), and have an impact on organizations and, consequently, on the economy (Bailey et al., 2015). A recent UNESCO report (Dorcet et al., 2020) has emphasized the need to address teachers' wellbeing and the disturbances which may affect their work and which have emerged during the pandemic, such as organizational commitment affecting burnout (Sokal et al., 2021) and positive attitudes toward change, perceptions of principal support, teaching efficacy, and attitudes toward technology negatively predicting burnout (Sokal et al., 2020). Accordingly, in the case of teachers, we propose that observing cyberbullying incidents among students can be considered a psychosocial risk that may be associated with these professionals' overall wellbeing, since it is a social aspect of their work context which teachers may have to manage.

Cyberbullying proliferated during the COVID-19 pandemic, leading to unhealthy behavior and carrying grave consequences for those involved (Barlett et al., 2021). Considering the challenges presented by the pandemic, we aim to understand whether experiencing cyberbullying as a bystander can be associated with teachers' productivity loss due to presenteeism and burnout. That is, whether observing these incidents could be related to how teachers may underperform during work due to physical or psychological complications and burnout. Presenteeism is a problem of workers not working at work due to illness, injury, or other condition (Koopman et al., 2002; Johns, 2010). Presenteeism may be impacted by fatigue, low supervisor support, the lack of performance recognition, and inappropriate administration efforts (Dudenhöffer et al., 2017), situations which emerged during the pandemic (Joshi et al., 2020). Even though they are at work, they may not be able to fully perform their duties and are more likely to make mistakes at work and reveal a loss of productivity. Lastly, productivity loss due to presenteeism has been known to be correlated with teachers' levels of burnout (Ferreira and Martinez, 2012). Thus, we intend to investigate the role of this variable in the relationship between observing cyberbullying among students and teachers' burnout. By reaching these objectives, this study provides a contribution to the field of presenteeism (Koopman et al., 2002) and to the Job Demands-Resources theory (Bakker and Demerouti, 2007), by introducing a variable from experimental social psychology, such as being a bystander of cyberbullying (Latané and Darley, 1970). In fact, an integrative approach of possible causes and consequences of presenteeism is crucial to understand it (Johns, 2010). Thus, we propose that being a bystander of cyberbullying may be a predecessor of presenteeism as a job demand, since job demands may elicit presenteeism (Miraglia and Johns, 2016), whereas burnout may be a consequent also due to do greater job demands within the context of confinements due to SARS-CoV2.

It is essential to investigate the psychosocial risks emerging for teachers in the context of distance learning forced by confinement because an effective prevention of these types of risks can promote wellbeing at work (Hammer et al., 2019) and increase productivity (Bakker and Wang, 2019). In emergency situations, such as confinements due to SARS-CoV2, there can be an increase in psychosocial risks, such as interpersonal conflicts between teachers, school, students, and even family members (Kubik et al., 2018). Accordingly, these conflicts have been associated with psychological health problems, such as depression, so it is imperative to understand whether, in the digital sphere, this type of phenomenon occurred in this situation. Since teachers during the confinement were at home working, we believe that these psychosocial risks became part of their job demands (Bakker and Demerouti, 2007), since they involve extra effort and skills to perform their job accordingly.

Teachers play a key role in solving peer aggression because they can witness the development of many interpersonal relationships among adolescents in the classroom (DeSmet et al., 2015) and even mobilize efforts to prevent this phenomenon (Eden et al., 2013). However, evidence has shown that in face-to-face settings, teachers tend to notice bullying situations more than cyberbullying, interpret the first more as an emergency, take responsibility for intervening, know the appropriate form of action, and provide assistance (Eldridge and Jenkins, 2020). From this evidence, teachers' capacity to affectively empathize with cyberbullying victims was positively associated with taking responsibility for intervening in cyberbullying situations. Thus, it is crucial to investigate the role of teachers as bystanders of aggression among peers, such as cyberbullying. Bystanders experience several cognitive and behavioral processes when facing critical situations, such as noticing something is wrong, interpreting the severity of the situation, assuming responsibility for intervening (or not), deciding on the appropriate form of assistance, and intervening (or not; Latané and Darley, 1970). In this study, we focus specifically on bystanders of cyberbullying due to the fact that it is often more difficult for teachers to identify this phenomenon (Eldridge and Jenkins, 2020), and also, because it has proliferated with the succession of lockdowns due to SARS-CoV2 (Barlett et al., 2021). Specifically, cyberbullying is the act of deliberately and repeatedly posting or sending harmful messages or engaging in other forms of social aggression among peers while using digital technologies with the aim of hurting someone (Belsey, 2005; Hinduja and Patching, 2009).

Some evidence has shown that female teachers tend to demonstrate greater concern about cyberbullying, have more information on the subject, and believe more in the school's commitment to deal with the problem than male teachers (DeSmet et al., 2015). Nonetheless and in general, teachers have reported that they lack training, skills, and confidence to deal with the problem (Li, 2009). In fact, we consider that this lack of training, perceived skills, and confidence to deal with cyberbullying situations falls within the lack of resources proposed by Bakker and Demerouti (2007; as conceptualized by the Job Demands-Resources theory), since these variables are important aspects that may impede teachers'

regular functioning at their job. According to the Job Demands-Resources theory, job demands (e.g., such as observing cyberbullying) may lead to less engagement and more burnout, whereas resources (e.g., training in how to deal with cyberbullying) can lead to less burnout and more engagement at work, which in turn, affect job performance (Bakker and Demerouti, 2007) and a decreased productivity loss due to presenteeism (Ferreira et al., 2019). The strain that is associated with excessive job demands and reduced work engagement may give rise to presenteeism, especially when there are little work resources (McGregor et al., 2016). Moreover, although adolescents may not consider teachers as part of the solution to preventing cyberbullying (Mishna et al., 2014), it appears that when they report incidents to their teachers, their perceptions of the school climate improve significantly (Veiga Simão et al., 2017).

Cyberbullying can have harmful consequences for the mental health of individuals, as it can negatively influence their relationships and social reputation, which, in turn, contributes to a decrease in their wellbeing (Anderson and Sturm, 2007). Accordingly, cyberbullying can also be considered a public health problem and should be the responsibility of public health systems and services. Research has indicated that victims of cyberbullying tend to be at greater risk of developing aggressive, depressive, and somatic symptoms (Gradinger et al., 2009). However, recent evidence has shown that cyberbullying bystanders can also reveal greater levels of depression, anxiety, and somatic symptoms and those who have not been exposed to the phenomenon (Doumas and Midgett, 2020). Although these studies have used samples with children and adolescents, some of the literature suggests that teachers themselves can also get involved in online aggression situations. Recent studies point to the cybervictimization of teachers by guardians (Küçüksüleymanoğlu, 2019) and even by students (Kyriacou and Zuin, 2015), despite the fact that the phenomenon of cyberbullying is characterized by being among peers. Male teachers have also shown greater involvement as cyberaggressors than female teachers (Tosun, 2016), although they do not report its occurrence on a large scale, as this type of behavior is not considered adjusted or accepted according to social norms. Following these results, other studies have highlighted the negative effects that cyberbullying can have on teachers at an emotional, physiological, and behavioral level (Kopecký and René, 2016). In line with the evidence presented on cyberbullying as a potential psychosocial risk and consequent job demand, as well as on the impact the phenomenon may have on children and adolescent bystanders and teachers, we question as:

Can observing cyberbullying among students be associated with teachers' productivity loss due to presenteeism and burnout?

Psychosocial risks have been associated with physical and mental health problems, such as lack of motivation and reduced effectiveness at work, which in the area of teaching can have an impact on the quality of teaching (Bergh et al., 2018). Psychosocial risks have been associated with physical and psychological health problems (Bergh et al., 2018), namely, work-related stress and a reduction in social interaction (Junne et al., 2018), burnout (Maslach et al., 2001), depression and anxiety, lack of concentration (Nielsen et al., 2020), and low job satisfaction (Guadix et al., 2015).

In this study, we focus on the specific context of cyberbullying, a psychosocial risk, and consequent job demand teachers may face when working with students online, as was the case with the lockdowns due to SARS-CoV2. Moreover, considering that previous studies have shown that psychological conditions, such as high levels of stress and lack of emotional fulfillment, can impact the existence of presenteeism (Boles et al., 2004; Pelletier et al., 2004), as is the case with cyberbullying situations, we proposed to consider teachers' productivity loss due to presenteeism.

Although there are several definitions of presenteeism in the literature (Johns, 2010), all recent perspectives agree that it essentially consists of being present at work, despite feeling unhealthy. Symptoms of presenteeism include various types of medical conditions, such as migraines and other types of episodic or chronic pain, allergies, asthma, dermatitis, anxiety, and depression (Koopman et al., 2002), or even other types of distracting events (Hummer et al., 2002). Presenteeism is often associated with significant losses in productivity, as it hinders the quality of professional life and increases the perception of ineffectiveness at work (Lofland et al., 2004). It appears in most professions but occupies a particularly high place among the education and health sectors (Aronsson et al., 2000; Ferreira and Martinez, 2012); therefore, we opted to examine this variable in our study.

Professions with relational contact with others also tend to increase levels of burnout, as is the case with teaching. In fact, there is scientific evidence indicating that teachers have more burnout than other professionals, such as mental health professionals, domestic, and personal care professionals (Shirom and Ezrachi, 2003). Burnout has been defined by some of the literature as a prolonged response to stressful, emotional, and interpersonal situations at work (Maslach et al., 2001), and thus, representing a lack of energy. It can include three distinct dimensions or phases (Maslach et al., 1986), namely (1) emotional exhaustion (2) professional effectiveness, and (3) depersonalization. Accordingly, emotional exhaustion can refer to a feeling of emotional and physical exhaustion. Teachers can feel exhausted due to work overload. Professional effectiveness can refer to feelings of (failure) and (lack of) competence. Depersonalization may be associated with the lack of personal responses and the absence of feelings toward others. On the other hand, burnout can be considered as the degree of physical and psychological fatigue and exhaustion that is perceived by the self as related to their work (Kristensen et al., 2005). Furthermore, it has also been described as emotional exhaustion, physical fatigue, and cognitive weariness (Melamed et al., 1992; Shirom and Melamed, 2006; Gerber et al., 2018).

High demands and lack of resources can lead to a series of negative consequences for workers (Karasek, 1979), namely, psychosomatic health problems and burnout. Previous studies have shown that primary school teachers tend to be less emotionally exhausted and depersonalized, and more professionally effective, than secondary school teachers and

that older teachers have higher levels of emotional exhaustion (Russell et al., 1987; Byrne, 1991). Since the sample we worked with in this study presented a mean age of over 50, we opted to focus specifically on the emotional exhaustion dimension of burnout, which is the central feature of the construct, as some of the literature indicates (Kristensen et al., 2005). Accordingly, these teachers' emotional exhaustion (23.6% of the variance explained) was significantly predicted by presenteeism variables (our mediating construct), unlike professional effectiveness, which was not, and cynicism which only explained 5.6% of the variance (Ferreira and Martinez, 2012). Therefore, from now on, we mention burnout as representative of teachers' emotional exhaustion, as described in previous studies (Kristensen et al., 2005).

Recent research has shown that 15% of educational professionals are at moderate risk of burnout and that the percentage of employees with burnout syndromes increased from 8 to 15% between 2008 and 2013 (Aumayr-Pintar et al., 2020). Due to the high prevalence of burnout in the education sector in recent years, namely, as a risk for teachers (Yerdelen et al., 2016), the study of burnout in the education sector becomes essential (Schonfeld et al., 2019), as it can have a negative impact on teaching (Travers, 2017) in terms of work motivation (McLean et al., 2019), depression (Martínez-Monteagudo et al., 2019), and interpersonal relationships with students (Travers, 2017).

According to previous studies, working while one is ill may lead to burnout (Demerouti et al., 2009) because the risk of underperforming when individuals feel sick at work (Wright and Cropanzano, 1998) may lead them to use performance protection strategies (Hockey, 1993), such as investing more, in order to work as well as healthy workers, as opposed to staying at home sick to minimize their resource losses (Bakker and Demerouti, 2007). Being sick at work may have psycho-physiological consequences (Kivimäki et al., 2005), whereas staying at home can aid physical and psychological recuperation and recovery, as well as wellbeing (Fritz and Sonnentag, 2005). Therefore, if workers do not take the time to regenerate their psycho-physiological state, but rather, go to work while they are sick, they may accumulate more exhaustion and feel burned out because they have used up their energy trying harder to compensate for their exhaustion (Demerouti et al., 2005) and to avoid the loss of resources (Bakker and Demerouti, 2007).

In times of the COVID-19 pandemic, we believe that the same process may have occurred with teachers during the lockdown while they worked at a distance witnessing disturbing events, such as cyberbullying. In other words, we believe that being a bystander of cyberbullying among their students may have led teachers to underperform as they felt unwell while working remotely from their homes, which in turn, may have directed them to use performance protection strategies to compensate for their exhaustion and therefore, leading them to burnout. Hence, we question as:

Can productivity loss due to presenteeism explain the relationship between observing cyberbullying among students and teachers' burnout?

MATERIALS AND METHODS

Design

This study presents a cross-sectional design, while exploring the relationship between an independent variable (teachers as bystanders of cyberbullying among students), a dependent variable (teacher burnout), and a mediator variable (teachers' productivity loss due to presenteeism).

Participants and Procedures

A total of 1,044 teachers working in Portugal participated in this study ($M_{age} = 51.05$; $SD = 7.35$), 76. 6% of whom were female. In terms of teachers' daily professional activity, 69.4% mentioned they worked more than 6 h a day, whereas 30.6% referred that they worked 6 or less hours per day. As for the grade-levels teachers taught, 54.4% taught 7th, 8th, and 9th grades (third cycle in Portugal), 52.4% taught 10th, 11th, and 12th grades (high school in Portugal), and 27.3% taught 5th and 6th grades (second cycle in Portugal). A total of 34.1% of these teachers had an overlap in the cycles they taught. Moreover, 10.4% had up to 10 years of teaching experience, 16.1% had between 11 and 20 years, 44.6% mentioned they had between 21 and 30 years, and 28.9% between 31 and 45 years. As for Internet use, 47.8% considered themselves to be very experienced, 45.6% said they were more or less experienced, and 6.6% had little to no experience.

This study was authorized by the ethics committee of the research team's institution. All participants voluntarily and anonymously responded to an online inventory individually in the second trimester of, 2020. We used self-report measures since they enabled us to gather information about the subjective experiences of teachers as bystanders of cyberbullying (Graham et al., 2003). The instrument was sent by email and a link for access. Our response rate was 100%, since all 1,044 teachers completed the instrument.

Instruments

Teachers as Bystanders of Cyberbullying

An adaptation (i.e., including translation and changes to items and/or instructions to fit the specific context of teachers' online teaching during the pandemic) of the questionnaire of the observer of the Cyberbullying Inventory (originally created and validated by Francisco et al., 2015) for University Students was used. Teachers were instructed to think about the months of distance learning due to confinement because of COVID-19 and to answer whether they had observed repeated behavior(s) among students with the intention of hurting someone through various platforms, such as the Zoom, Skype, Email, Chat, Messenger, Facebook, YouTube, Blogs, and WhatsApp. The Teachers as Bystanders of Cyberbullying Questionnaire (TBCQ) contains nine items ($\alpha = 0.82$) that ask participants to report how often they observed students engaging in cyberbullying situations (e.g., "I saw someone being threatened.") on a Likert-type scale from 1 (never) to 5 (several times a day). We performed CFA, which presented good values according to the literature (Hooper et al., 2008). Specifically, $\chi^2(25) = 171.74$, $p < 0.00$,

$\chi^2/df = 6.87$; CFI = 0.95; GFI = 0.96; IFI = 0.92; AIC = 211.74; RMSEA = 0.07, LO = 0.06, HI = 0.08; SRMR = 0.03.

Productivity Loss Due to Presenteeism

An adaptation (i.e., including translation and changes to items and/or instructions to fit the specific context of teachers' online teaching during the pandemic) of the Productivity Scale due to Presenteeism (originally created and validated by Koopman et al., 2002) was used. Teachers were requested to describe their experiences working as a teacher during confinement because of COVID-19. They were informed that "health problems" could be physical health or mental health, such as "back pain," "cardiovascular problems," "constipation," "stomach pain," "depression," or other similar conditions. Participants answered three items ($\alpha = 0.90$) of the Productivity Loss due to Presenteeism Scale (PLPS; e.g., "Health problems inhibited me from taking pleasure in work.") on a Likert-type scale from 0 (no, I never felt sick) to 5 (yes, more than 10 times). We performed CFA, which presented good values for this sample were good in accordance with the literature (Hooper et al., 2008). Specifically, $\chi^2(4) = 14.98$, $p < 0.00$, $\chi^2/df = 3.74$; CFI = 0.99; GFI = 0.99; IFI = 0.99; AIC = 48.98; RMSEA = 0.05, LO = 0.02, HI = 0.08; SRMR = 0.01.

Teacher Burnout

An adaptation (i.e., including translation and changes to items and/or instructions to fit the specific context of teachers' online teaching during the pandemic) of the Copenhagen Burnout Inventory questionnaire (originally created and validated by Kristensen et al., 2005) was used. Teachers were asked to take into account their current situation of distance learning due to mandatory confinement because of COVID-19. Then, they were instructed to answer all the questions presented considering the academic period in which they had to teach in this context. Participants responded to eight items ($\alpha = 0.91$) with the Teacher Burnout Questionnaire (TBQ; e.g., "I feel frustrated with my job.") on a Likert-type scale from 0 (never) to 4 (always). We performed CFA, which presented good values for this sample according to the literature (Hooper et al., 2008). Specifically, $\chi^2(12) = 34.21$, $p < 0.00$, $\chi^2/df = 2.85$; CFI = 0.99; GFI = 0.99; IFI = 0.99; AIC = 66.21; RMSEA = 0.04, LO = 0.02, HI = 0.05; SRMR = 0.01.

Common Method Variance

In addition, we computed the Harman's single-factor test to control the potential common method variance due to the self-reported nature of the instruments. Specifically, there is common method variance if a single-factor is extracted (Podsakoff et al., 2013). Therefore, to compute this test, the TBCQ, PLPS, and the TBQ were loaded into a confirmatory factor analysis. A three-factor model [$\chi^2(149) = 853$, $p < 0.00$, $\chi^2/df = 5.72$; CFI = 0.93; GFI = 0.93; IFI = 0.93; AIC = 935.57; RMSEA = 0.06, LO = 0.06, HI = 0.07; SRMR = 0.04] provided better fit indices than a single-factor model [$\chi^2(152) = 4467.47$, $p < 0.00$, $\chi^2/df = 29.39$; CFI = 0.55; GFI = 0.59; IFI = 0.55; AIC = 4543.47; RMSEA = 0.16, LO = 0.16, HI = 0.16; SRMR = 0.16], hence revealing no common method variance (see **Table 1** for factor score weights). This evidence corroborates the three distinct constructs that are being assessed. The composite reliability scores were equal to or higher than 0.80 (Hair et al., 2010) for each of the three dimensions (TBCQ = 0.83; PLPS = 0.89; and the TBQ = 0.91), whereas the Average Variance Extracted (AVE) was close or higher than 0.50 (PLPS = 0.74 and the TBQ = 0.59), and greater than the variance shared with the remaining constructs, hence supporting convergent validity for PLPS and TB (Henseler et al., 2009). The TBCQ revealed lower levels of AVE (0.36), as it is a very distinct theoretical construct from the other two dimensions. Lastly, our findings confirm the variables' discriminant validity (TBCQ = 0.02; PLPS = 0.18; and the TBQ = 0.18) with all of the Average Shared Variance (ASV) scores below the AVE value (Hair et al., 2010).

TABLE 1 | Factor score weights of the three distinct constructs analyzed in this study.

	Factor 1	Factor 2	Factor 3
Teachers as bystanders of cyberbullying			
1. I saw someone being threatened.	0.65		
2. I saw someone being harassed with sexual content.	0.38		
3. I saw rumors being spread about someone.	0.72		
4. I saw someone impersonating someone else.	0.51		
5. I saw someone being made fun of.	0.65		
6. I saw someone being insulted.	0.75		
7. I saw someone show that they had information about someone else's life that could affect their psychological wellbeing.	0.64		
8. I saw someone's private life data being released.	0.49		
9. I saw someone's image being used without permission.	0.52		
Productivity Loss due to Presenteeism			
1. Due to my health problems, the difficulties that are normally part of my job were more complicated to manage.		0.86	
2. Health problems inhibited me from taking pleasure in work.		0.88	
3. I felt desperate in carrying out certain work tasks due to my health problems.		0.85	
Teacher Burnout			
1. I feel exhausted at the end of the workday.			0.83
2. I feel exhausted in the morning thinking that I will have to work.			0.77
3. I feel tired with every hour I work.			0.80
4. I feel my job is more emotionally draining.			0.75
5. I feel frustrated with my work.			0.63
6. I feel exhausted from my work.			0.89
7. I have enough energy for my family and friends during my rest time.			0.69

Data Analysis Strategy

Before performing structural equation modeling, we computed Pearson correlations. We examined how the relationship being a bystander of cyberbullying and teacher burnout could be mediated by productivity loss due to presenteeism. We assessed

the significance of the regression coefficients with IBM AMOS 26 after estimating the parameters through Maximum Likelihood. We used Maximum Likelihood because not only did we work with a large sample size, which reduces any issues regarding multivariate non-normality (Hair et al., 2010), but also it is considered a robust estimator regarding both normally distributed data, as well as any violations of normality assumptions (Bollen, 1989; Diamantopoulos et al., 2000). In fact, Monte-Carlo experiments have provided evidence that no major differences in results from structural equation modeling analysis using the Maximum Likelihood estimator on studies with different sample sizes with different Kurtosis and Skewness levels (Reinartz et al., 2009). Moreover, Bootstrapping methods are increasingly used to resolve these issues (Preacher and Hayes, 2004), which is what we also present in our results section. Then, we assessed the possible significant effects of the control variables age and sex. We tested the significance of the total, direct, and indirect effects with χ^2 tests (Marôco, 2010). We considered effects $p < 0.05$ significant. Lastly, we computed the bootstrapping method (2000 samples, CI 90%) to test for mediation effects (Preacher and Hayes, 2008).

RESULTS

In this section, we present a descriptive analysis and the Pearson correlations between the variables (see **Table 2**). Results for the general sample revealed a positive significant correlation between all of the variables, therefore, being a bystander of cyberbullying among students is significantly correlated with teachers' burnout and their productivity loss due to presenteeism, and teachers' burnout is also positively associated with their productivity loss due to presenteeism.

We questioned whether observing cyberbullying among students could be associated with teachers' productivity loss due to presenteeism and burnout. The correlations presented indicate that in fact, these variables are associated. Moreover, from the analyses done with structural equation modeling, we tested and verified that the predictor variables were positively associated with the dependent variable. Our adjusted structural equation model [$\chi^2(166) = 879.58$, $p < 0.05$, $\chi^2/df = 5.29$, CFI = 0.93, GFI = 0.92, IFI = 0.93, RMSEA = 0.06, LO = 0.06, HI = 0.07, AIC = 967.58] presented 35% of the variance relating to teachers' burnout. The standardized total effect of observing cyberbullying behavior among students on teachers' burnout was 0.16 [CI90, LO = 0.09 HI = 0.22] and 0.15 [CI90, LO = 0.09 HI = 0.20] on productivity loss due to presenteeism. Also, the standardized total effect of productivity loss due to presenteeism on teachers' burnout was 0.57 [CI90, LO = 0.53 HI = 0.62]. All of these paths were statistically significant according to the Bootstrap sampling method ($p < 0.01$).

We also questioned whether productivity loss due to presenteeism could explain the relationship between observing cyberbullying among students and teachers' burnout. **Figure 1** shows the conceptual model proposed in this study.

The standardized direct effect of observing cyberbullying behavior among students on teachers' burnout was 0.07 [CI90, LO = 0.01 HI = 0.13] and 0.15 [CI90, LO = 0.09 HI = 0.20] on productivity loss due to presenteeism. Also, the standardized direct effect of productivity loss due to presenteeism on teachers' burnout was 0.57 [CI90, LO = 0.53 HI = 0.62]. These trajectories were statistically significant, with the exception of the direct effect of observing cyberbullying incidents on teachers' burnout according to the Bootstrap sampling method ($p < 0.01$). Moreover, the standardized indirect effect of observing cyberbullying behavior among students on teachers' burnout was 0.08 [CI90, LO = 0.06 HI = 0.13] and statistically significant according to the Bootstrap sampling method ($p < 0.01$). These results reveal how the relationship between observing cyberbullying incidents among students on teachers' burnout ceases to exist when it is mediated through productivity loss due to presenteeism. Therefore, the mediator variable can explain the relationship between independent and the dependent variable.

We also tested for possible effects of age and sex by controlling these variables because as mentioned in the literature (García-Arroyo et al., 2019), they may affect burnout. Age revealed no significant effect on the dependent or mediator variable. Sex had a significant positive standardized total effect of 0.07 [CI90, LO = 0.03 HI = 0.12] on burnout only, revealing that female teachers reported more burnout than male teachers, which is consistent with the literature.

TABLE 2 | Descriptive statistics and correlations between the variables of this study.

Variables	*M*	*SD*	Correlations	
			1	2
1. Teachers as bystanders of cyberbullying	1.12	(0.28)		
2. Productivity loss due to presenteeism	2.26	(0.54)	0.09**	
3. Teacher Burnout	3.08	(0.80)	0.15**	0.44**

**$p < 0.01$.

DISCUSSION

During the pandemic caused by SARS-CoV2 teachers performed their work tasks while being exposed to a series of harmful psychosocial risks which may have impaired their physical and psychological wellbeing (Prado-Gascó et al., 2020), such as cyberbullying among their students. This study answered a call by a UNESCO report (Dorcet et al., 2020) for research to focus on the need to address teachers' wellbeing and the disturbances which may affect their work and which have emerged during the pandemic (Joshi et al., 2020). Hence, we aimed to understand whether observing cyberbullying among students could be associated with teachers' productivity loss due to presenteeism and burnout. We also aimed to understand whether productivity loss due to presenteeism could explain the relationship between observing cyberbullying among students and teachers' burnout. We specifically highlighted teachers'

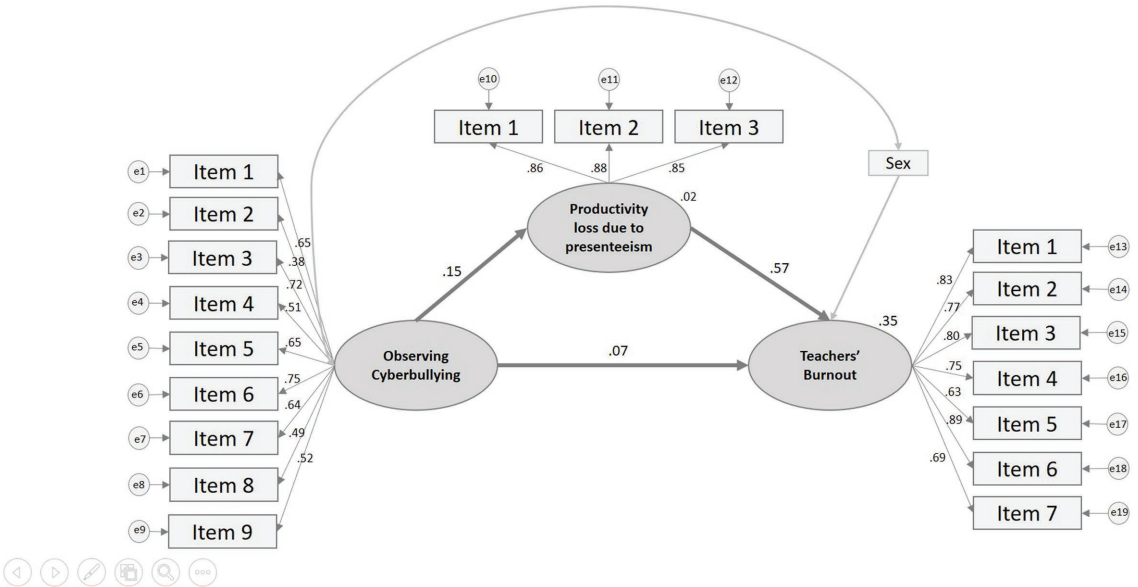

FIGURE 1 | Productivity loss due to presenteeism explaining the relationship between observing cyberbullying incidents and teachers' burnout. Items for Teachers as bystanders of cyberbullying: 1. I saw someone being threatened; 2. I saw someone being harassed with sexual content; 3. I saw rumors being spread about someone; 4. I saw someone impersonating someone else; 5. I saw someone being made fun of; 6. I saw someone being insulted; 7. I saw someone show that they had information about someone else's life that could affect their psychological wellbeing; 8. I saw someone's private life data being released; and 9. I saw someone's image being used without permission. Items for Productivity Loss due to Presenteeism: 1. Due to my health problems, the difficulties that are normally part of my job were more complicated to manage; 2. Health problems inhibited me from taking pleasure in work; and 3. I felt desperate in carrying out certain work tasks due to my health problems. Items for Teacher Burnout: 1. I feel exhausted at the end of the workday; 2. I feel exhausted in the morning thinking that I will have to work; 3. I feel tired with every hour I work; 4. I feel my job is more emotionally draining; 5. I feel frustrated with my work; 6. I feel exhausted from my work; and 7. I have enough energy for my family and friends during my rest time.

experiences with observed cyberbullying incidents because this phenomenon increased during the COVID-19 pandemic and led to unhealthy behavior and severe consequences for those involved (Barlett et al., 2021).

Our results demonstrated that observing cyberbullying incidents among students was positively related to teachers' productivity loss due to presenteeism and burnout, which is in line with and adds to previous literature that has provided evidence that cyberbullying can have an impact on teachers at an emotional, physiological, and behavioral level (Kopecký and René, 2016). As bystanders of cyberbullying, teachers may have potentially experienced depression, anxiety, or somatic symptoms and those who have not been exposed to the phenomenon, which corroborates previous studies examining different samples with diverse characteristics (Doumas and Midgett, 2020). Moreover, the positive and significant relationship between observing cyberbullying incidents among students was positively related to teachers' productivity loss due to presenteeism and burnout may also be interpreted as a function of these professionals' beliefs that they lack training, skills, and confidence to deal with the phenomenon and those involved (Li, 2009). This lack of training, perceived skills, and confidence to deal with cyberbullying may constitute an important lack of resources (Bakker and Demerouti, 2007), since they may hinder teachers' regular functioning at their job.

The findings reported in this study also revealed that productivity loss due to presenteeism explained the relationship between observing cyberbullying among students and teachers' burnout. Specifically, results showed that observing cyberbullying among students could be positively associated with higher levels of teachers' burnout, but being at work while not feeling well (i.e., physically or psychologically), fully mediated that association, thus reducing the relationship between the independent and dependent variables. This could suggest that how cyberbullying among students is interpreted to the point that it creates burnout in teachers may be dependent on teachers' perceived inefficiency at work due to their physical and psychological state. Since presenteeism has been known to affect professionals from the education sector severely (Ferreira and Martinez, 2012), it would be no surprise that it could determine the relationship between observing continuous online harassment among their students (i.e., cyberbullying), which could constitute a high job demand with little intervention resources for teachers (Karasek, 1979) and their burnout levels. Moreover, in the particular context of the lockdown due to the COVID-19 pandemic and the student difficulties that may have arisen, teachers worked from home; therefore, the line between what separates absenteeism (i.e., staying home while one is sick) from presenteeism could have been tougher to draw and hence, these professionals may have felt compelled to use performance protection strategies (Hockey, 1993), such as investing more,

and meet extraordinary needs which could have triggered a loss of resource (Bakker and Demerouti, 2007). This conjecture may have hindered teachers from physical and psychological recuperation and recovery (Fritz and Sonnentag, 2005). Therefore, being a bystander of cyberbullying among students may have led teachers to underperform as they felt unwell while working remotely from their homes, which in turn, may have directed them to use performance protection strategies to compensate for their exhaustion and thus, lead them to burnout. Ultimately, if teachers observed cyberbullying, then, they were likely to report more burnout. This relationship could be explained by detailing the involvement of productivity loss due to presenteeism. Thus, teachers who reported that they observed cyberbullying, reported feeling burnout, and in turn, those with productivity loss due to presenteeism reported higher levels of burnout.

Theoretical Contribution

This study provides a theoretical contribution to the literature on productivity loss due to presenteeism (Koopman et al., 2002) and to the Job Demands-Resources theory (Bakker and Demerouti, 2007), by introducing a variable from experimental social psychology, such as being a bystander of cyberbullying (Latané and Darley, 1970). Being a bystander of a harmful phenomenon, such as cyberbullying (Belsey, 2005; Hinduja and Patching, 2009), implies noticing there is an emergency, interpreting the event as such, taking responsibility for intervening (Latané and Darley, 1970), understanding one's own emotional reactions (Eldridge and Jenkins, 2020), self-efficacy beliefs (Ferreira et al., 2020), and considering the rewards and cost consequences of intervening in specific contexts with others observing (Batson, 1994). Thus, the role of the bystander of cyberbullying carries a heavy load which could add to teachers' already overloaded job demands (Bakker and Demerouti, 2007), culminating in a psychosocial risk of interpersonal conflict during confinement due to SARS-CoV2 for these professionals (Kubik et al., 2018), even though they are key elements in resolving peer aggression situations (DeSmet et al., 2015; Veiga Simão et al., 2017). Moreover, considering an integrative approach of possible causes and consequences of presenteeism (Johns, 1,010), we found that being a bystander of cyberbullying may be a predecessor of presenteeism as a job demand, because job demands may elicit presenteeism (Miraglia and Johns, 2016), whereas burnout may be a consequent within the context of confinements due to SARS-CoV2.

Moreover, teachers' lack training, skills, and confidence to deal with cyberbullying (Li, 2009) can be translated as a lack of resources (Bakker and Demerouti, 2007), since these resources are essential to aid teachers' regular functioning at their job and impede any possible disengagement from it (Demerouti et al., 2001). In fact, as teachers gain awareness of this lack of resources to deal with cyberbullying, and as they may also be impacted negatively by the phenomenon (Doumas and Midgett, 2020), they could be at risk of underperforming (Wright and Cropanzano, 1998), leading them to invest in protection strategies (Hockey, 1993), to minimize their resource losses (Bakker and Demerouti, 2007). Having to work at home due to the pandemic could have hindered teachers from recuperation, recovery, and wellbeing (Fritz and Sonnentag, 2005), and hence, they may have experienced productivity loss due to presenteeism, which led them to more burnout as they tried to compensate for their exhaustion (Demerouti et al., 2005) and avoid the loss of more resources (Bakker and Demerouti, 2007). This conjecture also provides an important contribution for the cyberbullying literature and the role of teachers as bystanders of their students' cyberbullying behavior, because it may lead to new clues as to why these professionals may morally disengage from these incidents, as opposed to intervene pro-socially.

Practical Implications

The present study demonstrated the positive association of a psychosocial risk, and consequent job demand for teachers, which is observing harmful events among students (as is cyberbullying), with their productivity loss due to presenteeism and burnout levels. Accordingly, presenteeism seems to constitute an increasing health and productivity risk (Demerouti et al., 2009). Thus, it is important to manage the possible impact of observing cyberbullying among students and presenteeism with both prevention and mitigation strategies within a systemic approach. Educational systems could invest in identifying the key risk factors for teachers as bystanders of violence among their students, and as agents performing work tasks under potential psychological and physical health strain, which could potentially lead them to burnout. In turn, policy makers could emphasize laws which could reduce these risk factors, whereas parents' associations could be sensitive to the issues surrounding teachers' role in managing cyberbullying situations and how these could impact their wellbeing and, consequently, their performance in class. Lower quality in teaching could inevitably impact learning.

It would also be important to develop strategic training programs backed by governmental institutions and parents' associations based on social and emotional learning strategies (Oliveira et al., 2021a) to minimize the potential impact of observing cyberbullying on teachers' productivity loss due to presenteeism and burnout. These programs could take on a whole-institution systemic approach and could include specific and tailored strategies involving social and emotional learning core areas, such as self-awareness, self-management, social awareness, relationship skills, and responsible decision making (Durlak et al., 2015; Oliveira et al., 2021b).

Initial and in-service teacher training could consider new job demands, such as knowing how to deal with phenomena, such as cyberbullying, which have an impact on the regular functioning of students (Ferreira et al., 2020), and as this study revealed, are also positively associated with teacher productivity loss due to presenteeism and burnout. It is a risk in itself for institutions to consider that teachers have all the necessary resources to deal with such phenomena, because these events may have high health and productivity costs. It would be important to provide training opportunities for teachers to become more aware of themselves as professionals

and the new possible job demands that may constitute a psychosocial risk for them and their students. Another important aspect could be the shared regulation of new job demands through collaboration with other professionals, such as the schools' counselors/psychologists, other teachers, school assistants, and the board of directors. It is crucial to build a positive institutional climate with a support network to collaborate with ill teachers so that they may manage work issues (Dudenhöffer et al., 2017).

Furthermore, developing a culture of awareness within institutions, where professionals who may be struggling with such job demands, are identified, supported, and encouraged to take some time to recover physically and psychologically (Fritz and Sonnentag, 2005). During this time, a systemic support system could be implemented where colleagues could be compensated to temporarily cover for the teacher during his/her time of recovery. By doing so, long-term negative effects of productivity loss due to presenteeism could be avoided (Demerouti et al., 2009). Accordingly, if this is implemented on a systemic level, then, school principals could lead by example and other colleagues could be role models and develop a belief system where taking time to recover is not seen as a taboo. By implementing such practices, educational systems could avoid scenarios with more burned out teachers and even contribute to the wellbeing of school communities by providing an adaptive resolution for violent phenomena among students, such as cyberbullying. Lastly, students could also benefit from understanding how observing incidents of cyberbullying could impact their own presenteeism when in class and their levels of burnout as well. Therefore, measures to assess these variables would also be a step forward to implement wellbeing among school communities.

Limitations and Future Directions

This study is not without limitations. It is cross-sectional in nature and therefore, it was not used to assess behavior over time and determine cause and effect among variables. Therefore, future studies could investigate the examined variables with tools that would enable them to capture objective data concerning teachers' reactions to cyberbullying events and later performance indicators, such as serious games (Ferreira et al., 2021). Accordingly, it would also be interesting to invest in a longitudinal analysis of the interaction between the examined variables (Ruhle et al., 2020), similarly to what previous research has done with presenteeism, burnout, and other variables (Demerouti et al., 2009). This would enable future research to investigate specifically how observing cyberbullying among students could lead to productivity loss due to presenteeism but mediated by burnout – a relationship which seems to be reciprocal in specific contexts (Demerouti et al., 2009). Although the response rate in our study was 100%, because all of the teachers answered the entire protocol due to forcing response options in the online format, no researcher was present while participants were answering. Future research could provide an online survey, but within a school context with a researcher present to monitor participants and help with any technical issues. Moreover, despite our large sample, since we worked with data pertaining to cyberbullying, which may include data that deviates from normality, as it is criminal behavior, we used bootstrapping, a nonparametric resampling procedure, to account for any violations of normality assumptions. In fact, bootstrapping tests mediation without imposing the assumption of normally distributed data (Preacher and Hayes, 2008) and shows greater power while controlling the Type I error rate, which is an advantage (Preacher and Hayes, 2004). Also, although we considered productivity loss due to presenteeism, future research could also consider examining a process approach of presenteeism (Ruhle et al., 2020), focusing on individuals' experience during the pandemic with qualitative measures. Furthermore, it would also be interesting for future research to consider other variables that teachers could potentially use and self-protection strategies to deal with observing cyberbullying and not be affected by it, such as moral disengagement mechanisms (Bandura, 2002). This study only considered a perspective on burnout as majorly emotional exhaustion (Kristensen et al., 2005); therefore, future research could consider other perspectives of the construct. Even though we provided information regarding occupational/sectoral area and broader context of a confined working environment due to the COVID19 pandemic (Ruhle et al., 2020), future research could also focus on investigating the relationship between the examined variables would also be interesting in a post-pandemic context to understand whether the relationships would still hold or be different. Other variables could be considered as important to the relationships we proposed in this study, such as teachers' self-efficacy at work regarding task management and using problem-solving strategies in cyberbullying situations. Lastly, the fact that teachers had to adapt to a new model of teaching in a short period of time, and during a pandemic, may have also contributed to presenteeism and burnout among these professionals.

Conclusion

During the pandemic caused by SARS-CoV2, teachers performed their tasks, despite the difficulties they faced. Addressing teachers' wellbeing and the disturbances which may have affected their work and which emerged during the pandemic is of vital importance for a universal understanding of how educational systems dealt with the adversities (Dorcet et al., 2020). This study responded to this call and found that observing cyberbullying incidents among students can be considered a psychosocial risk and consequent job demand which was positively associated to productivity loss due to presenteeism and burnout. As cyberbullying proliferated during the COVID-19 pandemic with devastating consequences for those involved (Barlett et al., 2021), we suggest that future avenues of research and opportunities for professional training may consider the results presented here to meet further challenges that may arise at a global scale and impact worldwide educational institutions and its collaborators.

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 Ética de Deontologia da Faculdade de Psicologia da Universidade de Lisboa. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

PF has first authorship. AB, NP, AP, and AS have contributed equally to this work and share second authorship. PF designed and executed the study, analyzed the data, and wrote, edited, and revised the manuscript. AB assisted with the design, data gathering, and the editing of the final manuscript. NP collaborated with data gathering, the editing, and formatting of the manuscript. AP assisted with data gathering, theoretical section, and the editing of the manuscript. AS assisted with the design of the study, data gathering, and editing of the final manuscript. All authors approved the final version of the manuscript for submission.

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Teleworking While Sick: A Three-Wave Study of Psychosocial Safety Climate, Psychological Demands, and Presenteeism

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Introduction: The COVID-19 pandemic has led to a significant increase in the proportion of employees for whom teleworking became mandatory. Presenteeism, or the behavior of working while ill, has hardly been studied in the context of telework. The pandemic forced millions of workers to abruptly transition to working from home for a prolonged period of time, leaving employers often unaware of their health status or work capacity of the workers. This change also eroded the work experience itself, the workplace, and their protective impact on both individual health and work outcomes. This study focused on the longitudinal relationships among psychosocial safety climate (PSC), a lead indicator of workplace conditions, psychological demands, an indicator of quality of work, and presenteeism among a representative sample of teleworkers. PSC was expected to have an indirect impact on presenteeism with psychological demands as a mediator of this impact.

Method: We collected the data from a representative sample of teleworkers in the first months (T1: April, T2: June, and T3: December 2020) of the pandemic using a three-wave online survey ($n = 275$). We tested a model of PSC as a determinant of presenteeism in teleworkers with psychological demands as a mediator. A cross-lagged panel model was estimated to test cross-sectional and longitudinal relationships.

Findings: As expected, psychological demands increased over time. Contrary to expectations, the prevalence of presenteeism remained unchanged while PSC increased over time. The data fully supported the mediating effect of psychological demands such that a higher evaluation of PSC at T1 led to lower psychological demands at T2, which led to reduced presenteeism at T3. We also found a reciprocal relationship, with higher psychological demands at T2 leading to decreased evaluation of PSC at T3. These results show that the perception of teleworkers on their organization as giving a high priority to their psychological health is an important determinant of their work experience, ultimately

influencing their decision to work while ill. The context of the pandemic has highlighted the importance of a positive workplace climate and working conditions for reducing the behaviors that can be harmful to health and productivity. Implications for theory and practice, beyond the pandemic, are discussed.

Keywords: COVID-19, pandemic, telework, psychosocial safety climate (PSC), psychological demands, presenteeism

INTRODUCTION

The possibility to work from home used to be considered as a privilege only available to a few, but the COVID-19 pandemic has created a shift in this work arrangement and forced workers and employees (hereafter both referred to under the umbrella term "workers") from a wide range of occupations and employment sector to work primarily or fully from home (Kramer and Kramer, 2020). The proportion of workers who predominantly work from home varies depending on the context and nature of work, but it increased dramatically in several countries during the pandemic. For example, in Canada, by early 2021, 32% of Canadian employees aged 15–69 were working most of their hours from home, compared to only 4% in 2016 (Mehdi and Morissette, 2021). In a sample of managerial and professional workers across 29 European countries, Ipsen et al. (2021) found that 84.1% worked exclusively from home during the pandemic. The proportion of EU-27 employees who usually worked from home hardly increased between 2006 (4.6%) and 2019 (5.4%) (Samek Lodovici, 2021). In contrast, during the pandemic, 34% of the workforce worked from home full-time across all sectors and occupations (Eurofound, 2020).

In the Canadian province of Québec, the government imposed general lockdown in March 2020, by closing all but essential shops such as groceries and pharmacies to reduce the transmission of the virus. In June 2020, telework was favored and recommended by the government, but in December 2020 it became compulsory for all employees of all sectors who carry out administrative or office work, except for workers whose physical presence is essential for the continuation of the business. National data from Statistics Canada show that 37% of the companies in Québec reported that teleworking was possible for all employees. In August 2020, 27% of these companies reported that all their employees were teleworking while 14% expected their entire workforce would continue to primarily telework after the pandemic (Institut de la statistique du Québec, 2021). This contrasts sharply with the data from 2006 showing that only 5% of Quebec employees actually worked primarily from home (Gagnon, 2009).

A change of this magnitude raises several important questions. One concern relates to the psychological demands perceived or experiences by teleworkers. Unhealthy levels of screen time, more time spent at online meetings, work during evenings and weekends, higher pressure to produce, and no respect for time and boundaries are just a few examples of the impacts of the pandemic on teleworkers highlighted by Moss (2021). In a survey of over 1,500 employees in several employment sectors in 45 countries in the autumn of 2020, Moss (2021) found that 89% of the workers reported a decrease in their work-related well-being, with an increase in workload being the strongest explanatory factor for this trend. The survey of Statistics Canada of the active population revealed that 35% of all "new teleworkers" (those who began working primarily from home due to the pandemic) reported working more hours per day than previously, whereas only 3% reported fewer working hours (Mehdi and Morissette, 2021). Nearly half (48%) of the teleworkers indicated that they worked for longer hours (Mehdi and Morissette, 2021). Teleworkers tend to work more hours and more intensively than employees working onsite (Messenger et al., 2017; Tavares, 2017). Drawing on this research, in this study, we focus on psychological demands, which refer to the amount of work, mental demands, and time constraints experienced by workers (Karasek et al., 1998). The question arises whether this increase in psychological demands can be prevented in a context where the management of an organization show that they value the psychological health and well-being of workers—in other words, in the context of a high psychosocial safety climate (PSC; Dollard and Bakker, 2010). In a high PSC context where the psychological health of workers is a priority, managers are aware of the negative effects of high job demands, and ensure that there are policies, practices, and procedures to protect employees from harmful work conditions (Idris et al., 2011).

A second question raised by this sudden and dramatic increase in the number of teleworkers relates to their experiences of PSC in their organizations, especially due to the physical and often social isolation from their workplace, colleagues (Tavares, 2017), and line managers (Contreras et al., 2020). In an economic context characterized by strong pressures on organizations, do the economic imperatives take precedence over the concern and priority given to the psychological health of workers (Dollard et al., 2019)? Can a concern for work-related well-being be communicated well enough considering the remote nature of the work and ensuring that teleworkers feel safe to express any difficulties to their colleagues and line managers? While mental health has broadly deteriorated in the general population due to the COVID-19 crisis (Salari et al., 2020), the mental health of those who are primarily teleworking remains relatively unexplored. An international study by Ipsen et al. (2021) conducted during the early stages of lockdown concluded that, although individuals experienced teleworking more positively than negatively, nearly half also experienced deteriorating mental health. This raises questions about the ability of employers to prioritize the well-being of teleworkers and to remain accessible to those in difficulty and the strategies

that can enable those workers to share and resolve issues and access appropriate support.

A third question raised by this change in the proportion of teleworkers and the resulting increase in psychological demands and in mental health problems is presenteeism. Presenteeism has been defined as being physically present at work despite illness (see Karanika-Murray and Cooper, 2018; Ruhle et al., 2019 for an overview). In the context of telework, we adopt the definition of presenteeism as the state of attending work when one is unwell (Karanika-Murray and Cooper, 2018) or the act of working in a state of ill-health (Ruhle et al., 2019). Presenteeism has been linked to negative health conditions, be it physical or psychological (Johns, 2010; Gosselin and Lauzier, 2011), with the latter being the most prevalent (Klachefsky, 2013). Presenteeism is highly prevalent across all occupations and sectors (Karanika-Murray and Cooper, 2018). However, a very few studies have investigated presenteeism in teleworkers. One rare study showed that teleworking is linked to increased presenteeism through lifting any barriers to overworking (Steidelmüller et al., 2020). Indeed, data from the sixth wave of the European Working Conditions Survey 2015 indicated a strong positive association between teleworking and presenteeism, especially for those who work from home several times a week or daily (Steidelmüller et al., 2020).

Providing answers to these questions is essential for informing discussions about the viability of telework following the COVID-19 pandemic. Among the many emerging changes in working practices brought about by the pandemic (Kniffin et al., 2021), telework is becoming a more and more widespread practice that needs to be better understood in terms of its impact on health issues. Considering that telework is likely to become a permanent solution for many organizations in the future, there is a need to better understand how it can become a healthy and productive arrangement for both employers and workers. Thus, the main thrust of this paper is to investigate the reality of teleworkers who primarily worked from home throughout the pandemic. The findings will help to understand how contextual factors (PSC) and proximal job factors (psychological demands) together shape the presenteeism behavior, with potential implications for sustainable organizational interventions that can be developed to improve the health and well-being of teleworkers.

Teleworking During the Pandemic

Research within the current field of teleworking is limited in two ways. A first and methodological limitation is that most studies investigating teleworkers have been conducted with homogeneous groups such as the self-employed, knowledge workers, or high-skilled workers (such as professionals and managers). A very few studies have investigated this heterogeneous group of workers who are teleworking most of the time and without a choice in the matter. A second limitation concerns the theoretical implications of PSC for presenteeism in the context of telework. PSC highlights the importance of protecting employees from poor quality of work by providing sufficient and adequate resources, such as autonomy, supervisor support, and healthy relationships, which can mitigate the negative effects of high job demands (Law et al., 2011). However, PSC has hardly been investigated in teleworkers and is therefore unknown if it can protect this group from otherwise poor working conditions.

Before proceeding, it is important to define teleworking. A few studies vary in terms of the definition and measurement of teleworking as there are several nuances in the terms that are used to characterize those who work away from their workplaces (e.g., virtual teams, remote work, telecommuting, and teleworking) (Allen et al., 2015). We define home-based telework, hereafter referred to as telework, as: "work performed by those whose remote work is from the home" (Allen et al., 2015, p. 43; also following Steidelmüller et al., 2020).

It is also important to distinguish between the flexibility available to employees to work from home, on one hand, from the type of mandatory or forced telework that was provoked by the pandemic, on the other hand. The former was a trend strongly on the rise before the pandemic with, for example, 20% of the US employers offering this option in 1996, compared to 60% in 2016 (Society of Human Resource Management., 2016). Working from home as a flexible working arrangement is very different as an experience form being "forced" into it, often without the appropriate tools, support, or management systems to accommodate large groups of workers away from the organizational premises or often without clear guidelines or performance expectations. Ipsen et al. (2021) found that, despite some positive aspects, 45% workers experienced teleworking as a mostly negative experience, citing as main disadvantages missing their colleagues, poor physical work conditions in the home office, and feeling isolated at home.

Among the work issues and outcomes most frequently identified with telework are disruption of work-life boundaries, overwork, presenteeism, social isolation, barriers to career progression or promotion, and the lack of support (Montreuil and Lippel, 2003; Tavares, 2017; Ipsen et al., 2021). Teleworking can also have negative impacts on well-being due to potential overcommitment, overwork, and the lack of time to recuperate when boundaries between work and personal life are unclear (Grant et al., 2013). For presentees, teleworking is an ally as it allows them to more easily adjust their work pace according to their health status, take breaks, and do fewer or less demanding tasks, potentially though masking the seriousness of a health condition. However, such adjustment latitude is less likely when job demands are high (Johansson et al., 2015), which makes presenteeism more likely under high demands. Despite hopes that telework would lighten work schedules because of the time saved in travel, recent data suggest that the time spent working has increased among teleworkers (Lundberg and Lindfors, 2002; Peters et al., 2008; Tavares, 2017).

By allowing for more work scheduling flexibility, telework has enabled workers to connect remotely, even when they are feeling less well, and even take time off due to their health conditions and without mentioning it to their line managers. The extent of presenteeism in the context of telework may thus be underestimated. Steidelmüller et al. (2020) highlight the three main reasons for an increased risk of presenteeism among teleworkers: because they do not have to travel to work and are in a more convenient work environment, they do not risk

contaminating their colleagues in case of a contagious disease, and finally, they are not under the supervision of their managers nor are they visible to colleagues and do not have to justify working when they should not. Thus, they have fewer barriers to work even when they are unwell: "In the worst case of sickness I said: Okay, I do not come to the office, I'll stay at home. Then, I just worked out of the bed" (Ruhle and Süß, 2020, p. 248). This quote illustrates the issues surrounding presenteeism in the telework context. Given the lack of clear boundaries between home and work and the difficulty for teleworkers to efficiently manage these boundaries (Ashforth et al., 2000; Kniffin et al., 2021), we expect that psychological demands will increase over time. When teleworking is mandatory, employees may also experience difficulties in being efficient at work due to the normative demands that stem from personal life and occur during work time (e.g., family responsibilities and emergencies such as homeschooling during lockdown).

Based on these challenges experienced by teleworkers and in line with the lack of recovery spiral (Hobfoll, 2002), we expect that presenteeism will increase over time. Whereas teleworkers devote considerable energy to meet work requirements, the resources available to sustain such an effort over time are limited (Hobfoll, 2002) and may result in loss of psychological resources and in other negative outcomes including presenteeism. Therefore, we can expect that, over time, psychological demands and presenteeism of teleworkers will both increase.

H1: Perception of psychological demands among teleworkers will increase over time.

H2: Presenteeism prevalence among teleworkers will increase over time.

Psychosocial Safety Climate

Excessive psychological demands can influence the decision of an employee to work despite illness (Miraglia and Johns, 2016) and therefore it is important to examine the factors that can protect presentees. PSC has been shown to influence working conditions, including both job demands and job resources (Hall et al., 2010; Idris and Dollard, 2011; Idris et al., 2011; Law et al., 2011; Dollard et al., 2012). As such, PSC is a leading indicator of work quality.

Considered to be a precursor of unsafe work conditions and psychosocial risk factors, PSC refers to the perceptions of employees regarding the policies, practices, and procedures for the protection of worker psychological health and safety (Dollard and Bakker, 2010). PSC emphasizes the important influence of organizational climate on job design and psychological health (Dollard et al., 2012). Four organizational domains define PSC: senior management commitment to stress prevention, senior management priority for psychological health vs. productivity imperatives, organizational participation and involvement in managing psychological health risks, and organizational communication about psychological health issues (Dollard et al., 2019).

Psychosocial safety climate has been shown to be an important organizational resource (Garrick et al., 2014) that influences the work experience of one, including their job demands and job resources (Dollard and Bakker, 2010). High levels of PSC have been linked to the decreases in experienced job demands and load, in both cross-sectional (Dollard and Bakker, 2010) and longitudinal research (Idris et al., 2014). In a study by Idris et al. (2014), it has been suggested that the period required for macro-level contextual variables to influence work design and organization is rather short, 3 months in their study. Although PSC has not been explored in the context of telework, it is expected that PSC will be an important resource for teleworkers, especially because of the remote nature of work and distance from managerial and collegial support during the pandemic, where important immediate resources are not available or their availability decreases over time. Therefore, we can expect that over time, in the context of the pandemic, the perceived PSC of teleworkers would decrease because of the loss of social and otherwise contact with work, and that higher perceived PSC would also support reduced experience of psychological demands.

H3: PSC perceptions among teleworkers will decrease over time.

H4: PSC will have a negative effect on teleworkers' psychological demands over time.

Indeed, job demands are an important causal factor for presenteeism (Demerouti et al., 2009). Research suggests that presenteeism is more sensitive to job demands than absenteeism. For example, regular overtime has been found to decrease absenteeism but to increase presenteeism (Böckerman and Laukkanen, 2009). Similarly, meta-analytic estimates have revealed stronger links between job demands and presenteeism ($r = 0.24$) compared to job demands and absenteeism ($r = 0.05$) (Miraglia and Johns, 2016).

In agreement with the Job Demands-Resources (JD-R) model (Bakker and Demerouti, 2017), job demands vary in nature and include cognitive, physical, emotional, and psychological demands. Psychological demands, such as work pace, time pressures, and high workload, have been found to be strong predictors of presenteeism (Claes, 2011; Deery et al., 2014; Baeriswyl et al., 2017). Data from the fifth European survey on working conditions (2010) suggest that time demands (working outside work hours such as at weekends and during non-work time) are strongly linked to presenteeism (Nordenmark et al., 2019). Other cross-sectional (Janssens et al., 2016; McGregor et al., 2016) and longitudinal studies (Demerouti et al., 2009; Oshio et al., 2017) have shown that the demands of high workload and time pressures predict the prevalence of presenteeism.

H5: Over time, psychological demands will be associated with increased presenteeism.

Recently, direct relationships between PSC and presenteeism have been supported (Liu et al., 2020). However, the workplace climate also shapes the working conditions that in turn shape the work experience of one (Dollard et al., 2019). The effects of PSC on mental health outcomes *via* working conditions have been supported in longitudinal studies (Idris et al., 2014; Dollard et al., 2017; Huyghebaert et al., 2018; Loh et al., 2018). For

example, Dollard et al. (2012) found that an experienced PSC among one group of nurses in one work unit predicted the ratings of workload, job control, supervisor social support, and psychological strain in a different group of nurses from the same work unit, over 24 months. Dollard et al. (2012) also found that the effects of PSC on psychological strain were through psychological demands. Indeed, the lack of resources can make one more vulnerable to resource loss and less capable of resource gain (Conservation of Resources Theory, COR; Hobfoll, 1989; Freedy and Hobfoll, 2017), which implies that a weak PSC may increase the perceptions of psychological demands. Because PSC and psychological demands are expected to have a direct impact on presenteeism, we expect that psychological demands will mediate the relationship between PSC and presenteeism. This is consistent with the health impairment process of the JD-R model (Bakker and Demerouti, 2017) whereby a poorly designed job (as it may be reflected by low PSC) can increase job demands and in turn lead to strain and health problems.

H6: Psychological demands mediate the relationship between PSC and presenteeism, such that positive perceptions of PSC will lead to lower psychological demands that will in turn lead to lower presenteeism prevalence.

METHODS

Designs and Procedures

This was a longitudinal cohort study that used the data collected between April 2020 and December 2020 during the COVID-19 pandemic and following the pandemic-related restrictions in Canada. The first data collection wave was in April 2020, during the strict lockdown the Québec province, where Public Health issued an incentive to all employers to encourage telecommuting for all employees, as permitted by the nature of the work. The second data collection wave was 3 months later, at the end of June 2020 where most stores and shops had opened, and schools had reopened, and the summer holidays were about to start. Except for key workers and those necessary for the pursuit of essential organizational activities, telework was still highly recommended by the Québec government. The third data collection wave was at the end of November and early December 2020, about 3 months after the summer holidays (July–August). This was the onset of the second wave of COVID-19 when lockdown measures came back into effect. Stores were closing, and teleworking was therefore mandatory for people working in offices from December 17, 2020 to January 10, 2021. Data were collected *via* a web panel representative of the Quebec population. Web panels are increasingly recommended for population-based studies (Svensson, 2014). A random prize draw was offered at each time point, with an increasingly higher prize for those who participated in more than one wave.

Participants

The web panel included 60,000 adults (2020 population of Québec of those aged 18–64 comprises 5.3 million). A total of 6,000 were invited randomly, of whom 1,450 replied that they had worked over the past 7 days and agreed to participate. The sample consisted of 553 participants working from home at least 80% of their work hours (the rationale for the 80% cut-off is provided below), of whom 275 were also teleworking at each time wave, had complete data on independent variables at T1, and had completed at least two of the three waves. These participants ($n = 275$) were considered to be teleworkers and were included in the analyses.

TABLE 1 | Description of the sample ($n = 275$, unweighted, at T1).

Socio-demographics	*n* (%)
Gender	
Male	117 (42.6)
Female	158 (57.4)
Age	
20–34	39 (14.2)
35–54	178 (64.7)
55+	58 (21.1)
Occupation	
Top/middle manager	25 (9.1)
Line manager	24 (8.8)
Professional	142 (51.8)
Clerical/admin	41 (15)
Technical	42 (15.3)
Blue-collar	0
Employment sector	
Primary/construction	12 (4.4)
Manufacturing	10 (3.6)
Services (information, arts, leisure, hospitality, retail)	34 (12.4)
Health/social aid	18 (6.6)
Education	30 (10.9)
Public/governmental	124 (45.1)
Finances/insurance	36 (13.1)
Others	10 (4)
Contract	
Full time	219 (79.6)
Education	
Highschool or less	13 (4.7)
College	76 (27.6)
University	186 (67.6)

Measures

Demographic Variables

Demographic variables demographic information included gender, age, occupation, employment sector, type of work contract, and education (see **Table 1**). Employment sector classification was based on the North American Industry Classification System (Statistics Canada., 2002), which was used by the last population-based study conducted on the working population of Québec (Vézina et al., 2011).

Teleworking

Teleworking using an open-ended response format, respondents were asked to indicate the number of hours they had worked

from home and the number of hours worked on site in the past week (7 days) and normally (before the onset of the COVID-19 pandemic). We considered teleworkers to be the ones who reported working from home at least 80% of their work hours at each of the three data collection waves. The rationale for the 80% cut-off was based on the average number of hours of teleworking ($M = 29.3$ h over the past week at T1), considering that a typical employment contract of Québec's is 37 h (29.3/37 $h = 79\%$).

Presenteeism and Absenteeism

Presenteeism and absenteeism presenteeism was measured using an open-ended response format where respondents indicated how many days they had worked while they had been unwell over the past 7 days: "in the last week (7 days), how many days did you work while you had a health problem?" A definition of health problems was provided as "any physical or emotional problem or symptom." For absenteeism, the same format was used but the focus was on the number of work hours missed, including being late or having to leave early, because of the health issue. Although a 12-month recall period is often used in presenteeism studies, we used a shorter period to reduce recall bias according to Navarro et al. (2019) and Ruhle et al. (2019).

Psychological Demands

Psychological demands this construct covers the quantity of work, mental requirements, and time constraints at work. The six items forming this scale were based on the short version of the Job Content Questionnaire (Karasek et al., 1998). The French version of the scale has been shown to have acceptable psychometric properties (Brisson et al., 1998). Following a CFA analysis, only four of the original six items were used. Item 4, which was referred to contradictory demands, and item 6, which was referred to as being often interrupted at work, had low loadings between 0.30 and 0.50 and were removed. The response scale ranged from 1 (strongly disagree) to 4 (strongly agree). An example item is: "My job requires working very fast." Internal consistency ($\alpha = 0.77$) and composite reliability (T1 = 0.807, T2 = 0.795, and T3 = 0.795) were within acceptable levels.

Psychosocial Safety Climate

Psychosocial safety climate (PSC) was measured using PSC-4 (Dollard, 2019). Items refer to the perception of respondents on the priority given to mental health issues by the top management of their organization, the commitment of top management, and the participation and communication from all levels of the hierarchy to prevent mental health problems at work. The responses scale ranged from 0 (strongly disagree) to 5 (strongly agree), such that a higher score implies a climate perceived as more favorable. An example item is: "senior management shows support for stress prevention through involvement and commitment." Internal consistency ($\alpha = 0.94$) and composite reliability (T1 = 0.936, T2 = 0.935, and T3 = 0.918) were high.

Analyses

Post-stratification weights were computed to ascertain the representativeness of the adult population of Québec according to gender, age, rural/urban area, education, and language. To evaluate whether mean levels of the dependent (presenteeism) and independent variables (PSC and psychological demands) changed over time, a series of random intercept mixed models with time (three waves) as a fixed effect were performed. A cross-lagged panel model (three waves) was estimated to test cross-sectional and longitudinal relationships between PSC, psychological demands, and presenteeism. A longitudinal mediation effect was tested according to the guidance by Taris and Kompier (2006) to include the three waves of data. This is recommended to enable the estimation of the directional associations between PSC at T1 and psychological demands at T2 (alpha relation), and psychological demands at T2 and presenteeism at T3 (beta relation), while controlling for autoregressive effects (correlations between each consecutive measurement for each variable). Model measurement fit and composite reliability were estimated. Model invariance according to demographic variables (gender, age group, education, and having children younger than 18 years of age) was tested using chi-squared difference (Satorra and Bentler, 2010). Analyses used longitudinal weights and were performed with SAS 9.4 and MPlus 7 using standard two-tailed 5% alpha.

RESULTS

Non-response Analysis

As mentioned earlier, of the 553 participants who teleworked at least 80% of the time, we used a subsample of 275 who had no missing values on the independent variables at T1 and who had completed at least two measurement waves. We verified the differences between dropouts and our sample ($n = 275$) of teleworkers. No differences were detected for gender [$\chi^2 = 0.23$ (1), $p = 0.64$] and age group [$\chi^2 = 55.2$ (1), $p = 0.76$]. However, differences were found for occupation [$\chi^2 = 29.0$ (5), $p = 0.00$]. No differences were found for managers ($p = 0.93$), professionals ($p = 0.37$), clerical workers ($p = 0.16$), and technicians ($p = 0.70$), but there was a significant difference for unskilled workers [$\chi^2 = 21.3$ (1), $p = 0.00$]. Our panel group includes 0% of unskilled workers, but the comparative ($n = 553$) group included 8% of unskilled workers who spend 80% of their time teleworking. Differences were found according to the employment sector [$\chi^2 = 33.37$ (4), $p = 0.00$], but 25% of the cells had fewer than five participants. Overall, our study sample included a higher number of participants from the public sector (49 vs. 36%) and the finance/insurance sector (22 vs. 6%) but fewer from retail (5 vs. 24%) compared to the dropouts. Our sample also included a higher number of participants who worked full-time (80%), whereas the dropout group included only 68% of full-time employees [$\chi^2 = 10.65$ (1), $p = 0.00$]. Finally, our panel is comprised of a higher proportion of workers with a university degree (63%) compared to the dropout group (57.8%) and a lower proportion of workers with a high school degree (9 vs. 17%) [$\chi^2 = 8.08$ (2), $p = 0.02$].

Considering that no gender and age differences were found and that the very nature of telework implies that some professionals are unable to work from home, the differences between our panel and the dropouts were to be expected given

the nature of telework. We concluded that there were no issues related to panel loss.

Descriptive Statistics

Descriptive statistics for the demographic variables at T1 are displayed in **Table 1**. The correlations between variables at each time are described in **Table 2**.

Table 3 shows the means for all variables at each time. Psychological demands showed an increase over time ($F = 32.40$, $p < 0.00$) and were significantly higher at each consecutive time: T1 = 2.32, T2 = 2.50, and T3 = 2.57, thus supporting H1. Contrary to H2, the number of days of presenteeism remained stable across measurement times (T1 $M = 1.28$, T2 $M = 1.29$, T3 $M = 1.06$, $F = 1.18$, $p = 0.31$; overall $M = 1.21$ days of presenteeism in the past week). In contrast, absenteeism decreased from T1 ($M = 0.21$) to the other two waves (T2 $M = 0.11$, T3 $M = 0.10$, $F = 3.60$, $p = 0.03$). In terms of frequency of presenteeism in the past week, at T1, 61.8% reported no presenteeism, 11% worked while unwell at least 1 day, whereas 27.8% worked while unwell at least 2 days during the preceding week. In contrast, at T1, 88.8% reported no absenteeism, 6.9% were absent between 1 h and 1 full day, and 4.3% were absent for 2 days or more. These findings are reported for a comparison but considering the distinct etiology of absenteeism and presenteeism (Miraglia and Johns, 2016), only presenteeism was used in the subsequent analyses.

The data did not support H3. Contrary to H3, PSC increased over time ($F = 5.33$, $p = 0.00$) and was higher at T3 ($M = 3.83$) compared to T1 ($M = 3.71$) and T2 ($M = 3.64$).

Cross-Lagged Panel Model

A CFA analysis was conducted to assess the measurement model by combining all times of measurement. Following previous recommendations (Little et al., 2007), each variable at Time 1 was also allowed to covary with its corresponding variable at Time 2 and Time 3. The results showed a satisfactory fit: $\chi^2(\text{df}) = 641.88$ (313), standardized root mean square residual (SRMR) = 0.081, comparative fit index (CFI) = 0.922, Tucker-Lewis index (TLI) = 0.912, and root mean square error of approximation (RMSEA) = 0.062.

Figure 1 illustrates the cross-lagged model for teleworkers, which showed a satisfying fit to the data with χ^2 (12) = 33.90, $p = 0.00$, SRMR = 0.039, CFI = 0.964, TLI = 0.90, and RMSEA = 0.081.

The examination of standardized cross-path regression coefficients showed that PSC at T1 predicted increased psychological demands at T2 ($B = -0.11$, $p = 0.04$), confirming the alpha indirect relation (H4: independent variable → mediator). Psychological demands at T2 predicted an increased

TABLE 2 | Correlations (*r*) for the study variables (T1: April 2020, T2: June 2020, and T3: December 2020) ($n = 275$).

	Psychosocial safety climate T1	Psychological demands T1	Presenteeism T1	Psychosocial safety climate T2	Psychological demands T2	Presenteeism T2	Psychosocial safety climate T3	Psychological demands T3	Presenteeism T3
Psychosocial safety climate T1	1.00								
Psychological demands T1	−0.19***	1.00							
Presenteeism T1	−0.04	0.17***	1.00						
Psychosocial safety climate T2	0.67***	−0.12*	−0.07	1.00					
Psychological demands T2	−0.23***	0.73***	0.12**	−0.29***	1.00				
Presenteeism T2	−0.09	0.08	0.48***	−0.28***	0.16**	1.00			
Psychosocial safety climate T3	0.58***	−0.26***	−0.06	0.74***	−0.29***	−0.25**	1.00		
Psychological demands T3	−0.06	0.61***	0.16*	−0.04	0.64***	0.07	−0.26***	1.00	
Presenteeism T3	−0.08	0.18*	0.47***	−0.13	0.24**	0.49***	−0.19*	0.30***	1.00

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

TABLE 3 | Means (M), test of mean differences, SDs, for the study variables (T1, T2, and T3, $n = 275$), reliability coefficients (Cronbach's α at T1).

	T1 (April 2020) *M*(SD)	T2 (June 2020) *M*(SD)	T3 (December 2020) *M*(SD)	*F* (2,429)	α
1. Psychosocial safety climate (scale 0–5)	3.71^a (0.06)	3.64^a (0.06)	3.83^b (0.07)	5.33 ($p = 0.005$)	0.94
2. Psychological demands (scale 0–4)	2.32^a (0.03)	2.50^b (0.03)	2.57^c (0.04)	32.40 ($p < 0.0001$)	0.77
3. # days of presenteeism (scale 0–7)	1.28 (0.12)	1.29 (0.12)	1.06 (0.15)	1.18 ($p = 0.31$)	–

Cronbach α measured at T1. Different subscripts (a,b,c) refer to differences in means between times of measurement at $p < 0.05$.

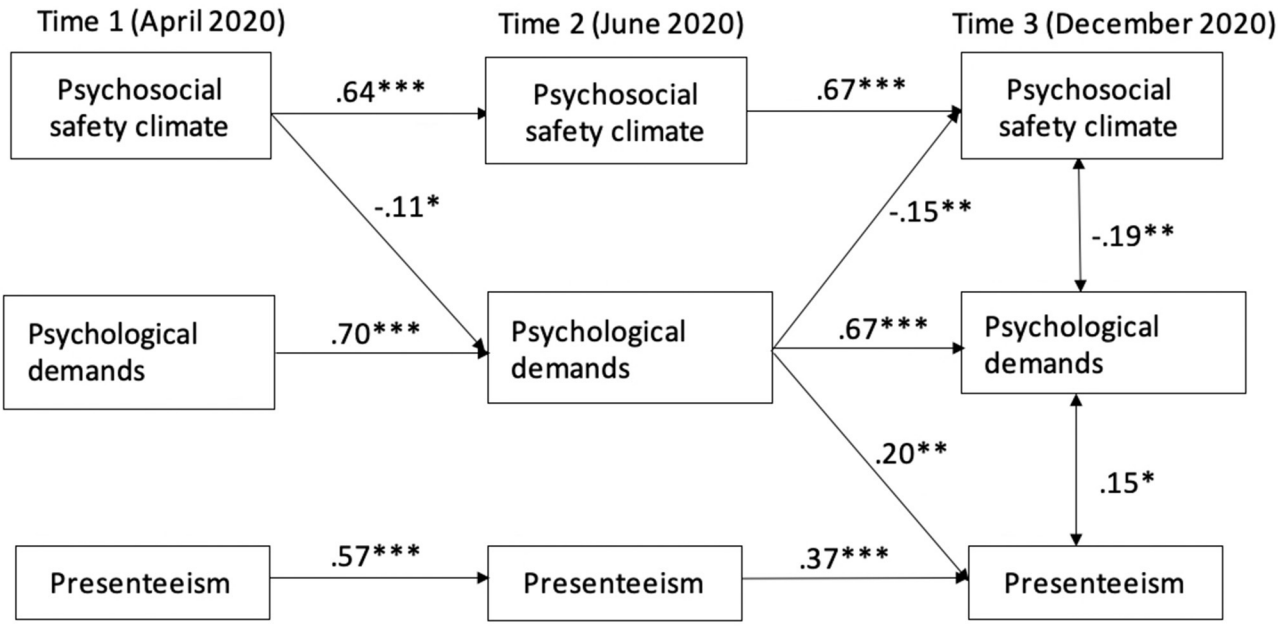

FIGURE 1 | Three-wave mediation model of psychosocial safety climate and presenteeism for teleworkers ($n = 275$). $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$.

number of days of presenteeism at T3 ($B = 0.20$, $p = 0.01$), thus supporting the beta relation (H5: mediator → dependent variable). These two associations supported H6 on the presence of a longitudinal indirect effect of psychological demands on the relation between PSC and presenteeism ($B = -0.021$, $p = 0.05$). Cross-sectional associations between the three variables at T3 provided additional support for the indirect relationship (H6). Specifically, PSC was negatively correlated with psychological demands ($B = -0.19$, $p = 0.01$), and psychological demands were positively associated with the number of days of presenteeism ($B = 0.15$, $p = 0.04$), but no significant association was found between PSC at T3 and presenteeism at T3 ($B = -0.11$, $p = 0.13$). Finally, a reciprocal longitudinal relationship was found between psychological demands at T2 and PSC at T3 ($B = -0.15$, $p = 0.01$).

Model invariance according to gender, age, education, and having children under 18 years old was also tested. We found no significant difference in the model across gender ($p = 0.72$), age groups ($p = 0.38$), or having children under 18 years old ($p = 0.70$). A significant difference was found for education [χ^2 (33) $= 61.20$, $p = 0.00$] suggesting that the model had a lower fit for teleworkers without a university degree.

DISCUSSION

Using a three-wave cross-lagged panel design in a large, representative population sample, our data on teleworkers who primarily worked from home throughout the first 10 months of the COVID-19 pandemic showed a constant increase in psychological demands and an unchanged prevalence of presenteeism. Yet, teleworkers reported a more favorable perception of the PSC of their organization. Our study showed that PSC at T1 was associated with lower psychological demands at T2, whereas psychological demands at T2 were associated with increased presenteeism at T3. The data also showed reciprocal relationships between psychological demands and PSC over time. This suggests that teleworkers who experience excessive psychological demands may come to perceive their organization as less supportive of their psychological health and well-being. Our study highlights the interdependence among the organizational context and the perceptions of individuals on their job conditions and, ultimately, their behavior.

Contributions

This study has several important contributions. Firstly, it responds to a recent call for PSC to be investigated in relation to a broader range of outcomes (Dollard et al., 2019). Most studies on PSC have focused on the core outcomes of the JD-R model such as burnout and engagement. Considering the importance of PSC for outcomes, such as presenteeism, further investigation is needed especially because it is possible to alter PSC through organizational-level interventions (Rickard et al., 2012). The findings lend additional support to JD-R model-based studies having shown the relative contribution of the various task- and organizational-level job resources (Hakanen et al., 2021). Whereas, research has heavily focused on task-level job resources (e.g., skill discretion), our results invite to further examine the specific nature of organizational resources such as PSC within different work settings, including teleworking.

Secondly, the study contributes to our efforts to put the presenteeism behavior in its context. Conceptually, the implications for developing the field are substantial and can add

to attempts to offer evidence addressing the observation made by Johns (2010) that the field is theoretical. As argued by Dollard et al. (2019, p. 12): "PSC precedes work quality (such as job demands and resources), it is pronounced as a "cause of the causes" of work stress, and is an upstream theoretical precursor to job design based work stress theories." Several studies on the antecedents of presenteeism include contextual variables in their predictors, but these are often to combine both variables related to the work environment with variables related to a wider organizational context. Lohaus and Habermann (2019) emphasized the need to distinguish between contextual levels, instead of referring to the context as encompassing all factors that do not refer to the person. Our study brings empirical support for this distinction by considering a contextual distal factor, PSC, and a more proximal factor related to job design, psychological demands. Our results are in line with Liu et al. (2020) who found that PSC positively predicted the perceptions of the working environment, namely organizational support, which in turn reduced presenteeism. Unlike the present study, which uses a longitudinal design with a representative sample of the population of Québec, Liu et al. (2020) use a time-lagged design in which not all variables are measured at each time point, and only with a sample of healthcare workers in China. Although scholars have proposed a person-focused understanding of the presenteeism behavior (Karanika-Murray and Biron, 2020), the presentee cannot be viewed independently of their work environment and organizational behavior cannot be viewed independently of its context (e.g., Grant et al., 2010; Morgeson et al., 2010).

Thirdly, the study is the first to explore the particularities of presenteeism in a sample of teleworkers, since prior to the pandemic, presenteeism was intrinsically linked with physical presence at work. Based on the Health-Performance Framework of presenteeism (Karanika-Murray and Biron, 2020), it is important to consider the relationship of an individual to work and the decision to work or not when ill. Presenteeism can be seen as an adaptive behavior occurring within a complex network of influences in which the worker needs to evaluate the balance resources available to balance the performance demands at work with the health ailment. In the context of telework characterized by social isolation, the absence of formal group norms, and distant leadership, the decision-making process of a worker might depend more on what is more salient in terms of the psychosocial work environment, namely the pressure of psychological demands. This decision-making process has not been investigated in a context where the employee has no physical presence at work and no barriers to prevent working despite illness. As highlighted by Kniffin et al. (2021), the pandemic brought several changes to the workplace, and our study contributes to a better understanding of the potential health-related risks posed by employees being forced into working from home for an extended period.

Finally, using a three-wave design for mediation analysis is uncommon in research on presenteeism. We found the two other studies that have explored the impact of psychosocial constraints on presenteeism using a three-wave design, but neither used a sample of teleworkers nor a contextual higher-level variable such as PSC. In their study, Demerouti et al. (2009) found a reciprocal relationship between burnout and presenteeism over 24 months in a sample of nurses. They showed that, over time, job demands induced pressure to work while ill over time. Similarly, Oshio et al. (2017), using a sample composed of mostly men in the manufacturing sector and a three-wave cohort study, found that job demands were significantly associated with presenteeism 2 years later. Our study brings partial support for a reversed causation between presenteeism and the perception of the PSC as we found that psychological demands at T2 led to a lower perception of the PSC at T3. This points at a downward spiral, in that higher psychological demands, eventually lead workers to perceive their organizational climate in a less positive light, which can lead to increased presenteeism behavior. There is already evidence for this spiral loss as a consequence of presenteeism, where the demands placed on workers take priority over their health, leading them to work while ill, which then leads to further health deterioration (Bergström et al., 2009; Aronsson et al., 2011). A focus on how presenteeism behavior develops over time is needed and can provide new avenues for theorizing in the field.

In terms of methodological contribution, we used a very short (7-day) recall period for presenteeism contrarily to most studies in this field. Presenteeism and absenteeism were both measured as frequencies and in an open-response format. On average, participants reported 1.21 days of presenteeism across each of the three waves, which represents a much higher prevalence compared to pre-pandemic studies and studies that used a 12-month recall period. Only a few studies have used a shorter period of 6 months or less (Lu et al., 2013, 2014; Dhaini et al., 2016; Collins et al., 2018), and all used pre-defined response categories, rendering comparison difficult. In the study of owners and managers, Cocker et al. (2013) used a 4-week recall period and found that 66% of their sample reported at least 1 day of presenteeism (the mean number of days was not reported). Furthermore, as pointed by Ruhle et al. (2019), the temporal order must be consistent, with the antecedents being measured before the predicted variables. Longer recall periods pose threats to the internal validity of the study as the predicted events sometimes occur early in the 12-month period, while the antecedents are measured later. Therefore, also in line with Ruhle et al. (2019), we advocate shorter recall periods to measure the prevalence of presenteeism (e.g., 7 days), using a count measure with an open-response format instead of predefined categories, and with antecedents and consequences. Given that the many changes in health and working conditions were brought about by the pandemic, the context of the study justified a very short recall period.

The rather high prevalence of presenteeism in this study could also be explained by the context of the pandemic. Indeed, we used the definition of presenteeism that included motives related to both physical and mental health. Several studies have shown an increase in mental health problems in connection with the pandemic (Institut National de Santé Publique du Québec, 2020; Salari et al., 2020; Kwong et al., 2021). This increase in mental health problems could explain the high prevalence of presenteeism found in this study. The high prevalence of presenteeism could also be related to the definition

of presenteeism we used, namely the behavior of working in a state of ill-health. Following the recommendation by Ruhle et al. (2019), we did not specify a severity threshold (e.g., illness that would justify a sick leave) because, as they argue, this kind of wording implies that the behavior is judged negatively by the presentee. Presenteeism is instead here seen as an adaptive behavior, which serves as a function for the presentee (Karanika-Murray and Biron, 2020). As such, it is neither positive nor negative, it is instead part of a more complex decision-making process. Further studies are needed to investigate the prevalence of presenteeism in the context of teleworking and how preventive interventions can be adapted to their reality.

Practical Implications

The support we found for the longitudinal effect of PSC on presenteeism *via* psychological demands has important practical implications. Firstly, it shows that, despite the lack of proximity, employers can demonstrate to their employees the importance they place on their psychological health and their commitment to protecting that by adjusting the psychological demands. These results are in line with the practical recommendation by Nordenmark et al. (2019) for organizations to reduce workload and time demands to allow individuals to make the right presence or absence decisions (to work or not to work when ill). A context of high PSC favors balanced job demands, which are aligned with the capacities of workers. The study bolsters calls for top management to make stress and mental health issues a priority.

While COVID-19 has generated many publications in the media on mental health, most of the available resources have focused on self-management tools instead of organizational-level solutions. For example, the Québec government invites people to take care of their health and lifestyle (https://www.quebec.ca/en/health/advice-and-prevention/mental-health#c74786). While these self-help tools are useful and necessary, they put the responsibility on individuals instead of reducing the exposure to adverse work conditions such as excessive psychological demands. This is in line with the recommendation to develop the interventions that are focused more on management practices (Tinline and Cooper, 2019). However, there is evidence showing that managers as a group are also vulnerable and should also be supported during interventions. For example, in a sample of managers, Biron et al. (2018) found that PSC predicted managerial quality during an intervention, but that this relationship was mediated by managers' own level of job control. Managers in that study pointed out that they felt overloaded at work and felt powerless to manage the psychosocial constraints of employees. Their study points toward a cascade effect where PSC improves the psychosocial work environment of managers, which in turn influences their management practices that can have an impact on the health of employees. There are several management challenges associated with the mitigation of the impact of teleworking and place additional constraints on the already heavy workload of managers. We thus argue that interventions should not just target managerial practices, but also include managers as targets for interventions. Enhancing PSC should also involve training and support for strategic decision-makers at the very top of the organization to make mental health a priority.

Future Research

Future research should aim to understand the aspects of the work context in which presenteeism is situated. Variations in presenteeism climates, norms, and organizational culture, across occupations or sectors are possible. For example, a workplace climate that is competitive and values overtime or in which workers cannot easily be replaced encourages presenteeism (Ferreira et al., 2019). In addition, Aronsson et al. (2000) observed prominent occupational differences in the prevalence of presenteeism. Research on absenteeism behavior has extensively focused on the importance of absence norms and culture (Baker-McClearn et al., 2010). Thus, it is possible that PSC, together with such components of the context, and possibly other aspects of the workplace such as policies and procedures, can together inform a more comprehensive view of the role of workplace climate in the presenteeism behavior.

With the pandemic having revealed an important and weak link in boundary setting, future work on teleworkers and presenteeism can also be expanded in view of the boundary theory (Ashforth et al., 2000) to help understand how weaker or even a lack of physical and temporal boundaries between work and non-work can impact health and performance. Thus, where distinct work–family roles are not possible, or where roles are more blurred, role transitions from one domain to another will be more difficult to delineate among those working from home.

Finally, in addition to further explore the factors linked to the prevalence of presenteeism, it would be useful to incorporate in such longitudinal research, different types of presenteeism that place varying foci on health or performance demands (Karanika-Murray and Biron, 2020). This would help to understand how the workplace and job context shape the balance between health and performance demands and how, over time, they can help to move presentees toward functional presenteeism.

Limitations

Despite the methodological strengths of the study, its findings should be interpreted considering its limitations. Firstly, we exclusively focused on psychological demands, as opposed to including several mediators such as other types of demands, or resources such as job control, the lack of social support from colleagues or from supervisors, or effort-reward imbalance. Such psychosocial characteristics could play a role in explaining presenteeism and would be consistent with the JD-R model. Our decision to focus on psychological demands was based on the shift in work arrangements that forced workers, from a wide range of occupations and employment sectors, into home-based telework without being prepared for it (Kramer and Kramer, 2020), leading to longer working hours and increased workload (Moss, 2021). This focus on the psychological demands of teleworkers supports the JD-R health impairment process when presenteeism is viewed as an outcome. Future research should identify and investigate the role of other types of job demands for teleworkers. Another limitation concerns the generalizability of the mediation model to other samples (i.e., office-based, or hybrid

workers), and to workers from other countries for whom working arrangements are different, which remain to be explored. Despite having a representative sample of the population of Québec in terms of age, gender, and education, data were collected using self-report measures, which are susceptible to self-evaluation bias. Upcoming longitudinal studies should include the data from other sources (e.g., peer perceptions of PSC) and outcomes (e.g., job performance) to increase the scope of the findings. Moreover, our sample of participants showed some differences compared to participants who dropped out, which represents a selection bias. However, as our study focused on those who primarily telework, the observed differences are not surprising as they hinge on the nature of the work itself. Indeed, telework is difficult or impossible for some jobs and employment sectors that are customer-facing, such as transport, trade, food, or tourism. Such a difference was expected given the very nature of telework. Even though the proportion of teleworkers increased dramatically with the pandemic and many people who had never teleworked found themselves working from home, telework still seems to be more common among the more highly educated and among knowledge workers. Finally, regarding the measure of presenteeism, despite the limitations of using a single item to measure presenteeism, this at least allowed us not to measure a phenomenon by its consequence as it is the case when using productivity-based measures of presenteeism (Karanika-Murray and Cooper, 2018).

CONCLUSION

Our study shows that despite the distance from the workplace and potential isolation experienced by many teleworkers, the perception that their employer cares about their well-being is important in reducing presenteeism, and psychological demands play a determining role in this process. In their position paper on the "research priorities for the COVID-19 pandemic and beyond," O'Connor et al. (2020) underline the importance of a better understanding of the impacts of flexible and remote working arrangements on employee mental health and well-being, performance, organizational productivity. While telework can have benefits for well-being (Charalampous et al., 2019) it also has health risks that need to be better understood in light of the organizational context and working conditions.

These results of this research highlight workplace climate as a context to the job (perceptions of psychological demands) and in turn as a context to the presenteeism behavior. Importantly, it has helped to place these influences in a temporal order, thus offering stronger evidence on their causal links. Conceptually, the implications for further developing the field by exploring additional aspects of job design or work characteristics are substantial. Specifically, it would be useful to ascertain which aspects of the PSC are most influential and the mechanism for these influences. For example, How does commitment to mental health by top management or participation and communication to prevent the impact of mental health problems on perceptions of psychological demands? And reversely, How does one's perception of psychological demands support a more positive PSC? It will be worth expanding our investigation into additional aspects of the presenteeism context that work synergistically to impact on the presenteeism decision. Overall, our study provides a more comprehensive framework to conceptualize how an individual, the work, and organizational factors are combined to define presenteeism among teleworkers.

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'éthique pluridisciplinaire de l'Université Laval. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

CB is the principal investigator of this project, conducted the data collection, and performed the statistical analyses with HI. MK-M and CF are co-investigators in this project and contributed to the development of the data collection tools. SS was in charge of the literature review. All authors were involved in the writing process and the revisions.

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Unlocking the Contradictory Outcomes of Presenteeism Through a Temporal Model: Effort Exertion as a Mediator

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The effects of presenteeism, that is, working while ill or exhausted, are unclear, as previous research has yielded contradictory results. The aim of this study was thus two-fold: clarify the differential effects of short versus long-term presenteeism and corroborate the mediating effect of effort exertion on the relationship between presenteeism and work-related outcomes. We adopt a three-wave panel design and measure all the variables at three different points (initially, after one week and after one year) to understand the effects of presenteeism over time. Our sample consists of 361 Chinese employees working in diverse industries in Taiwan. We analyze the panel data using structural equation modeling and bootstrapping. Our results reveal that presenteeism is positively associated with increased effort, work engagement, and job performance after one week. By contrast, presenteeism is negatively associated with job performance and work engagement though positively associated with emotional exhaustion after one-year. Our research contributes to clarify paradoxical results regarding presenteeism's consequences, as well as corroborating that effort exertion mediates the relationship between presenteeism and work outcomes. We also identify practical implications for organizations managing employees working remotely, a more common reality with the outbreak of the COVID-19 pandemic, the ensuing lockdowns and digitalization which has started to become the norm for a significant proportion of working sectors. Finally, we suggest recommendations for future research on presenteeism.

Keywords: presenteeism, effort exertion, job performance, work engagement, emotional exhaustion

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INTRODUCTION

Presenteeism, defined as working while ill (Johns, 2010), has a wide range of consequences for people and organizations; however, research regarding presenteeism in various disciplines has yielded inconsistent results (Ruhle et al., 2020). Longitudinal research conducted over one year has revealed a strong, negative relationship between presenteeism and personal well-being (Skagen and Collins, 2016) as well as job performance (Leijten et al., 2014). However, a systematic review of cross-sectional presenteeism studies revealed negligible or nonsignificant relationships between presenteeism and performance ratings (Lohaus and Habermann, 2019).

Research over shorter intervals has also revealed positive relationships between presenteeism and job performance (3-month interval; Lu et al., 2013) and mental health (2-month interval; Lu et al., 2014).

These inconclusive results in presenteeism research call for further exploration on the consequences of presenteeism over time (Skagen and Collins, 2016). Furthermore, a theory that could potentially explain the uneven findings when considering short or long-term presenteeism research is missing. In recent theoretical contributions, presenteeism is viewed as a neutral act, without positive or negative valence (Ruhle et al., 2020). Therefore, this research aims to shed light on these contradictory results by applying the cognitive activation theory of stress (CATS; Ursin and Eriksen, 2004) and the conservation of resources theory (COR; Hobfoll and Wells, 1998) and by reviewing empirical evidence regarding presenteeism behavior over two time spans (one week and one year). We thus aim to achieve a more nuanced understanding of "bad presenteeism" (Lu et al., 2013; Cooper and Lu, 2016).

Research regarding the effects of presenteeism has primarily focused on predicting work-related outcomes, such as job performance and emotional exhaustion (Skagen and Collins, 2016). These outcomes are thought to be influenced by "effort exertion." Hockey (1993) highlighted the concept of effort exertion which other research has applied to link work behaviors to related outcomes (Brown and Leigh, 1996; Hockey, 1997). Overall, there are few studies in the organizational behavior field regarding effort exertion mechanisms (Yeo and Neal, 2004). The effects of the effort exerted at work and the time over which such effort is exerted are often overlooked when describing personal and organizational outcomes. Therefore, drawing on CATS and COR theories, we predict that effort exertion at work is a key underlying psychological mechanism to understand whether presenteeism leads to two distinct circumstances, namely, increased or decreased performance over different time spans. **Figure 1** depicts our conceptual research model.

This research makes three valuable contributions to the presenteeism field. First, based on the CATS and the COR theories and our multiple follow-up research design, we shed light on the conflicting results regarding presenteeism and we hypothesize and test a temporal presenteeism model with short and long-term effects (one week and one year) on personal well-being and organizational effectiveness. Second, by incorporating the effort exertion construct as a key mediator, we establish a process model of presenteeism – effort exertion – health/behavioral outcomes to increase our understanding of how the neutral act of presenteeism is translated into future outcomes over various timespans. Finally, presenteeism behavior, although widely scrutinized in Western literature, is considered a key virtue in the Confucian cultural context (Chinese Culture Connection, 1987), emphasizing values such as hard work, diligence, and perseverance (Bond, 1988). The Chinese work culture is thus an ideal context to examine the generalizability of Western presenteeism research and to further explore the psychological mechanisms that explain the paradoxical short and long-term outcomes of presenteeism.

HYPOTHESES DEVELOPMENT

Contrasting Outcomes of Short and Long-Term Presenteeism

Inspired by a recent review across disciplines (Ruhle et al., 2020) that cautioned against overgeneralizing the negative effects of presenteeism behavior, we considered presenteeism to be an act without positive or negative valence. We thus avoided obscuring the possible positive effects of this behavior. Although presenteeism has long been conceived as a counterproductive work behavior (Aronsson and Gustafsson, 2005) that reduces employee well-being and organizational effectiveness over the long term, for example, 1.5 years (Demerouti et al., 2009) and 2 years (Conway et al., 2014; Gustafsson and Marklund, 2014), recent research has suggested that the negative effects of presenteeism in terms of productivity loss and on personal and organizational outcomes have been overstated (Johns, 2012; Cooper and Lu, 2019; Ruhle et al., 2020). For example, Lu et al. (2014) found no lasting effects of presenteeism on mental health, physical health, or burnout over a two-month interval. Another study adopted a three-month interval and found no evidence of long-lasting or damaging effects on productivity

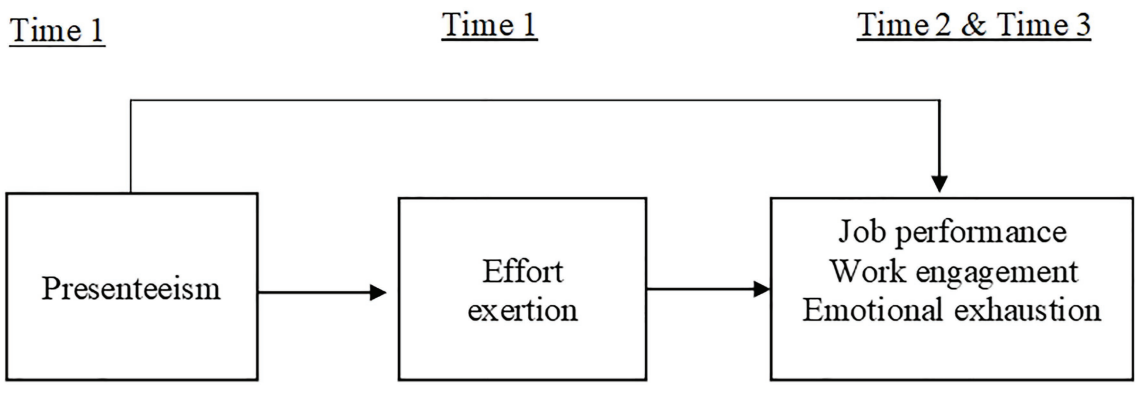

FIGURE 1 | Conceptual research model.

or job performance (Lu et al., 2013). Due to these inconclusive findings, recent research has suggested that presenteeism can also be considered an adaptive coping strategy for individuals and may increase short-term job performance without damaging personal health (Karanika-Murray and Biron, 2020).

We propose that the length of time that workers adopt presenteeism behavior should be considered to examine its effects on personal well-being and organizational effectiveness. This approach is consistent with Skagen and Collins' suggestion (2016) that future research on presenteeism should consider timeframes to understand the long-term consequences of presenteeism. Thus, to help explain the different outcomes of presenteeism over different time spans, we apply CATS theory (Ursin and Eriksen, 2004).

CATS (Ursin and Eriksen, 2004) is a general and comprehensive theory of stress that is attuned with contemporary stress theories such as the job demand-control model (Karasek, 1979) and the effort-reward imbalance model (Peter and Siegrist, 1997). CATS explains the effects of the expectation of stress in determining personal and organizational outcomes; these expectations are demand-control (resource) expectancy and effort-reward expectancy. CATS also incorporates a time perspective and explains the effects of stressors over different time intervals by including the time expectancy of a stressor. In fact, the basic assumptions of CATS theory (Ursin and Eriksen, 2004) are that stressors are normal and healthy stimuli and that the stress response is necessary. Corroborating work by Hockey (1993, 1997), which highlights the importance of considering the biological context of behaviors in explaining human behavior, CATS theory maintains that, if an individual expects a stressor will be resolved within a short time, the stress response is simply an increase in stimulation without any detrimental health effects. However, if stressors persist for longer than the expected time, stress can contribute to negative health outcomes.

In line with the CATS framework, we propose that individuals going to work in suboptimal physical conditions within a limited and predictable timespan (e.g., short-term to meet a project deadline) will allocate more energetic resources such as effort to meet goals and that this may not have any negative effects on those individuals; in addition, such additional effort will facilitate the attainment of performance goals (Hockey, 1997). Thus, we propose that, over a one-week interval (denoted as Time 2 [T2]), presenteeism behavior has positive cross-lagged effects on job performance and work engagement but does not increase emotional exhaustion (Hypothesis 1, H1).

However, considering the time expectation component of CATS theory, routinely carrying out excessive work with no clear end date is likely to have negative effects because sustained stimulation due to continual overwork causes sensitization and extensive activation of the psychobiological system, leading to negative health outcomes. Also, recruiting the energetic resources to meet chronic work demands has psychological and physiological costs (Hockey, 1997). This reasoning is also corroborated by COR theory (Hobfoll, 2001), suggesting that stress will result from a loss or threat of losing resources or due to an imbalance between invested resources and expected returns (Halbesleben, 2006), especially in long-term scenarios (Hobfoll et al., 2018).

When individuals experience ongoing losses or expect substantial resource losses, they suffer from resource depletion, which ultimately leads to exhaustion or dysfunctional behavior (Hobfoll et al., 2018). We considered stress over time by examining three intervals: T1, the initial assessment; T2, one week after T1; and T3, one year after T1. Accordingly, we propose the following cross-lagged hypotheses:

H1: Presenteeism at T1 has positive cross-lagged effects on a) job performance and b) work engagement at T2.

H2: Presenteeism at T1 has a) negative cross-lagged effects on job performance, b) work engagement at T3, and c) positive cross-lagged effects on emotional exhaustion at T3.

Effort Exertion as a Mediating Mechanism for the Outcomes of Presenteeism

Research regarding the consequences of presenteeism has primarily concentrated on assessing the predictive strength of presenteeism measures for outcomes (see the systematic review by Skagen and Collins, 2016, or the meta-analysis by Lohaus and Habermann, 2019). Nevertheless, previous studies have ignored the underlying mediating mechanisms that translate presenteeism into outcomes and thus connect behaviors with their effects. Failing to do so prevents studying the consequences of going to work while feeling unwell, something which has yielded inconsistent findings regarding the outcomes of presenteeism behavior (e.g., positive well-being and performance; Lohaus et al., 2020) and negative well-being and productivity (Warren et al., 2011). Understanding presenteeism's underlying psychological mechanisms is warranted for both extant literature and practical implications.

Effort has been recognized as an important mechanism in translating inputs into outputs in the organizational setting, especially under high work stress circumstances (Hockey, 1997). Effort exertion is the direction, intensity, and persistence of the effort a person applies to execute a chosen behavior (De Cooman et al., 2009). Researchers have thus far conceived displaying presenteeism behavior as comparable to exerting intensive effort. Specifically, working through illness instead of taking sick leave has been seen as the amount of effort expended in work-related tasks (Miraglia and Johns, 2016). However, overt behaviors like presenteeism may require or encourage employees to dedicate extra effort to work, though they are distinct concepts. Although presenteeism can result in dedicated effort, people with a suboptimal physiological condition may be psychologically absent and thus exert limited effort while working. Unlike the observable act of presenteeism, effort exertion is not immediately visible (Kanfer, 1990). Therefore, presenteeism and effort exertion are distinct concepts and must be refined in order to explain presenteeism's conflicting outcomes.

By contrast, the limited cross-sectional research dedicated to effort exertion in the work setting has yielded consistent

conclusions. Results have demonstrated that effort exertion is an underlying mechanism for translating work motivation into job performance and satisfaction (Dysvik and Kuvaas, 2013). Therefore, greater effort exertion leads to increased job performance (Brown and Peterson, 1994; Brown and Leigh, 1996). Although effort exertion is a key mechanism, empirical research is scarce, and existing theory does not clearly describe the links between individuals, work characteristics, and outcomes (Yeo and Neal, 2004). Accordingly, we apply the CATS and COR frameworks to examine the mediating effects of effort exertion on the relationship between overt presenteeism behavior and short- and long-term work-related outcomes.

To maintain the desirable performance, individuals will mobilize the resources they can apply to perform their professional tasks (Hockey, 1997). In the case of this study, employees who go to work while feeling ill will navigate more effort to compensate for their suboptimal situation and achieve the expected performance. Building on CATS principles, we contend that individuals who go to work while feeling ill for a short and expected period of time (e.g., a few days) to achieve their work goals will allocate their energetic resources to push themselves and exert sufficient effort to complete the necessary tasks (Hockey, 1997). Over these short intervals, intensified effort can result in achieving a performance goal without negative health effects, although it produces emotional stimulation (Ursin and Eriksen, 2004). Based on CATS theory (Ursin and Eriksen, 2004), we predict that, in the short-term, presenteeism is indicative of individual effort and thus facilitates performance and engagement without causing exhaustion (H3).

Considering the long-term effects of presenteeism and based on COR theory (Hobfoll, 2001), we contend that continuous effort exertion to meet work demands in a resource-loss situation diminishes personal resources and, in turn, leads to poor personal and organizational outcomes (Hobfoll et al., 2018). COR theory postulates that individuals confronted with resource-depleting circumstances adopt behaviors to preserve their remaining resources. Research has consistently shown that resource-depleting scenarios (such as working long hours or working through illness) cause further losses such as poor long-term performance and engagement (Lu and Chou, 2020). Employees who are chronically subject to these resource-depleting circumstances, although they exert effort and allocate their limited resources to their work, still prioritize retaining their personal resources to compensate for their suboptimal situations. However, applying limited energy resources for constant overwork while feeling ill or exhausted not only negatively affects physiological and psychological functions but also personal well-being (Skagen and Collins, 2016). Accordingly, people with diminished resources experience high levels of emotional exhaustion (McGregor et al., 2016) and are likely to have difficulties in continuing to exert additional efforts at work, stay engaged, and maintain high levels of performance (H4). Consequently, we propose the following hypotheses:

H3: Presenteeism at T1 has positive cross-lagged effects on a) job performance and b) engagement at T2 *via* effort exertion at T1.

H4: Presenteeism at T1 has a) negative cross-lagged effects on job performance, b) work engagement at T3 *via* effort exertion at T1, and c) positive cross-lagged effects on emotional exhaustion at T3.

METHODS

Procedure and Participants

We first examined previous research to decide on the appropriate intervals to contrast the short-lived versus long-lasting effect of adopting presenteeism behaviors (e.g., Lu et al., 2014, for the short-term; and Leijten et al., 2014, for the long-term). We employed a three-wave panel study design in which we measured all the variables three times: initially (T1), at one week (T2), and after one year (T3).

We used a snowball sampling approach to recruit participants across different industries, occupations, organizations, and locations in Taiwan. We began the data collection process in January 2020 and finalized in January 2021. We asked students enrolled in the executive MBA at two large universities in Taiwan, students who usually have professional experience and hold managerial positions in their organizations, to help advertise the study and invite participants to take part *via* Line, a freeware app for instant communication widely used in Taiwan. To facilitate the recruiting process, we provided students with a recruitment ad which articulated the study purpose. Eligible study participants were individuals with fulltime jobs. In the ad, we encouraged participation by offering a monetary incentive; we ensured that participants who completed the three survey waves would receive a compensation of NT $150 (approximately US $5). Students then posted the ad in a number of chat groups in Line. They also asked their peers to help further spread the ad. Interested participants contacted the corresponding author *via* Line by scanning a QR code in the ad, later receiving an informed consent form. In the latter, we again assured them that their participation was voluntary and that their responses would be confidential. We re-approached participants again in one week, as well as 12 months after their initial participation. We sent follow-up reminders to participants who did not complete the survey within 2 days after receiving it.

Moreover, to ensure data quality, we used participants' Line IDs to match the three-wave surveys and avoid repetitions. Participants used the virtual confidential IDs they created for themselves without disclosing their real names to the researchers, thus guaranteeing the participants' anonymity. We also used an attention check strategy (i.e., "For this item, please select 6 and move on to the next item") to detect and exclude inattentive respondents. After removing mismatched three-wave surveys and careless data, the final sample size was 361, resulting in an overall response rate of 52.24%. The 361 participants filled out three-wave survey questions with no missing data. At T1, the survey was completed by 691 individuals; of these, 578 persons completed the survey again at Time 2 (T2; retention rate of 83.65%). At Time 3 (T3), 361 of these 578 individuals who completed

the questionnaire at T1 and T2 completed the final questionnaire.

The 361 participants worked in 9 industry sectors according to the Global Industry Classification Standard (GICS: industrial (3.6%), consumer discretionary (19.6%), consumer staples (2.8%), health care (12.8%), financial (31.3%), information technology (3.9%), communication service (11.1%), utilities (7.8%), and real estate (9.6%). In addition, two-thirds of all participants (66.3%) were female. Participants had an average age of 36.91 years (SD = 8.89), within the 25-67-year range; their average job tenure was 7.25 years (SD = 6.57); and 81.40% held a bachelor's degree. Only 28.80% of participants held a managerial position, and just over half of the sample (54.2%) were married.

We investigated the possibility of selection bias between dropout and final samples by systematically examining differences between participants in the panel sample and the dropouts regarding their demographic data as well as mean scores on the study variables. Our analyses revealed no significant differences for any category. We thus concluded that no significant selection bias had occurred due to panel loss.

Measures

Presenteeism

We assessed presenteeism by using a two-item scale developed by Lu et al. (2013; e.g., "Although you felt sick, you still forced yourself to go to work"). Respondents indicated their agreement with each statement using a 4-point scale (1 = never, 2 = one to two times, 3 = three to four times, 4 = more than five times), with higher scores representing more frequent presenteeism. Factor loadings were 0.88–0.91 at T1, 0.91–0.92 at T2, and 0.90–0.92 at T3. Spearman-Brown formula was applied to calculate the reliability of the two-item measurement (Eisinga et al., 2013), the values for the scale were 0.90 (T1), 0.90 (T2), and 0.91 (T3).

Effort Exertion

We adopted a ten-item scale developed and validated by De Cooman et al. (2009) to measure three effort exertion factors (persistence, direction, and intensity). Sample items included: "I always work equally hard at my job"; "I do my best to do what is expected of me"; and "I always exert equally hard during the execution of my job." We used a 7-point Likert scale, ranging from 1 (fully disagree) to 7 (fully agree). We considered effort exertion to be a second-order latent factor in which the items measuring persistence, direction, and intensity were loaded onto their underlying constructs, and these three constructs loaded on the higher-order factor. Fit statistics supported the use of this second-order factor model of effort exertion (root mean square error of approximation (RMSEA) = 0.07; comparative fit index (CFI) = 0.97; and incremental fit index (IFI) = 0.97). Factor loadings were 0.90–0.95 at T1, 0.91–0.94 at T2, and 0.90–0.94 at T3. Cronbach's α values for the scale were 0.92 (T1), 0.90 (T2), and 0.89 (T3).

Emotional Exhaustion

We used a nine-item emotional exhaustion scale based on the Maslach Burnout Inventory (MBI; Maslach et al., 1997). One sample item utilized was "I feel used up at the end of the workday." We applied a 7-point scale, ranging from 0 (never experience this feeling) to 6 (experience similar feelings every day). Factor loadings were 0.92–0.94 at T1, 0.91–0.93 at T2, and 0.90–0.93 at T3. Cronbach's α values for the scale were 0.93 (T1), 0.92 (T2), and 0.91(T3).

Work Engagement

We used the nine-item Utrecht Work Engagement Scale (UWES-9; Schaufeli et al., 2006) to measure work engagement. Sample items included: "At work, I feel like I am bursting with energy"; "I am enthusiastic about my job"; and "I am immersed in my work." Scholars have pointed out that the UWES-9 scale is based on a one-dimensional construct but that it encompasses three different but highly correlated concepts and that the corresponding scores indicate overall work engagement (Schaufeli et al., 2006; Bakker and Leiter, 2010). We used a 7-point rating scale, ranging from 1 (never) to 7 (always). Factor loadings were 0.89–0.93 at T1, 0.90–0.93 at T2, and 0.90–0.92 at T3. Cronbach's α values for the scale were 0.89 (T1), 0.91 (T2), and 0.90 (T3).

Job Performance

We applied a four-item scale developed by Ashford et al. (1989) to assess job performance. Items included: "My supervisor is satisfied with my performance" and "I am effective at my job." We used a 5-point Likert scale, ranging from 1 (disagree very much) to 5 (agree very much). Cronbach's α values for the scale were 0.87 (T1), 0.89 (T2), and 0.89 (T3).

Controls

We controlled for gender (coded male = 0, female = 1), age, marital status (coded as married = 1, not married = 0), education level (converted to years of formal education), job tenure (in years), and managerial job position (coded as 1 = managers, 0 = employees).

Data Analysis Strategy

To test our research hypotheses, we applied structural equation modelling (*SEM*) techniques (AMOS 22) to examine the direct cross-lagged effects of presenteeism on outcomes over the short (H1) and long terms (H2), as well as testing the mediating role of effort exertion in the presenteeism-outcome relationship over different time spans as proposed in H3 (short-term with a 1-week interval) and H4 (long-term with a 1-year interval). Furthermore, to corroborate the indirect effects of H3 and H4, we also applied bootstrapping methods.

Confirmatory Factor Analysis

We first conducted a series of confirmatory factor analyses (*CFA*) to examine the validity of our measures. Our results indicated that the hypothesized 15-factor measurement model (i.e., presenteeism and effort exertion, as well as emotional exhaustion, job performance, and work engagement, etc.) fit the data well: $\chi^2(df = 733) = 2826.89$, $p < 0.001$, $CFI = 0.92$,

RMSEA = 0.06, and *SRMR* = 0.05. All scale items loaded on their intended factors significantly ($p < 0.001$). Factor loadings for each item are provided in the Appendix. We then compared the 15-factor model with 105 alternative 14-factor models, where any two of the 15 factors were combined. These results demonstrated that the 15-factor model fit the data significantly better than any other of the 14-factor models ($\Delta\chi^2[\Delta df = 14]$ ranged from 139.66 to 1339.96, $p < 0.001$). Furthermore, they suggested that the measure used in our study captured distinct constructs.

Measurement Model and Common Method Variance

To evaluate the extent to which our findings were influenced by common method variance, we followed the procedure recommended by Podsakoff et al. (2003) and widely employed (Ahuja et al., 2007). Following their approach, we estimated three models: (1) Model 1: a null measurement model, (2) Model 2: multifactor measurement model with the proposed latent constructs, and (3) Model 3: measurement model with an additional method factor. If a common method effect existed, Model 3 would fit the data significantly better than Model 2. Then we would need to determine the amount of variance in the model contributed by the single method factor. To do that, we computed the average variance extracted (AVE) for the latent constructs against the method factor. It has been argued that, to rule out the presence of pervasive method variance, the variance explained by the method factor should be less than 25% of the total variance (Williams et al., 1989).

The results demonstrated that: Model 1 [$\chi^2 = 3328$, $p < 0.001$, $\chi^2/df = 27.09$, Tucker–Lewis index, TLI = 0.56, CFI = 0.42, RMSEA = 0.17]; Model 2 [$\chi^2 = 1112$, $p < 0.001$, $\chi^2/df = 2.39$, TLI = 0.91, CFI = 0.91, RMSEA = 0.05]; Model 3 [$\chi^2 = 2269.11$, $p < 0.01$, $\chi^2/df = 21.03$, TLI = 0.51, CFI = 0.61, RMSEA = 0.15]. The loadings from model 3 were then used to compute the AVE for each latent construct, including the method factor.

The Model 2 provided a good fit to the data, with RMSEA scores below 0.06, whereas TLI and CFI were above 0.90 (Bentler and Bonnet, 1980). The loadings from model 3 were then used to compute the AVE for each latent construct, including the method factor the method factor accounted for only 14% of the total variance, less than the 25% cut-off recommended by Williams et al. (1989). Thus, we concluded that common method variance did not significantly contaminate the results.

As a supplementary analysis, we also computed alternative models to investigate the causal relations between presenteeism and outcomes. Though we hypothesized that the causal effects of T1 presenteeism on T2 and T3 outcomes were theoretically based, reversed relationships between the constructs are plausible (Lesener et al., 2019). However, the research model, which is composed of M1 and the causal relationships of T1 presenteeism on exhaustion, work engagement, and job performance at T2 &T3 outperformed the stability, reversed causality, and reciprocal models also tested.

Longitudinal Factorial Invariance

Examining factorial invariance in this three-wave panel study is important because it helps provide evidence for the imperative assumption that the fundamental meaning of the latent variables is consistent across measurement points. We thus examined invariance by modeling constrained models and comparing all the models to more restricted models. According to our results, the research dimensions were invariant across time by showing intercept invariance [$\Delta\chi^2(58) = 42.66$, $p = 0.59$], loading invariance [$\Delta\chi^2(46) = 36.77$, $p = 0.67$], configural invariance [$\Delta\chi^2(25) = 26.88$, $p = 0.36$], and residual invariance [$\Delta\chi^2(88) = 100.24$, $p = 0.11$].

RESULTS

Descriptive Analysis

We report the mean, standard deviations, and correlations among all study variables in **Table 1**. Most of the relationships between the variables were significant and took the expected directions. Specifically, presenteeism behavior positively correlated with job performance and work engagement at T1 and T2. However, the patterns were diametrically different between T1 and T3. Namely, presenteeism negatively correlated to job performance (−0.18, $p < 0.05$) and work engagement (−0.19, $p < 0.05$) at T3, but positively correlated to emotional exhaustion at T3 (0.29, $p < 0.001$).

Hypotheses Testing

To test the hypothesized direct and indirect effects, we constructed two *SEM* models corresponding to the different time spans. Thus, every model included presenteeism at T1, effort exertion at T1, and three endogenous variables (job performance, work engagement, and emotional exhaustion) at one week (T2) and one year (T3), respectively.

Cross-Lagged Direct Effects of Presenteeism on Outcomes

Hypotheses 1 and 2 examine the short and long-term effects that presenteeism has on outcomes at work. Specifically, hypothesis 1 predicted that displaying presenteeism is conducive to job performance (H1a) and work engagement (H1b), without damaging personal health over a short timeframe.

As reported in **Table 2**, after controlling for the baseline level of outcomes, the results supported the direct short-term effects of presenteeism on outcomes by corroborating that displaying presenteeism has a positive cross-lagged effect on job performance ($\beta = 0.13^{**}$, $p < 0.01$) and work engagement ($\beta = 0.16^{**}$, $p < 0.01$). Therefore, H1a and H1b are supported.

Although not hypothesized, we also examined the direct effects of presenteeism behavior on emotional exhaustion after a 1-week interval (T2). Our findings do not show any significant positive cross-lagged effects of presenteeism on short-term emotional exhaustion ($\beta = 0.05$, ns.).

Hypothesis 2 predicted the negative direct effects of presenteeism on job performance (H2a), work engagement

TABLE 1 | Mean, standard deviations, and correlations among focal research constructs ($N = 361$).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Time 1															
1. Presenteeism	(0.90)														
2. Effort exertion	0.21**	(0.92)													
3. Work engagement	0.19*	0.37***	(0.89)												
4. Job performance	0.18*	0.36***	0.44***	(0.87)											
5. Emotional exhaustion	0.11*	0.08	−0.13	−0.21**	(0.93)										
Time 2															
6. Presenteeism	0.62***	0.18*	0.16*	0.26**	0.22*	(0.90)									
7. Effort exertion	0.31***	0.66***	0.33***	0.33***	0.13	0.34***	(0.90)								
8. Work engagement	0.16*	0.45***	0.64***	0.20**	−0.07	0.18*	0.53***	(0.91)							
9. Job performance	0.20**	0.42***	0.41***	0.01	0.01	0.22**	0.48***	0.42***	(0.89)						
10 Emotional exhaustion	0.15*	0.14*	−0.17*	0.21**	0.52***	0.24**	0.16*	−0.18 *	−0.23**	(0.92)					
Time 3															
11. Presenteeism	0.53***	0.19*	−0.12	−0.27**	0.37***	0.58***	0.19*	0.03	−0.22**	0.34***	(0.91)				
12. Effort exertion	0.32***	0.45***	0.23**	−0.22*	0.28**	0.34***	0.63***	−0.23**	−0.20*	0.27**	0.25**	(0.89)			
13. Work engagement	−0.19*	−0.14*	0.56***	0.13	−0.18*	−0.21*	−0.14*	0.54***	0.16	−0.21*	0.17*	0.32***	(0.90)		
14. Job performance	−0.18*	−0.18*	0.22**	−0.20*	−0.20*	−0.22*	−0.18*	0.42***	0.55***	−0.23*	0.21*	0.38***	0.46***	(0.89)	
15. Emotional exhaustion	0.29***	0.26***	0.13*	0.26**	0.53***	0.31***	0.31***	0.07	0.25**	0.63***	0.06	0.06	−0.12	−0.28**	(0.91)
Mean	5.12	53.10	16.03	47.88	36.72	5.13	53.44	16.88	49.02	37.88	5.27	54.12	15.78	44.31	41.33
SD	1.07	6.91	3.34	3.17	5.13	1.01	6.67	3.12	3.25	5.10	1.23	6.46	3.08	3.08	5.32

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

Cronbach's α was shown in the diagonal between brackets (two-tailed).

TABLE 2 | Medwiation effects of effort exertion between presenteeism behaviors and outcomes over a 1-month interval (T2) and a 12-month interval (T3).

		β	*SE*	*χ2/(df)*	*R2*	*RMSEA*	*GFI*	*CFI*
Direct path effects								
	T1 Pres → Eff T1	0.13**	0.04	2349.23/266	0.26	0.07	0.89	0.88
H1a	T1 Pres → Perf T2	0.13**	0.01	2823.40/266	0.32	0.07	0.89	0.90
H1b	T1 Pres → Eng T2	0.16**	0.02	2543.31/266	0.30	0.06	0.88	0.88
	T1 Pres → Exh T2	0.05	0.02	2399.31/266	0.28	0.08	0.88	0.88
H2a	T1 Pres → Perf T3	−0.24***	0.02	2648.42/266	0.29	0.07	0.89	0.90
H2b	T1 Pres → Eng T3	−0.26***	0.02	3123.34/266	0.31	0.07	0.89	0.91
H2c	T1 Pres → Exh T3	0.36***	0.02	2778.33/266	0.31	0.07	0.88	0.90
Indirect effects								
H3a	T1 Pres → T1 Eff → Perf T2	0.09*	0.02	2923.40/264	0.35	0.05	0.90	0.91
H3b	T1 Pres → T1 Eff → Eng T2	0.10*	0.01	2842.46/264	0.33	0.04	0.90	0.91
	T1 Pres → T1 Eff → Exh T2	0.03	0.01	2972.22/264	0.33	0.06	0.89	0.90
H4a	T1 Pres → T1 Eff → Perf T3	−0.17**	0.01	2887.21/264	0.33	0.07	0.89	0.90
H4b	T1 Pres → T1 Eff → Eng T3	−0.23***	0.02	3347.54/264	0.34	0.07	0.89	0.91
H4c	T1 Pres → T1 Eff → Exh T3	0.16**	0.02	3134.23/264	0.35	0.06	0.90	0.91

*N = 361. β, standardized path coefficients; SE, standard error; χ2/(df), Chi squared (degrees of freedom); RMSEA, Root Mean Square Error of Approximation; GFI, Goodness-of-Fit Index; CFI, Confirmatory Fit Index. T1, Initial test; T2, 1-month interval; T3, 12-month interval. Pres, Presenteeism; Eff, Effort exertion; Perf, Performance; Eng, Work engagement; Exh, motional Exhaustion. *p < 0.05, **p < 0.005, ***p < 0.001.*

(H2b), and the positive direct effect on emotional exhaustion (H2c) over the long-term (T3). As can be seen in **Table 2**, after controlling for the baseline level of outcomes, our results supported the direct long-term effects of presenteeism on outcomes by corroborating the negative cross-lagged effects on job performance ($\beta = -0.24^{***}$, $p < 0.001$), and work engagement ($\beta = -0.26^{***}$, $p < 0.001$), as well as a positive cross-lagged effect on emotional exhaustion ($\beta = 0.36^{***}$, $p < 0\ 0.001$) at the 12-month interval (T3), thus corroborating hypotheses H2a, H2b, and H2c.

The Mediating Effect of Effort Exertion Between Presenteeism and Outcomes

Hypothesis 3 anticipated the mediation effects of effort exertion on the relation between presenteeism and outcomes, namely, displaying presenteeism behavior over the short-term would have positive effects on job performance (H3a) and engagement (H3b) *via* effort exertion. The results in **Table 2** indicate that presenteeism has positive cross-lagged relationships with job performance and work engagement *via* effort exertion over a 1-week interval (at T2). Specifically, the indirect effect of presenteeism at T1 on job performance at T2 through effort exertion at T1 was positive ($\beta = 0.09$, $p < 0.05$). Therefore, effort exertion mediates the relationship between presenteeism and job performance at T2, supporting H3a.

Likewise, the indirect effect of presenteeism at T1 on work engagement at T2 through effort exertion at T1 was positive ($\beta = 0.10$, $p < 0.05$). Thus, effort exertion mediates the relationship between presenteeism and work engagement at T2, supporting H3b. Furthermore, we carried out bootstrap analyses of the mediating effects which further confirmed these results by showing the mediating effect of effort exertion between presenteeism on job performance at T2 (estimate = 0.07, $SE = 0.01$, 95% *Boot CI* = [0.012; 0.019]) and work engagement at T2 (estimate = 0.08; $SE = 0.02$; 95% *Boot CI* = [0.023, 0.039]), as evidenced by a 95% bias-corrected bootstrap confidence interval that did not include zero. Therefore, the H3a and H3b were supported.

Hypothesis 4 predicted that exhibiting presenteeism behavior over the long-term would hinder job performance (H4a) and work engagement (H4b), while provoking greater emotional exhaustion (H4c) *via* effort exertion. Our results in **Table 2** indicate that presenteeism has negative cross-lagged relationships with job performance and work engagement as well as positive cross-lagged relationship with emotional exhaustion *via* effort exertion over a 1-year interval (T3). Specifically, the indirect effect of presenteeism at T1 on job performance at T3 through effort exertion at T1 was negative ($\beta = -0.17$, $p < 0.01$). Therefore, effort exertion mediates the relationship between presenteeism at T1 and job performance at T3, supporting H4a.

Likewise, the indirect effect of presenteeism at T1 on work engagement at T3 through effort exertion at T1 was negative ($\beta = -0.23$, $p < 0.001$). Thus, effort exertion mediates the relationship between presenteeism at T1 and work engagement at T3, supporting H4b. Similarly, the indirect effect of presenteeism at T1 on emotional exhaustion at T3 through effort exertion at T1 was positive ($\beta = 0.16$, $p < 0.01$) in the long run (T3). In sum, effort exertion at T1 mediated the relationship between presenteeism at T1 and emotional exhaustion at T3, supporting H4c.

Moreover, our bootstrap analyses of the mediating effects further confirmed these results by showing the mediating effect of effort exertion between presenteeism on job performance (estimate = −0.08, $SE = 0.01$, 95% *Boot CI* = [−0.014; −0.009]) and work engagement (estimate = −0.09, $SE = 0.02$, 95% *Boot CI* = [−0.012; −0.008]), as well as emotional exhaustion (estimate = 0.12, $SE = 0.01$, 95% *Boot CI* = [0.001; 0.017]) at the 12-month interval (T3). Therefore, the H4a, H4b, and H4c were supported.

Overall, our findings support all the proposed hypotheses and raise important issues concerning the management of

presenteeism. Furthermore, our proposed process-based model of presenteeism highlights and captures the differential effect of presenteeism behaviors across different time spans.

DISCUSSION

Our study answers the call to provide empirical evidence regarding the differential effects of timeframes on employee presenteeism patterns (Lohaus and Habermann, 2019). This pioneering research helps understand the psychological mechanisms influencing presenteeism over distinct timeframes (one week and one year), each leading to different personal and work outcomes, whether positive or negative.

The aim of this study was two-fold: shed light on the inconsistent results of previous presenteeism studies by investigating its short and long-term effects and understand the psychological mechanisms transforming neutral presenteeism behavior into positive or negative outcomes. In accordance with recent cross-discipline reviews (Ruhle et al., 2020), we consider effort exertion to be the underlying mechanism for presenteeism's effects. We test a process-based model, namely, the presenteeism–effort exertion–outcomes linkage, to analyze the relationship between overt presenteeism behavior and distinct outcomes. Our findings strongly corroborate this model, which differentiates short and long-term presenteeism (H1 and H2) and captures the process-based model of presenteeism (H3 and H4).

These results provide strong evidence of the distinctive outputs of short versus long-term presenteeism. Indeed, working while feeling unwell for a short period of time is conducive to job performance (H1a) and work engagement (H1b), without negatively affecting personal well-being. However, recurrent presenteeism and overwork lead to decreased job performance (H2a), work engagement (H2b), and well-being (H2c) after a year. Furthermore, these relationships are mediated by effort exertion. Specifically, we found presenteeism to be positively related to job performance and work engagement through effort exertion over a one-week interval (H3a and H3b). However, the same scenario generated distinct patterns over time. Through effort exertion, presenteeism was negatively related to job performance and work engagement, though positively related to emotional exhaustion over a one-year interval (H4a–c). These effects were attributed to effort exertion, the psychological mechanism underlying observable presenteeism behavior.

By differentiating between overt presenteeism behavior and real effort exerted through presenteeism, our multi-timeframe study reconciles the contradictory consequences of presenteeism behaviors found in previous research. Some scholars have described presenteeism as exerting effort at work despite exhaustion or illness, indicating high engagement with a task and, therefore, beneficial over the short-term (Biron and Saksvik, 2009; Godøy, 2016; Karanika-Murray and Biron, 2020). However, presenteeism can represent a silent cost for organizations over longer periods of time (e.g., Demerouti et al., 2009; Gustafsson and Marklund, 2014; Lu and Chou, 2020). The reason for this remarkable change has not been explained in prior research. By considering effort exertion, we connect stress theory with resource theory to address this research gap. In accordance with previous studies that identified effort exertion as an invisible mechanism regulating individual efforts and work performance (e.g., Brown and Peterson, 1994; Brown and Leigh, 1996; Cook et al., 2000), our findings measuring presenteeism over different timeframes clarify how individuals allocate their limited effort capacity to work activities and how this allocation leads to different outcomes. Overall, by incorporating time into a process-based model, our framework offers a more nuanced treatment of presenteeism.

Theoretical Contribution

From a theoretical perspective, our study has important implications for the presenteeism research field. Different theories have been adopted to explain the inconsistent presenteeism outcomes for different time periods, though an overarching theory to elucidate the consequences of presenteeism has been lacking. For example, job demand-resource theory (Bakker and Demerouti, 2007) is commonly applied in longitudinal research to explain the negative consequences of presenteeism on job performance and well-being (e.g., Baker-McClearn et al., 2010; Deery et al., 2014; McGregor et al., 2016). By contrast, cross-sectional studies have adopted self -determination theory (Deci and Ryan, 2000) to explain the relationship between presenteeism and positive work-related outcomes (e.g., Cooper and Lu, 2019; Karanika-Murray and Biron, 2020). Thus, we provide a comprehensive conceptual model to explain the paradoxical outcomes of presenteeism behavior.

By considering the temporal effects of the stressor and by using the CATS and COR frameworks, we attempt to harmonize these findings. Thus, our results reveal how the presenteeism–effort exertion–outcomes linkage performs over different time spans. Being able to use a single model to explain prior contradictory presenteeism results will benefit the presenteeism field with a more systematic research design and robust findings.

Our proposed process-based model of presenteeism parallels the effort–recovery model (E-R model; (Meijman and Mulder, 2013), which suggests that effort activates "load reactions" leading to physiological and psychological reactions. These reactions are normal responses among people coping with demands over a short timeframe; however, without sufficient recovery time, load reactions have detrimental effects on job performance (Williams et al., 2006; ten Brummelhuis and Bakker, 2012) and health (Hall et al., 2010). Both CATS and E-R theories consider work demands as neutral stimuli within an expected duration. They highlight time relevance by suggesting that prolonged overwork and the resulting effort to meet the demands of work can harm well-being and performance.

Our study extends this research by demonstrating a mechanism through which presenteeism leads to short-term positive work-related outcomes but to impaired well-being and performance over the long-term. Our findings corroborate recovery literature. Research applying the E-R model has found promising effects of different forms of recovery on future work-related outcomes such as job performance and

well-being (Sonnentag and Fritz, 2015). Some scholars have documented the beneficial effects of taking time off during non-work time (e.g., not thinking about work after regular working hours) on future personal well-being and organizational outcomes. For example, Lu and Chou (2020) found that psychological detachment during off-job time can act as a buffer in decreasing the lasting negative effects of heavy workloads on work engagement as well as job performance. In addition, in a five-wave follow-up study, Meier and Cho (2019) found that switching-off psychologically after work can decrease the negative impact of work stressors on family relationships, in particular, the relationship with partners. Therefore, future research could include recovery in presenteeism research to clarify the role of rest time in coping with demanding work environments.

Managerial Implications

The results of our study also have implications for both organizational strategies and managerial practice. As we have corroborated, attending work while unwell has a catalytic effect on effort exertion, engagement, and performance, as well as on increased productivity for an organization though only in the short-term. These results may be more salient due to the Chinese cultural background of our sample. Lu and Chou (2017) have applied social cognitive theory (Bandura, 1997) to explain Chinese self-efficacy in displaying presenteeism behavior. The internalized Confucian cultural norms regarding both hard work and diligence as well as the social relatedness and interpersonal harmony of Chinese employees may function as push-and-pull factors for personal decisions regarding time commitments at work. However, such behavior harms employee performance and well-being over time. Therefore, organizations must attempt to decrease these practices to prevent the "accumulative consequences on downstream health" (Johns, 2010, p. 533).

Organizations and managers should clarify and ensure that taking sick leave when necessary is allowed and duly adjust task allocation or find replacements to reduce pressure on employees to adopt presenteeism behaviors. The appropriate use of sick leave and recovery as a health-promoting strategy is well-documented in recovery research (Bakker and Demerouti, 2017). Moreover, organizations should create work environments in which attractive incentives or other extrinsic reinforcements (e.g., praise) are provided in order to increase employee perceptions of fairness and organizational support (Olafsen et al., 2015). Both psychological states improve employee well-being (Eisenberger et al., 1999).

Furthermore, a central idea of our study is that, in order to obtain long-term sustainability, organizations should tend to employees' health and review corporate health management policies to ensure that, wherever possible, they do not penalize staff who take sick leave for legitimated reasons. This viewpoint provides implications for organizations and individuals given current trends regarding the adoption of digital practices and the increased virtualization of work, processes which the COVID-19 pandemic has accelerated.

Thereby, employees may also continue to work during illness or return to work too soon, as they do not want to let down their managers and colleagues because they believe that their fellow employees do not consider them sufficiently unwell to take time off (Hayes et al., 2020). Research regarding the impacts of presenteeism by employees with infectious conditions has found that people frequently continue to work while experiencing contagious flu-like symptoms, raising particularly serious public health concerns given the current pandemic (Webster et al., 2019). Therefore, organizational practices should consider that those who have contracted a fairly "mild" case of COVID-19 might return to work while experiencing symptoms such as chronic fatigue and cognitive difficulties several months later; this, in turn, could damage individual well-being, vigor, and organizational effectiveness over the long-term.

Limitations and Directions for Future Research

Our study has some limitations, though each also represents an opportunity for future research. First, we used self-reported measures, which may suffer from common method variance bias (Podsakoff et al., 2003). To minimize this, we adopted a longitudinal research design to separate the explanatory variables (presenteeism and effort exertion) over time from dependent variables (job performance, work engagement, and well-being). In addition, we conducted a *post hoc* analysis using Harman's single-factor test (Podsakoff et al., 2003) to detect any possible effects. However, future research could adopt a supervisor–employee dyadic study design to cross-validate our findings, including job performance ratings by supervisors.

We also extended existing studies on presenteeism to a non-Western society; however, the generalization of our findings may be limited by the convenience sample we recruited in Taiwan. Future studies should recruit larger and more representative samples to allow for the generalizability of our research findings in both Western and Eastern contexts.

Additionally, there is evidence that the type of health conditions predispose a person to work while ill (Gosselin et al., 2013); therefore, future research could include employees' specific health status as a control variable. Similarly, we did not control the firm-level contextual characteristics, which may result in omitted variable bias. However, we did control for some organizational factors such as organizational pressure to work and job replacement policies (not reported in the tables as they were nonsignificant). Future research could also pursue studies in different industries and countries to capture cross-cultural values and additional contextual characteristics.

CONCLUSION

This study contributes to shed light on the presenteeism behaviors which have a differential effect based on the scope considered (short versus long-term). By reconciling inconsistent findings regarding the outcomes of presenteeism behavior thanks to

our study's robust design, our research thus offers a more neutral perspective for the prevailing negativist view of presenteeism behavior. This study extends the organizational presenteeism research domain by clarifying the relationships between presenteeism and its outcomes, as well as corroborating that effort exertion mediates the relationship between presenteeism and work-related outcomes.

DATA AVAILABILITY STATEMENT

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

AUTHOR CONTRIBUTIONS

C-YC: conceptualization, funding acquisition, formal analysis, and resources. C-YC and MM: methodology, writing—original draft preparation, and writing – review. MM: editing and finalize. All authors have read and agreed to the published version of the manuscript.

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Increased Working From Home in Vocational Counseling Psychologists During COVID-19: Associated Change in Productivity and Job Satisfaction

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During the coronavirus disease 2019 (COVID-19) pandemic, vocational counselors in Switzerland more frequently worked from home (WFH) and less frequently worked on-site. The aim of this study was to assess how WFH corresponds with indicators of job performance and occupational wellbeing. More specifically, the current questionnaire study analyzed the increase in WFH, self-reported productivity, distractibility in WFH, current job satisfaction, work-life balance in WFH, and feeling of loneliness. Findings showed that the increase in WFH in vocational counseling psychologists during the COVID-19 pandemic was associated with an increase in productivity and job satisfaction and with lower distractibility in WFH compared to work on-site. However, more frequent WFH was not significantly associated with improved work-life balance during the COVID-19 pandemic. Vocational counselors who shared the office on-site with many colleagues experienced higher feeling of loneliness during WFH. Vocational counselors regarded the condition of WFH as productive and satisfying while work-life balance did not improve. The discussion sheds light on the potential WFH-related increase of boundary management demands.

Keywords: work from home (WFH), telework, remote work, vocational counseling, COVID-19 pandemic, productivity, job satisfaction

INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic changed the work of many employees (Galliker et al., 2021a), on top of persisting occupational change toward more flexible work places and work times, as well as shorter working hours (Kamerāde et al., 2019; Balderson et al., 2020).

The same applied to vocational counselors, whose work environment changed significantly. Working from home (WFH) increased largely (Galliker et al., 2021a). Before COVID-19, most vocational counseling happened in person. During the COVID-19 pandemic, online counseling was introduced, which can be used on-site as well as from home.

Even though WFH before COVID-19 was not very common in vocational counselors, WFH has a long history and can have different forms, depending on the employment status and permanent vs. occasional working from home. Recently, the International Labour Organization distinguished home-based workers, homeworkers, and teleworkers (International Labour Organization, 2021). Based on this scheme, vocational counselors can be classified as permanently employed teleworkers who work at home on an occasional basis (International Labour Organization, 2021). Thus, telework is characterized by an increased use of information and communication technologies by employees (ICTs; Aborg et al., 2002; Messenger and Gschwind, 2016; International Labour Organization, 2021).

While working conditions in office have been studied extensively, knowledge about the working conditions at home and their impact on the occupational health and productivity of an employee is limited. In their meta-analysis, Gajendran and Harrison (2007) reported positive associations between telecommuting and mental health (telecommuting must not, but is often done at home). Grant et al. (2013) conducted in-depth interviews with 11 experienced workers who did WFH. Workers reported positive as well as adverse impacts of WFH on wellbeing, with the latter due to overworking and a lack of time for recuperation. A review of 12 studies highlights the health risks that arise from musculoskeletal complaints when the workplace design is inadequate in WFH (Wütschert et al., in press). A recent longitudinal study, however, did not find an increase in musculoskeletal pain in Swiss office workers who worked from home full time after the COVID-19 pandemic outbreak, although ergonomic conditions were worse at home (Aegerter et al., 2021). Moreover, no decrease in presenteeism was observed (Aegerter et al., 2021). Another recent large longitudinal study from February 2020 to February 2021, which covered the COVID-19 and lockdown-related increase in WFH, also found an increase in indicators of health and wellbeing and a decrease in presenteeism (Galliker et al., 2021a). Hence, despite mixed effects of WFH on employee health, more consistent evidence exists on positive effects of WFH on job performance and job satisfaction (e.g., Kröll and Nüesch, 2019; Galliker et al., 2021a).

For instance, Bloom et al. (2015) randomly assigned call center employees to either a WFH group or an on-site work group for 9 months. WFH led to a 13% performance increase. This improvement came mainly from a 9% increase in the number of minutes they worked during their shifts (e.g., by taking fewer breaks) and 4% originated from working faster (more calls per minute, attributed to a quieter and more convenient working environment). In accordance with the rather consistent findings on improved performance in WFH, we expect more frequent WFH to be associated with higher self-reported productivity (H1).

Nevertheless, performance in WFH might depend on working conditions in WFH. Even when it can be expected that certain ergonomic working conditions are worse at home compared to on-site work, other ergonomic conditions, such as distractibility, were rarely addressed in WFH so far. Wegner et al. (2011) found that teleworkers showed higher vigilance and more distinct inner calm when they worked from home than when they worked in an office. Since inner calm and higher vigilance both overlap with lower distractibility, we expect lower distractibility to be a performance-related advantage of WFH. For most vocational counselors, we expect distractibility in WFH to be lower than during work on-site. Therefore, we expect more frequent WFH to be related to less distractibility at home compared to on-site work (H2).

Evidence for higher job satisfaction in WFH is rather consistent (e.g., Kröll and Nüesch, 2019). Bloom et al. (2015) found not only productivity but also job satisfaction to increase by WFH. In addition to higher productivity and lower distractibility in WFH, we expect more frequent WFH to correspond with higher job satisfaction (H3).

Various studies have shown that employees who have flexible work arrangements, including WFH, experience less work-family conflict and less family-work conflict (Hill et al., 2003; Byron, 2005; Kelly et al., 2008; Joyce et al., 2010; Solís, 2016). Conflicts between work and family life reflect a low work-family balance that is defined as "the extent to which an individual is equally engaged in—and equally satisfied with—his or her work role and family role" (Greenhaus et al., 2003, p. 513). Using a broader conceptual approach that does not only refer to family life as the major domain of life outside work (Guest, 2002), Grant et al. (2013) found that WFH made work life and non-work life more compatible and therefore improved work-non-work-life balance. Hence, more frequent WFH should be associated with a better work-life balance (H4).

There is evidence that commuting times may threaten work-life balance (Bai et al., 2021). As a positive consequence of WFH, commuting days per week decreased between February 2020 and February 2021 in Switzerland (Galliker et al., 2021a). In 2019, the average commuting time to work in Switzerland was 29.5 min one way (Bundesamt für Statistik [BFS], 2021). The duration of commuting is significantly associated with lower wellbeing next to many task demands, job resources, as well as private demands and resources (Elfering et al., 2020; Gerpott et al., 2021). During COVID-19 pandemic, longer commuting times may also be perceived as a higher risk of infection. Hence, more frequent WFH should be associated with a better work-life balance when (the thus saved) commuting time is longer (H5).

The study of loneliness at the workplace is a relatively new research field (Wright and Silard, 2021).

Wood et al. (2021) found that loneliness—besides the ability to detach from work—is the crucial factor in the changing level of wellbeing in WFH. In the experimental study of Bloom et al. (2015), 50% of WFH group participants wanted to switch back to on-site work. "Loneliness was the single biggest reason." Bloom explained in an interview with *The Guardian* (Usborne, 2020). During the COVID-19 pandemic, physical isolation during work may have resulted in increased social isolation because of reduced work contacts and predominant virtual communication (Lengen et al., 2021). Therefore, WFH may be associated with feeling of isolation from colleagues when vocational counselors—before the COVID-19 pandemic—were used to sharing the office with one or more colleagues and now do WFH. Hence, the current study expects feeling of loneliness during WFH to correspond

positively with the number of office coworkers before the COVID-19 pandemic (H6).

Hypotheses

The study hypotheses are shown in **Figure 1**.

Hypothesis 1: More frequent WFH is associated with a higher work productivity in WFH compared to work on-site.
Hypothesis 2: More frequent WFH corresponds to lower distractibility in WFH compared to work on-site.
Hypothesis 3: More frequent WFH is associated with higher job satisfaction.
Hypothesis 4: More frequent WFH is associated with a better work-life balance during the COVID-19 pandemic.
Hypothesis 5: More frequent WFH is more strongly associated with better work-life balance during the COVID-19 pandemic when commuting time is longer.
Hypothesis 6: Vocational counselors who share the office on-site with many colleagues experience higher feeling of loneliness when they are working from home.

MATERIALS AND METHODS

Data Collection

The participants were recruited through various channels. The first author (AZ) contacted most of the organizations in German-speaking Switzerland directly, including the heads of the offices, with the invitation to her survey and request for forwarding. The same applied to the academic advising centers of the universities and universities of applied sciences in German-speaking Switzerland. The participants could indicate if they were interested in the survey results. A total of 266 vocational counselors were solicited. This resulted in a response rate of 89%. It is not known whether participants could complete the survey during working hours, except for one public career counseling center that explicitly allowed this. The survey took place from early November 2020 to early December 2020. The participants were primarily asked about their current work situation in November and December 2020. It is important to note that on October 18, 2020, the Swiss Federal Council increased protective measures against the then sharply rising infection rates. More specifically, it recommended to work from home whenever possible (Federal Council media release of October 18, 2020).

The duration of the survey was approximately 15 min. All data were collected completely anonymously. The study participants were informed of the content of the study and its voluntary participation. The study language was German. The study was approved by the ethics committee of the University of Bern, Switzerland (12.01.21, Ethics No. 2021-01-00001).

Sample Characteristics

The sample consisted of 238 vocational, academic, and career counselors from German-speaking Switzerland. The participants included career counselors from occupational rehabilitation offices, cantonal vocational counseling offices, academic career counseling offices at universities, and private career counseling. In addition, some participants worked in related fields, such as

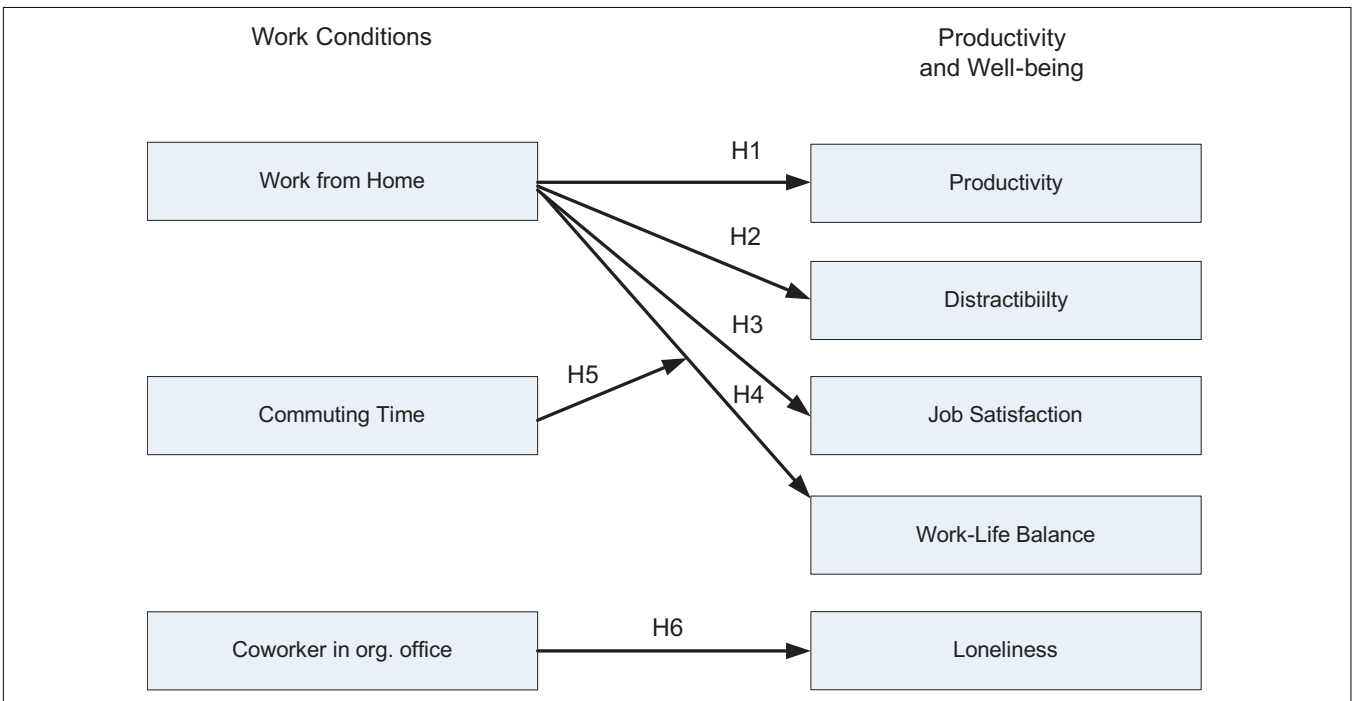

FIGURE 1 | Study hypotheses on working conditions during the coronavirus disease 2019 (COVID-19) pandemic and self-reported productivity, distractibility, and indicators of wellbeing.

internal career counseling in large companies or in institutions for bridge offers. This was an accrual sample, as it was not stratified and randomly selected.

The majority of participants were females (68.9%), married (82.4%), had a university/technical college degree (95.8%), and worked at a public career guidance office (61.8%). Specifically, more public career counselors participated in the survey than rehabilitation career counselors (21.0%). It is important to note that there are more public than rehabilitation vocational counselors throughout Switzerland. Furthermore, the contact details of the public vocational guidance offices are freely available on the Internet and could be contacted directly. The participants worked an average of 75% and were 46.2 years old. They had an average of 10.6 years of professional experience and had been working for the same employer for 8.5 years. Compared to public career counselors, rehabilitation vocational counselors were slightly younger on average, had less professional experience (also the duration of employment was somewhat lower), and worked at least 50% (vs. 30% for the public counselors).

At the time of data collection, 69.3% of respondents worked from home. Before the COVID-19 pandemic, there were only 28.2% participants who reported to WFH. Equally, there were only a few respondents who solely worked from home. The majority worked at home up to 10 days per month (no WFH: 30.7%; half a day to 5 days/month: 41.3%; 6–10 days/month: 15.6%, more than 10 days/month: 12.4%). Furthermore, the majority (91.5%) of participants who did WFH stated that they had an undisturbed work environment at home. The reasons why participants did not work from home were assessed in an open question and coded by a blind rater. Most respondents reported that they preferred to meet clients in person (25 out of 73) or that clients preferred a personal contact (19 out of 73). Sixteen participants explained that their office on-site was better equipped than their office at home. Finally, 13 participants reported their supervisor wanted them to work on-site.

Measures

Predictor Variables

Working from home (WFH) was assessed by asking subjects whether they worked from home ("Do you work from home?") with "Yes" and "No" as response options. If participants answered "no," they were asked to explain why in an open question. Participants were then asked whether they had already worked at home before the first corona-related lockdown (March 2020–June 2020) and, if so, how many days per month on average. Furthermore, they were asked whether they were *currently* working at home and, if so, how many days per month on average. Thus, "currently" referred to the time of data collection in November/December 2020. The questions used were adapted from the WFH questions used by Galliker et al. (2021a).

Commuting time was assessed by asking participants the duration of one-way commute from home to work, where 1 = less than an hour, 2 = about 1 h, and 3 = between 1 and 2 h.

Coworker in the on-site office was assessed by asking participants with how many coworkers they shared the on-site office.

Outcome Variables

Some outcome measures asked participants to compare their current work situation with the situation before the corona-related lockdown (March–June 2020). They were explicitly not asked about WFH during the corona-induced lockdown, as many other factors would have influenced the results during this time (e.g., homeschooling of the children).

If not specified otherwise, response options were indicated on a five-point Likert response scale (1 = completely agree, 2 = disagree, 3 = undecided, 4 = agree, and 5 = completely agree).

Productivity addressed WFH productivity versus on-site productivity ("When working from home, I am more productive than on-site"). The item used was adapted from the WFH questionnaire developed by Aczel et al. (2021).

Distractibility was measured with the following item: "When working from home, I am less distracted than on-site." The item was adapted from the WFH questionnaire developed by Aczel et al. (2021).

Work-life balance. The balance between work and non-work life was assessed by a single item adopted from Lonska et al. (2021): "Since the COVID-19 pandemic, work-life balance has improved."

Loneliness during WFH was assessed with the following item: "Sometimes I feel lonely when working from home," a question that was adopted from Golden et al. (2008).

Job satisfaction. The Kunin faces question (KFQ) was used to measure job satisfaction (Kunin, 1955). The KFQ is a single-item measure of overall satisfaction that focuses primarily on the affective component of job satisfaction compared with other scales (Elfering and Grebner, 2011; Elfering et al., 2016). The KFQ asked "How satisfied do you currently feel with your work?" This measure was assessed with seven smiley faces with written labels, ranging from a deep frown (1 = very unsatisfied) to a large smile (7 = very satisfied). Wanous et al. (1997) reported a good reliability and validity of the KFQ single-item measure of overall job satisfaction.

Control Variables

Age, gender, relationship status, leadership function, part-time work, number of children, and work demands were included as control variables in the regression analyses.

Age was included as a control variable because work and private demands that have an impact on work-life balance change with age (Rantanen et al., 2012). Furthermore, job satisfaction has been shown to be positively related to age (Spector, 1997).

Gender (i.e., 1 = female and 2 = male) was included as a control variable because gender differences in self-rated work productivity and job satisfaction during the lockdown may arise (Feng and Savani, 2020). Women are expected to spend more time on domestic work and childcare than their male counterparts when working from home.

Relationship status was included as a control variable because being in a relationship can alleviate stress or buffer the stressor-strain association (Grandey and Cropanzano, 1999). It was operationalized as "in a relationship" or "single."

Leadership function (yes/no). Working from home with leadership function does afford new remote leadership behavior (Parker et al., 2020; De Bloom and Keller, 2021a,b; Schall and Chen, 2021).

Number of children living in the same household. During the COVID-19 pandemic, new demands emerged with having children who also had to adopt to circumstances like home schooling (Harth and Mitte, 2020).

Part-time work can reduce work-life conflict (Roeters and Craig, 2014). Part-time work of an employed person was assessed in percentages of a full-time work equivalent (e.g., 60% of 100%; in Switzerland, 100% corresponds to 42 h of working time per week).

Job demands were included as control variables as working from home can introduce alterations in job demands (Sardeshmukh et al., 2012). Job demands were assessed using the scales quantitative work stress (e.g., "I have too much work") and qualitative work stress (e.g., "At this work, there are things that are too complicated") of the "Short Questionnaire for Work Analysis" (Prümper et al., 1995). The respective scales contain two items each. Response options were indicated on a five-point Likert response scale ("strongly disagree" to "strongly agree"). Cronbach's alpha was 0.89 for quantitative work stress and 0.69 for qualitative work stress.

Statistical Analyses

We used IBM SPSS Statistics 23, Armonk, NY, New York for all analyses. For the multiple regression analysis, we calculated linear regression models using the enter method. The multiple linear regression consisted of two steps: step 1 included control variables and step 2 included predictor variables [days WFH (# days/month), commuting time, and days WFH × commuting time or number of coworkers in the office on-site]. When examining hypothesis 5 with the interaction term, the predictor variables were centered.

We used an alpha level of 0.05, and the tests were two-tailed.

RESULTS

Descriptive Results

The mean values of study variables are shown in **Table 1**. When asked whether productivity in WFH was higher than on-site, most respondents were undecided in this question. Slightly more respondents agreed than disagreed (12.2% completely disagreed, 18.5% disagreed, 31.5% were undecided, 29.4% agreed, and 8.4% completely agreed).

The pattern of answers is more pronounced with respect to WFH when respondents were asked whether distraction in WFH was lower than on-site. The majority of respondents agreed that distractibility in WFH is lower than on-site work (11.8% completely disagreed, 16.9% disagreed, 19.0% were undecided, 35.4% agreed, and 16.9% completely agreed).

The mean value of current job satisfaction (5.28) reflects more than 80% of respondents who report being satisfied, very satisfied, or extremely satisfied with their current work (0.4% extremely unsatisfied, 1.9% very unsatisfied, 3.4% unsatisfied,

TABLE 1 | Mean values and Pearson correlations between study variables.

	M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Higher productivity in WFH	3.03	1.14	1															
2. Less distractibility in WFH	3.29	1.26	0.78***	1														
3. Higher loneliness in WFH	2.59	1.17	−0.16*	−0.15*	1													
4. Better work-life balance in WFH	4.28	0.87	0.01	0.09	−0.21**	1												
5. Job satisfaction	5.28	1.06	0.09	0.01	−0.09	0.18**	1											
6. Qualitative work demands	2.09	0.92	0.04	0.08	0.18**	−0.16*	−0.21***	1										
7. Quantitative work demands	3.06	0.96	0.18**	0.14*	0.09	−0.22***	−0.21**	0.45***	1									
8. WFH (# days/month)	4.02	4.83	0.31***	0.25***	0.14*	−0.04	0.11	0.15*	0.23***	1								
9. Coworker in org. office	1.07	1.65	0.23***	0.24***	0.18**	−0.02	0.03	0.17**	0.14*	0.41***	1							
10. Commuting time	1.41	0.66	0.14*	0.16*	−0.03	0.06	0.06	0.07	0.12	0.13*	0.01	1						
11. Age (years)	46.23	9.76	−0.15*	−0.18**	−0.09	0.14*	0.08	−0.05	−0.16*	−0.15*	−0.16*	−0.02	1					
12. Gender (1 = female, 2 = male)	1.31	0.46	−0.16*	−0.14*	−0.01	−0.02	0.01	0.11	0.04	−0.06	−0.05	0.04	0.11	1				
13. Partnership (0 = no, 1 = yes)	0.82	0.38	−0.03	−0.09	−0.10	0.04	0.04	0.01	−0.06	−0.05	0.01	0.09	0.08	0.07	1			
14. Leadership (0 = no, 1 = yes)	0.13	0.34	0.02	0.09	−0.17*	−0.03	0.10	−0.11	0.06	0.04	−0.06	−0.13	0.03	0.09	0.08	1		
15. Part-time work (%FTE)	75.18	13.86	0.06	0.13*	0.06	0.02	−0.11	0.06	0.19**	0.15*	0.12	−0.13*	−0.11	0.25***	−0.24***	0.22***	1	
16. Children	0.82	1.04	0.02	−0.08	−0.09	−0.06	0.21**	−0.04	0.01	−0.08	−0.04	−0.06	−0.01	0.10	0.27***	0.21***	−0.35***	1

*N = 238; %FTE = percentage of full-time equivalent. *p < 0.05, **p < 0.01, ***p < 0.001.*

13.9% undecided, 32.4% satisfied, 41.2% very satisfied, and 7.1% completely satisfied).

Regarding the work-life balance, the pattern is in favor of WFH. More than three-quarters of respondents agreed that since the COVID-19 pandemic outbreak, their work-life balance has improved (no respondent completely disagreed, 4.6% disagreed, 13.5% were undecided, 30.8% agreed, and 51.1% completely agreed). Loneliness in WFH was denied by most respondents. Only a quarter of participants agreed that they sometimes feel lonely when working from home (21.1% completely disagreed, 29.1% disagreed, 23.6% were undecided, 21.5% agreed, and 4.6% completely agreed).

Pearson correlations of study variables are shown in **Table 1**. The correlation between productivity and distractibility is very high ($r = 0.78$, $p < 0.001$). Both higher productivity in WFH and lower distractibility in WFH are positively related with more frequent WFH (productivity: $r = 0.31$, $p < 0.001$; distractibility: $r = 0.25$, $p < 0.001$) and quantitative work demands (productivity: $r = 0.18$, $p < 0.01$; distractibility: $r = 0.14$, $p < 0.05$). Higher productivity in WFH and lower distractibility in WFH also corresponded with longer commuting times (productivity: $r = 0.14$; $p < 0.05$; distractibility: $r = 0.16$, $p < 0.05$). Job satisfaction showed negative associations with quantitative work demands ($r = -0.21$, $p < 0.01$) and qualitative work demands ($r = -0.21$, $p < 0.001$) but no significant associations with frequency of WFH. The work-life balance also showed negative associations with quantitative ($r = -0.22$, $p < 0.001$) and qualitative work demands ($r = -0.16$, $p < 0.05$) but no associations with frequency of WFH. Higher qualitative work demands correspond to higher feeling of loneliness in WFH ($r = 0.18$, $p < 0.01$). Sharing the on-site office with more colleagues is associated with higher feeling of loneliness in WFH ($r = 0.18$, $p < 0.01$). More frequent WFH was also slightly associated with higher feeling of loneliness ($r = 0.14$, $p < 0.05$).

Hypotheses Testing

All hypotheses were examined with the multiple linear regression analysis. Informal examination of the data with histograms and scatterplots revealed no serious threats to underlying distributional assumptions of the residuals.

By testing the first hypothesis, a multiple regression was carried out to investigate whether WFH could significantly predict productivity above and beyond control variables. The results of the regression indicated that the model explained 14.1% of the variance and that the model was a significant predictor of productivity [**Table 2**; $F(9,224) = 4.094$, $p < 0.001$]. WFH contributed significantly to the model ($\beta = 0.267$, $p < 0.001$, variation explained by WFH = 6.5%; $\Delta R^2 = 0.065$), corroborating hypothesis 1, which predicted that more frequent WFH was related to higher self-reported productivity in WFH compared to work on-site above and beyond control variables.

The second hypothesis examined whether more frequent WFH corresponds to lower distractibility in WFH compared to work on-site. Another multiple linear regression was calculated to predict distractibility based on WFH and control variables. A significant regression equation was found [**Table 3**; $F(9,223) = 3.446$, $p < 0.001$] with an R squared value of 0.122. The results of the multiple linear regression indicated that the model

TABLE 2 | Multiple linear regression analysis for work from home (WFH) predicting higher productivity in WFH compared to work on-site (H1).

Variable	*B*	*SE B*	β	*t*	*p*
Age (years)	−0.008	0.008	−0.066	−1.019	0.309
Gender (1 = female, 2 = male)	−0.384	0.167	−0.154*	−2.302	0.022
Partnership (0 = no, 1 = yes)	0.034	0.197	0.011	0.170	0.865
Leadership (0 = no, 1 = yes)	−0.060	0.233	−0.018	−0.259	0.796
Part-time work (%FTE)	0.005	0.006	0.061	0.786	0.433
Children	0.078	0.081	0.070	0.955	0.340
Qualitative work demands	−0.059	0.088	−0.048	−0.675	0.500
Quantitative work demands	0.146	0.087	0.122	1.683	0.094
WFH (# days/month)	0.063	0.015	0.267***	4.113	<0.001
Total R^2			0.141***		<0.001
$F(9,224) = 4.094$					

*N = 234; *p < 0.05, ***p < 0.001.*

TABLE 3 | Multiple linear regression analysis for work from home (WFH) predicting less distractibility in WFH compared to work on-site (H2).

Variable	*B*	*SE B*	β	*t*	*p*
Age (years)	−0.015	0.009	−0.117	−1.785	0.076
Gender (1 = female, 2 = male)	−0.392	0.187	−0.143*	−2.103	0.037
Partnership (0 = no, 1 = yes)	−0.106	0.220	−0.032	−0.483	0.630
Leadership (0 = no, 1 = yes)	0.363	0.260	0.096	1.396	0.164
Part–time work (%FTE)	0.007	0.007	0.075	0.960	0.338
Children	−0.047	0.091	−0.038	−0.520	0.603
Qualitative work demands	0.055	0.099	0.040	0.561	0.575
Quantitative work demands	0.061	0.097	0.046	0.632	0.528
WFH (# days/month)	0.049	0.017	0.185**	2.814	0.005
Total R^2			0.122***		<0.001
$F(9,223) = 3.446$					

*N = 233; *p < 0.05, **p < 0.01, ***p < 0.001.*

TABLE 4 | Multiple linear regression analysis for work from home (WFH) predicting job satisfaction (H3).

Variable	*B*	*SE B*	β	*t*	*P*
Age (years)	0.009	0.007	0.080	1.248	0.213
Gender (1 = female, 2 = male)	0.043	0.153	0.019	0.284	0.776
Partnership (0 = no, 1 = yes)	−0.113	0.181	−0.041	−0.625	0.533
Leadership (0 = no, 1 = yes)	0.142	0.213	0.045	0.667	0.505
Part-time work (%FTE)	−0.003	0.006	−0.039	−0.503	0.616
Children	0.217	0.075	0.211**	2.916	0.004
Qualitative work demands	−0.163	0.081	−0.142*	−2.019	0.045
Quantitative work demands	−0.198	0.080	−0.180*	−2.490	0.014
WFH (# days/month)	0.047	0.014	0.215**	3.330	0.001
Total R^2			0.152***		<0.001
$F(9,224) = 4.452$					

*N = 234; *p < 0.05, **p < 0.01, ***p < 0.001.*

explained 12.2% of the variance of distractibility. Moreover, WFH was a significant predictor of distractibility (β = 0.185, $p = 0.01$; variation explained by WFH = 3.1%; $\Delta R^2 = 0.031$). In line with the second hypothesis, more frequent WFH predicted less distractibility in WFH compared to work.

The third hypothesis postulated more frequent WFH to be associated with higher job satisfaction. **Table 4** shows the results of the corresponding multiple linear regression analysis where job satisfaction was predicted by WFH and control variables. The results of the regression illustrated that the multiple linear regression model explained 15.2% of the variance in job satisfaction as the dependent variable. The regression equation was found to be significant [**Table 4**; $F(9,224) = 4.452$, $p < 0.001$]. In compliance with hypothesis 3, WFH contributed significantly to the model (β = 0.215, $p = 0.001$; variation explained by WFH = 4.2%; $\Delta R^2 = 0.042$).

According to the fourth hypothesis, more frequent WFH is expected to significantly predict better work-life balance during the COVID-19 pandemic beyond control variables. Testing hypothesis 4 in a multiple repression analysis resulted in only 7.1% of the variance in work-life balance that could be explained by the regression equation [**Table 5**; $F(9,223) = 1.907$, $p = 0.052$]. WFH was not a significant predictor of work-life balance (β = 0.024, $p = 0.726$). Thus, hypothesis 4 was not supported.

The fifth hypothesis expected that more frequent WFH would be associated with better work-life balance during the COVID-19 pandemic when commuting time is longer. By testing the fifth hypothesis, a multiple linear regression was carried out that included control variables, WFH, commuting time and the interaction between WFH, and commuting time in a regression equation. **Table 6** shows that the regression model explained only 7.7% of the variance in work-life balance as a dependent variable. The combination of independent variables in the regression equation did not achieve a significant prediction of work-life balance [**Table 6**; $F(11,221) = 1.681$, $p = 0.079$]. The interaction between WFH and commuting time did not significantly contribute to the regression model (β = −0.009, $p = 0.894$). Hence, hypothesis 5 was not confirmed.

Finally, the sixth hypothesis postulated that vocational counselors, who shared the on-site office with many colleagues, should be more prone to feeling of loneliness in WFH. A test of the sixth hypothesis also relied on a multiple linear regression to examine whether the number of coworkers in the on-site office could significantly predict loneliness in WFH above and beyond control variables. The results of the multiple linear regression indicated that the regression model accounted for 8.9% of the variance in feeling of loneliness that were explained by the regression model [**Table 7**; $F(9,223) = 2.416$, $p = 0.012$]. In line with hypothesis 6, the number of coworkers in the on-site office contributed significantly to the multiple regression model (β = 0.145, $p = 0.030$; variation explained by coworkers in the on-site office = 2.0%; $\Delta R^2 = 0.020$).

In summary, the results of regression analyses supported H1, H2, and H3: more frequent WFH was associated with higher self-reported productivity in WFH compared to work on-site (H1),

TABLE 5 | Multiple linear regression analysis for work from home (WFH) predicting improved work-life balance during COVID-19 pandemic (H4).

Variable	*B*	*SE B*	β	*t*	*p*
Age (years)	0.010	0.006	0.115	1.705	0.090
Gender (1 = female, 2 = male)	−0.074	0.132	−0.039	−0.561	0.576
Partnership (0 = no, 1 = yes)	0.113	0.156	0.050	0.728	0.468
Leadership (0 = no, 1 = yes)	−0.125	0.184	−0.048	−0.683	0.495
Part-time work (%FTE)	0.005	0.005	0.084	1.041	0.299
Children	−0.022	0.064	−0.026	−0.341	0.733
Qualitative work demands	−0.072	0.070	−0.076	−1.031	0.304
Quantitative work demands	−0.162	0.069	−0.179*	−2.357	0.019
WFH (# days/month)	0.004	0.012	0.024	0.351	0.726
Total R^2			0.071		0.052
$F(9,223) = 1.907$					

*N = 233; *p < 0.05.*

TABLE 6 | Multiple linear regression analysis for the interaction between work from home (WFH) and commuting time in predicting improved work-life balance during COVID-19 pandemic (H5).

Variable	*B*	*SE B*	β	*t*	*p*
Age (years)	0.003	0.002	0.122	1.803	0.073
Gender (1 = female, 2 = male)	−0.025	0.037	−0.047	−0.670	0.503
Partnership (0 = no, 1 = yes)	0.022	0.043	0.035	0.500	0.618
Leadership (0 = no, 1 = yes)	−0.043	0.051	−0.060	−0.842	0.401
Part-time work (%FTE)	0.002	0.001	0.110	1.321	0.188
Children	0.001	0.018	0.004	0.054	0.957
Qualitative work demands	−0.019	0.019	−0.073	−0.989	0.324
Quantitative work demands	−0.048	0.019	−0.190*	−2.477	0.014
WFH (# days/month)	0.001	0.003	0.021	0.308	0.758
commuting time	0.032	0.025	0.089	1.302	0.194
WFH × commuting time	−0.001	0.006	−0.009	−0.133	0.894
Total R^2			0.077		0.079
$F(11,221) = 1.681$					

*N = 233; *p < 0.05.*

TABLE 7 | Multiple linear regression analysis for coworker in the office on-site predicting loneliness in WFH (H6).

Variable	*B*	*SE B*	β	*t*	*p*
Age (years)	−0.005	0.008	−0.041	−0.609	0.543
Gender (1 = female, 2 = male)	0.038	0.175	0.015	0.219	0.827
Partnership (0 = no, 1 = yes)	−0.252	0.209	−0.082	−1.206	0.229
Leadership (0 = no, 1 = yes)	−0.488	0.244	−0.140*	−1.997	0.047
Part-time work (%FTE)	0.003	0.007	0.036	0.444	0.658
Children	0.005	0.085	0.005	0.061	0.952
Qualitative work demands	0.173	0.094	0.137	1.848	0.066
Quantitative work demands	0.004	0.091	0.004	0.047	0.962
Coworker in org. office	0.102	0.047	0.145*	2.187	0.030
Total R^2			0.089*		0.012
$F(9,223) = 2.416$					

*N = 233; *p < 0.05.*

lower distractibility during WFH compared to work on-site (H2), and higher job satisfaction (H3). Hypotheses 4 and 5, in contrast, were not confirmed: More frequent WFH was not associated with higher work-life balance (H4). Interestingly, the reduction in commuting times due to increased WFH during the COVID-19 pandemic was not found to be linked to a higher work-life balance (H5). However, the results confirmed hypothesis 6: a higher number of coworkers in the on-site office was related to higher feeling of loneliness during WFH (H6).

DISCUSSION

In this study, the results confirm that vocational counseling psychologists working from home (WFH) reported lower distractibility, higher productivity, and job satisfaction compared to working on-site. Furthermore, sharing on-site office with coworkers explains feeling of loneliness when working from home during COVID-19 confinement. Contrary to our expectations, WFH and reduction of commuting time do not explain work-life balance.

Working From Home, Productivity, Lower Distractibility, and Job Satisfaction

The current study found higher self-reported productivity in WFH compared to work on-site. A similar result was recently reported in a large Swiss population study that included two measurement points: the baseline questionnaire was collected in February 2020, before the COVID-19 pandemic started, followed by the second questionnaire 1 year later in February 2021 (Galliker et al., 2021a). In this longitudinal study, health-related productivity loss was measured by WPAI (absenteeism and presenteeism) and monthly income. WFH was a significant predictor of productivity, next to job stressors and resources (Galliker et al., 2021a). Future studies should also disentangle different aspects of work productivity that might differently change in WFH (e.g., innovation in WFH; Kniffin et al., 2021). Moreover, it would be interesting to analyze objective measurements of productivity, e.g., the number of clients or the number of counseling sessions.

The frequency of WFH was significantly associated with lower distractibility in WFH compared to work on-site as proposed by H2. A lower distractibility in WFH compared to working on-site may point to more privacy during WFH. A recent study on the role of privacy in WFH showed a significant indirect effect of the level of privacy in WFH via cognitive irritation, indicating a lack of detachment from work issues, resulting in sleeping problems (Wütschert et al., 2021). Hence, distractibility in WFH in relation to work on-site is not only closely linked to productivity but—as a proxy to privacy in WFH and work on-site—also to recovery from work. As a lesson learned from the COVID-19 pandemic, the study of WFH-specific work conditions, including detachment from work, becomes an important goal in work psychology (Rudolph et al., 2021). Furthermore, knowledge about how to best detach in WFH is still scarce. Not surprisingly, some practical strategies from the literature and popular press address privacy in WFH, e.g., having a separate office with a door (Rudolph et al., 2021).

More frequent WFH was associated with higher job satisfaction. The expected findings confirm the evidence from meta-analyses on WFH and important job outcomes, including job satisfaction (Gajendran and Harrison, 2007; Allen et al., 2015). It is important to note that there seems to be some evidence for a non-linear association between the frequency of WFH and job satisfaction, postulating a decreasing job satisfaction for those who nearly always work from home. In the current study, however, the frequency of WFH was only low to moderate with the majority of participants who worked only between 1 and 5 days per month at home. Hence, the linear relationship between the frequency of WFH and job satisfaction in the current study might partly reflect a range restriction in WFH.

Working From Home, the Commuting Time, and Work-Life Balance

Working from home is less restricted to normal office times than work on-site (Jostell and Hemlin, 2018). Therefore, WFH might promote online counseling at unusual work times (for instance, in the evening, after clients have finished their work). As a result, the worktime boundary between work and private life in WFH could gradually disappear. Thus, a potential dissolution of boundaries between work and personal life might result from WFH in vocational counselors. This might have a negative effect on work-life balance, which was originally found to be a positive consequence of WFH (Sinclair et al., 2020; Allen et al., 2021). Therefore, future studies should assess and test the usefulness of the so-called segmentation norms that protect from work-related technology use at home during non-work hours (Park et al., 2011).

Another preventive approach is to increase boundary control. Boundary control is a preventative measure against disappearing boundaries between work and private life in WFH. Boundary control is defined as the perception that an individual influences the transitions between work and family domains in WFH (e.g., the timing, frequency, and direction of transitions; Kossek and Lautsch, 2012). Future studies should test boundary control as a potential moderator of the association between frequency of WFH and work-life balance. The expectation would be that more frequent WFH is related to a better work-life balance but only when boundary control is sufficient. From the meta-analysis of Gajendran and Harrison (2007), researchers learned that WFH mostly includes a gain of autonomy in managing the interface between work and home (i.e., boundary control), but that gain may have been decreased in the latest decade by rising demands to be available 24/7 (Dettmers, 2017). Rudolph et al. (2021) claimed that research should focus on practical strategies to preserve role segmentation in WFH.

In the current study, commuting time and the amount of reduction in commuting times due to increased WFH during the COVID-19 pandemic were not significantly associated with work-life balance. One reason could be the range restriction in WFH: in the current study, the frequency of WFH was

only low to moderate with the majority of participants working only between 1 and 5 days per month at home. Therefore, the reduction of commuting times due to increased WFH was not that essential for the majority of participants. Another reason might be that the role-segregating function of commuting might have outweighed the burden of time costs on private life. In WFH, an alternative "commute strategy," such as walking around the block to mentally detach, should be evaluated (Rudolph et al., 2021). Clearly, the first major aim within boundary management is to ensure that WFH is *not* used as a form of childcare (Rudolph et al., 2021). Ideally, work design in WFH supports boundary management when employees proactively create conditions within work activities from home that foster enjoyment and challenge (Bakker and van Wingerden, 2021).

Working From Home, Working Conditions, and Loneliness

The experience of social connectedness was found to be a health-related work resource in WFH (Oakman et al., 2020). A recent study on work conditions, performance, and wellbeing in WFH identified loneliness as an important remote work challenge (Wang et al., 2021). In the current study, feeling of loneliness in WFH was prevalent in one out of four participants. Vocational counselors who shared the on-site office with many coworkers were likely to report stronger feeling of loneliness while working from home (H6). Significant negative association between loneliness and the sheer amount of face-to-face interactions was found in former studies (Jin and Park, 2010). Even the greater decrease in daily face-to-face contacts could therefore cause the stronger feeling of loneliness while working from home among those who share their on-site office with more colleagues. It could also be assumed that those who share their on-site office with multiple colleagues are more likely to have the opportunity to receive support from their coworkers. The lack of support from coworkers is strongly related to feeling of loneliness (Jones, 1981; Wright, 2005). Those who share their on-site office with colleagues may miss this support more when working from home. Perhaps, people who work on-site in an office without colleagues have already developed remote strategies for regularly getting support from colleagues and can apply these strategies when working at home.

Given that very few vocational counselors predominantly did WFH but still worked in their office during most working days, the current study might underestimate feeling of loneliness and its associations with WFH. Replication of the study is needed in a sample that comprises more employees who mainly work from home because "the greatest impact on feelings of isolation appears to be telecommuting frequency. If people do not telecommute a lot, they will not be isolated" (Cooper and Kurland, 2002, p. 512). Moreover, feeling of loneliness might be different in employees who choose themselves to WFH compared to others who were forced into WFH during the COVID-19 pandemic (Kniffin et al., 2021).

In any case, it seems important to note the double-edged nature of WFH: WFH can increase resources like autonomy (Wood et al., 2021) and reduce distractibility and ultimately increase productivity and wellbeing, but this can also come along with costs such as feeling of loneliness and blurring of boundaries between work and home. However, it seems important that practical measures to prevent loneliness and to help people detach from work should be given high priority when WFH is implemented.

LIMITATIONS

First, the main limitation arises from the cross-sectional data. Preferably, the WFH-related change in productivity is tested longitudinally. Moreover, changes in productivity and loneliness after frequent WFH may develop and change in time. So, even more than two measurement points are desirable. Second, bias from questionnaire responses as common source variance may have boosted correlations in this study (cf. Semmer et al., 2004). For instance, using client data on the helpfulness of vocational counseling as a productivity indicator could have helped prevent the common method variance (Semmer et al., 2004).

Third, we found that WFH was not related to a higher work–life balance. This finding may be due to a gender difference in total workload including work and private demands (Galliker et al., 2021b). At home, women are more likely to do WFH and may even increase their time spent on housework, increasing the work-life interference. The current study did not gather information about household work and other private demands and therefore could not test that potential gender-related effect. The *post hoc* regression analyses carried out separately for men and women showed that WFH was not associated with work-life balance in men and women. A test of the interaction between gender and WFH in association with work-life balance was not significant. Future studies on WFH should include household work and private demands.

Another important limitation refers to the unusual circumstances, in which the study took place. The COVID-19 pandemic entailed many restrictions regarding public and social life as well as working conditions. Shortly before the onset of data collection in October 2020, the Swiss Federal Council had increased protective measures against the then sharply rising infection rates. More specifically, it recommended to WFH whenever possible (Federal Council media release of October 18, 2020). Thus, it was not necessarily the own decision of an employee to work remotely. The question is therefore whether results can be generalized to non-pandemic working times. Finally, the study controlled work-related task stressors as predictors of productivity and other criterion variables, but did not assess work resources like social support (Chen et al., 2021) and individual factors that might contribute to successful work in WFH.

The study by Wang et al. (2021) showed that social support reduced feeling of loneliness only among workers who were high in self-discipline. It is assumed that occupational counseling psychologists may be relatively good in self-regulation skills like self-discipline, a hypothesis that should be investigated

in future studies. Other individual characteristics related to better productivity in WFH might be future time orientation and proactivity (Chang et al., 2021). Given that very few vocational counselors predominantly did WFH but still worked in their office during most working days, the current study might underestimate feeling of loneliness and its associations with WFH.

CONCLUSION

The COVID-19 pandemic increased WFH in vocational counselors. More frequent WFH was linked to higher productivity, lower distractibility, and higher job satisfaction. Vocational counselors who shared the office on-site with many colleagues experienced higher feeling of loneliness during WFH. The connection between WFH and work-life balance seems to depend on boundary management. Occupational health prevention should strengthen resources for boundary management in WFH.

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 Ethics committee of the University of Bern, Switzerland (12.01.2021, Ethics No. 2021-01-00001). The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

AcE, SG, and AZ: conceptualization. AZ: data collection. SG and AcE: methodology and writing—original draft preparation. AZ, SG, NJ, PLM, AnE, and AcE: review and editing. All authors have read and agreed to the published version of the manuscript.

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Sickness Presenteeism in the Aftermath of COVID-19: Is Presenteeism Remote-Work Behavior the New (Ab)normal?

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Due to the confinement imposed by the COVID-19 pandemic situation, companies adopted remote work more than ever. The rapid rise of remote work also affected local life and many employers introduced or extended their telework activities because of the associated advantages. However, despite the evident positive benefits, some employees were pressured to work remotely while ill. This evidence brought new challenges to the presenteeism literature. This article investigates how individual, economic/societal, and organizational/sectorial/supervisory-related variables can moderate the role of a contagious disease, such as the COVID-19, in explaining presenteeism behavior. Moreover, the current research presents a multi-level conceptual model (i.e., organizational, individual, supervisory factors) to describe how a new construct of remote-work presenteeism behavior mediates the relationship between different post pandemic health conditions (e.g., allergies, back pain, depression, anxiety) and future cumulative negative consequences. The authors suggested that the widespread pervasive adoption of remote work because of COVID-19 has important implications for the presenteeism literature and opens avenues for further research.

Keywords: sickness presenteeism, remote work, societal context, cross-cultural issues, COVID-19, changes in work practices

INTRODUCTION

COVID-19 has dramatically affected workers and organizations around the globe (c.f., Salem et al., 2021). Individuals have faced great challenges in terms of their health and wellbeing, changes in work practices arising with local lockdowns primarily related to the imposition of remote working, the need to strike a balance between the work and family/life domains, and the rise of unemployment, furlough schemes, and job insecurity, among others. At the same time, organizations have had to rapidly re-organize their workflows and processes, alter their human resource practices, modify operations profoundly, and find new ways to lead and motivate remote workers and teams. Moreover, businesses have been struggling to maintain productivity and profits in the face of the economic crisis associated with the pandemic. Similarly, the call to reduce costs associated with sickness absenteeism (Kinman and Grant, 2020) along with

the related costs of increased presenteeism, which is to say, working when sick (Aronsson et al., 2000) has influenced this new working environment. This might seem paradoxical in the context of a pandemic, in which the concept of health moves to the fore and the risks associated with attending work while sick are evident, considering the threat of contagion (Pichler and Ziebarth, 2017) and the spread of the virus in the workplace. Thus, presenteeism is no longer an individual behavior – a personal choice between going to work or not in the face of illness. Instead, it now configures as a behavior that is potentially dangerous for workplace, making it a shared issue, a public health matter.

To reflect this renewed collective meaning associated with the construct, the present investigation moves away from a focus on the individual determinants of presenteeism and seeks to draw attention to some of the most important organizational, occupational, and societal factors that can impact working while sick during the COVID-19 pandemic. This shift is also in line with calls in the literature to fully consider the social determinants of attendance at work (e.g., Ruhle et al., 2020; Miraglia and Johns, 2021).

Our conceptual study first examines the organizational factors that may lead to presenteeism in the context of COVID-19 by illustrating how changes in working practices triggered by the pandemic – specifically, remote working, remote teamwork, and remote leadership – affect working while sick, as well as the role that presenteeism climate (Ferreira et al., 2015) plays in encouraging or discouraging the behavior. The study will then examine variation in presenteeism across occupational sectors during COVID-19. Finally, the societal context will be considered, investigating how a country's legislative context (e.g., welfare and social security systems, and work regulations), its labor market, economic conditions, and its cultural values may prompt working while sick during COVID-19, both directly and through shaping people's notions of health. Also, differences in presenteeism behaviors during COVID-19 will be explained via looking at poverty, precarious work, and inequality, which are highlighted by the pandemic.

Moreover, the study attempts to guide future research and practice on presenteeism by proposing two models. First, by drawing on event system theory (Morgeson et al., 2015) and on the pivotal model by Johns (2010) regarding the factors intervening in the relationship between health conditions (i.e., acute, episodic, or chronic) and the individual choice between absenteeism and presenteeism, we build a model that accounts for acute and contagious health conditions (i.e., contracting the virus) as well as individual, economic/societal, and occupational/sectorial factors to explain presenteeism behaviors. Second, we propose the concept of remote-work presenteeism behavior, whereby continuing to work when sick while at home may become normalized, pressuring individuals into it. We discuss the abnormality of this in the light of the COVID-19 pandemic context and the negative consequences that presenteeism bring for individuals and organizations (Evans-Lacko and Knapp, 2016; Skagen and Collins, 2016). We conclude with a second model identifying the societal, organizational, supervisory, and individual dimensions that can foster such behaviors.

THE ORGANIZATIONAL AND OCCUPATIONAL CONTEXT

Remote Working

The COVID-19 pandemic has thrust upon us new ways of working, first by causing a rapid shift to "forced" remote work, especially for knowledge-intensive and office-based workers. The so-called "work-from-home experiment" (Harford, 2020) was enabled by the advancement in digital technologies, which allow employees to communicate, share data, and collaborate on projects and documents in real-time via audio, video, and/or text means. The shift to remote work has clear repercussions on the behavior of presenteeism and can also accelerate the adoption of digital practices, such as electronic monitoring and appraisal, which have important implications for presenteeism research.

The use of digital technologies associated with remote work creates an increased amount of employees' work inputs and outputs that are recorded and stored by the organization (Leonardi, 2021). When combined, these meta-data, also known as digital exhaust, can create "digital footprints" that reveal workers' patterns and can became a powerful instrument to monitor behavior, inputs, and outcomes at work (Leonardi, 2021). In the context of remote working, managers can use time tracking systems, which record the time spent on specific job activities (e.g., time spent on applications, keystrokes, emails read), or pervasive tracking, which keeps an open, continuous communication channel (e.g., having cameras on during the working day, being constantly connected to a chat app) with the employee, to monitor the productivity of remote workers (Nguyen, 2020).

Through the use of such control technologies, the digitalization of work enabled by remote working may make it more feasible for organizations to implement electronic monitoring and intrusive surveillance (George et al., 2020). This has implications for attendance behavior, including presenteeism. First, when employees recognize that their online activities generate digital footprints that can be followed by their employers, they may perceive their inputs and activities as extremely visible and under scrutiny, and therefore put in greater effort, which has been found to result in greater burnout (Cristea and Leonardi, 2019). By intensifying the employees' efforts at work (Delbridge et al., 1992), monitoring can promote a culture of being constantly available (Parker et al., 2020) and generate feelings of attendance pressure, likely leading to working when sick (Aronsson and Gustafsson, 2005; Baker-McClearn et al., 2010).

Second, as electronic monitoring of employee performance is perceived as intense and controlling (Miller, 2003; Levy et al., 2017), it can directly diminish employee wellbeing (Holman et al., 2002). In fact, the perceived intensity of monitoring has been associated to greater anxiety, depression, exhaustion, and job dissatisfaction (Holman et al., 2002). Similarly, preliminary evidence from a study conducted among employees working

from home during COVID-19 showed that high levels of strict monitoring caused greater anxiety at work (Parker et al., 2020). Thus, monitoring and controlling technologies can trigger presenteeism by affecting one of its deepest roots, that is, health (McGregor et al., 2018). Indeed, meta-analyses have reported negative effect of working while ill on mental health (McGregor et al., 2018), including emotional exhaustion and depression (Miraglia and Johns, 2016).

Remote Teamwork

Although remote teamwork was an emergent phenomenon and already underway in the pre-pandemic world, COVID-19 has accelerated the shift from in-person to virtual teams (Kniffin et al., 2021). Despite offering new opportunities (e.g., better brain storming; DeRosa et al., 2007), team virtuality poses some challenges for employees, teams, and organizations (for reviews, see Kirkman et al., 2012; Mak and Kozlowski, 2019).

Relevant to presenteeism research is the effect of team virtuality on identification in organizations, which may be threatened by the increasing virtualization of work (Ashforth, 2020). For example, individual perceptions of virtuality have been reported to influence organizational identification negatively (Sohrabi et al., 2011), and unevenly geographically dispersed teams seem to experience lower team identification (O'Leary and Mortensen, 2010). In the workplace, identification can foster the introjection of norms, and the consequent adoption of shared behaviors – and this is equally true for attendance behaviors. Drawing on social influence theories, individuals from the same social unit can adhere to the predominant norm and behave in line with the expected standards to seek social approval, a sense of identity, enhanced self-esteem (in line with social identity theory; Tajfel and Turner, 1986), or to obtain information to reduce ambiguity and facilitate judgment (consistent with social information theory; Salancik and Pfeffer, 1978).

The operating of such a normative mechanism has been well documented in the absenteeism literature, whereby employees model their absentee behaviors on those of their work group or colleagues (for a review, see Miraglia and Johns, 2021). Although virtually no empirical literature exists on presenteeism norms, some evidence of their influence on individual behaviors comes from research showing that the shared team perceptions of concern about health issues reduce working when sick (Schulz et al., 2017). Other studies focusing on presenteeism climate – which can encourage presenteeism behavior – showed that the social context of presenteeism climates where key variables (such as co-workers competitiveness, extra-time valuation, and difficulty of replacement) influence the relationship between job resources (e.g., degree of autonomy at work) and the occurrence of presenteeism behavior (Mach et al., 2018).

The challenges raised by remote working and COVID-19 are to understand how identification with the norms of their context develops in virtual working environments, whether new *foci* of identification emerged, and what the impact is on attendance norms and subsequent absenteeism and presenteeism behaviors. According to event system theory (Morgeson et al., 2015), "major crises are moral inflection points because they implicitly call upon organizations to rise to the occasion by doing the right things for the greater good" (Ashforth, 2020, p. 1764). For instance, if due to the pandemic crisis, the occupational/role identity becomes more prominent (for the sake of the "greater good") than the organizational or team one (Ashforth, 2020), individuals may adhere to the occupational norms regulating attendance (Miraglia and Johns, 2021), which in some professions (e.g., in human service organizations) can provoke working when ill (Gosselin, 2018). If the personal or "me" identity (Ashforth, 2020) becomes more salient, we could expect individual factors to have a stronger impact on presenteeism. Among others (for a review of presenteeism correlates see Lohaus and Habermann, 2019), an individual's physical or mental health conditions (e.g., allergies, back pain, depression, anxiety), financial situation, lifestyle, and positive attitudes toward the job and the organization could have a major role in determining the individual decision of working while ill, regardless of organizational or team norms.

Working in virtual teams, coupled with the associated loss of face-to-face, daily interactions among coworkers, may make it more difficult to ask for help (Kniffin et al., 2021), having consequences on the level of social support remote employees experience. In the remote working environment imposed by the pandemic, social support has been identified as a key factor in reducing loneliness, work-family conflict (WFC), and procrastination among physically distanced employees (Wang et al., 2021). In relation to presenteeism, social support is a deterrent to working while sick (Miraglia and Johns, 2016; McGregor et al., 2018), as supportive colleagues can ease disclosure of illness in the workplace (Munir et al., 2005), legitimizing absence and decreasing attendance pressure. Moreover, collegial support figures as a job resource (Bakker et al., 2014), which reduces work-related stress and physical health symptoms (Väänänen et al., 2003). This, in turn, can be expected to diminish the incidence of presenteeism. Therefore, unless organizations set best practices to help individuals to seek and offer help and support remotely, we could predict an increase in continuing to work while sick in the remote working context.

Remote Leadership

COVID-19 has greatly transformed leadership, forcing many leaders to rapidly transition to remote management, which can have consequences for individuals' presenteeism behaviors. As already documented in the absenteeism (Løkke Nielsen, 2008; Duff et al., 2014) and wellbeing (Inceoglu et al., 2018) literatures, initial empirical evidence shows that employees' presenteeism behaviors are modeled against those of the leader (Dietz et al., 2020). Supervisors have a crucial role in establishing presenteeism levels, especially during a pandemic, when health is a significant and delicate concern. In virtual teams, where communication richness is limited (Martins et al., 2004), it is essential for leaders to model healthy behaviors along with clarifying expectations and policies around sickness and attendance and promoting boundary-setting and mechanisms for switching off from work (including online communication) when sick (Kinman and Grant, 2020). Obviously, this should be accompanied by structural changes in the welfare system (e.g., offering paid sick leave) to ensure that constraints on absenteeism are lifted and presenteeism is not encouraged (Miraglia and Johns, 2016).

We could assume that the limited communication cues in a remote environment may also hinder supervisors from noticing presenteeism episodes among employees. However, a recent survey conducted by the Chartered Institute for Personnel Development (Chartered Institute for Personnel Development [CIPD], 2021) among 668 HR professionals in November/December 2020 reported that employers signaled that working while sick remained common during the pandemic, with 77% of employees working from home showing some signs of the behavior. Unanswered questions to address include how supervisors can realize when employees continue to work from home despite sickness and, more generally, how can they check employees' health and wellbeing without encroaching on their privacy rights (Kniffin et al., 2021). Another issue to address has to do with the measures and interventions that can be put in place to tackle presenteeism in remote working. This last issue is also important in light of the above-mentioned Chartered Institute for Personnel Development [CIPD] (2021) report, which reveals that two-fifths of employers experiencing presenteeism issues among their workforce are not taking any action to address or prevent it.

Presenteeism Climate

Presenteeism climate is another important variable that can affect individual attendance behavior. This concept is often mentioned in the literature. It results from beliefs and values about the sector, department, organization, and society that compel employees to attend work despite being ill. However, it has not been systematically measured until recently. Ferreira et al. (2015) developed a scale for measuring presenteeism climate, which included three dimensions: (1) extra-time valuation; (2) supervision distrust; and (3) co-workers' competitiveness. Companies have been increasingly creating climates of presenteeism by stimulating competition from within and by obsessing over productivity increases and organizational development. Recent studies (Mach et al., 2018) indicate that presenteeism climate is related to both the job resources (e.g., supervisor support, job autonomy) and the occurrence of presenteeism behaviors. Another large study on health sector employees in six different countries – Brazil, Ecuador, Lebanon, Portugal, Russia, and Spain – found that presenteeism climate increased WFC and higher levels of WFC were found in non-Latin countries (Ferreira et al., 2019). Despite the absence of recent studies evaluating the role of presenteeism climates during the COVID-19 pandemic, we are convinced that companies that in the past promoted sickness presence at any cost, continue to encourage their sick employees to work remotely when they cannot be present in the organization's premises (due to confinements). Hence, given the importance of presenteeism climate, we recommend that this construct should be effectively assessed in pandemic contexts and in additional countries (for example, a large-scale study comparing how presenteeism climate is related to the severity of COVID-19 in specific territories).

Occupational Sectors

The pandemic has affected employees and companies differently depending on the type of sector (Bapuji et al., 2020). Employees from the services sector rely on knowledge work and were easily able to work from home without any (or only marginally reduced) impact on their salary and career. Also, some employees belonging to the gig economy remained unaffected. Inclusively some of them saw an increase in terms of incomes because restaurants and stores were requesting their services to move to the digital and to help them developing new ways of approaching their customers and survive during the confinements.

Conversely, employees in sectors considered as essential, such as frontline jobs, agriculture, construction, food retail, logistics and distribution, public transport, healthcare, and the pharmaceuticals industry suffered from the high risk of exposure to the virus (Bapuji et al., 2020). Most of them worked in precarious conditions with little or no protection and therefore had greater chances of contracting the virus. In such sectors presenteeism is an important behavior to discourage in order to contain COVID-19 outbreaks and protect the health of employees and the entire community. An example of this was the COVID-19 outbreak in an Amazon warehouse (Thomson and Day, 2020). Several employees were infected, and workers protested the alleged hidden cases of sick employees and the silence of middle managers.

THE SOCIETAL CONTEXT

Economic Labor Market and Work Regulations

The context of presenteeism is influenced by factors at the societal level (Johns, 2006). Economic factors such as lack of alternative employment options, job insecurity, and limited right to sick pay encourage people to work while sick (Johns, 2010; Lu et al., 2013a; Miraglia and Johns, 2016; Kim et al., 2020). Therefore, to fully understand the COVID-19 lockdown effect on employees' attendance patterns, researchers should consider the economic, cultural, moral, and social reasons that push employees (such essential workers during the COVID-19 pandemic crises) to attend work despite being exposed to or diagnosed with COVID-19 (Probst et al., 2021).

Both the legislative context (work regulations, social security, and sick-leave coverage) and the current economic labor market conditions (Lohaus and Habermann, 2019) play an important role in explaining why people are turning up for work even though they may be feeling unwell. Thus, the level of development of a country's welfare system has an important interactive effect with labor market conditions and exerts guidance on which health behaviors are considered acceptable in that specific country (Gustafsson Sendén et al., 2013; Cooper and Lu, 2016). Social health protection including the role, patterns, and costs of paid sick-leave have diverse approaches in different world regions and in different countries (e.g., the paid sick-leave days in Sweden are 9% and in United Kingdom only 3% of the annual working days) (Spasova et al., 2016).

Paid sick-leave performs a crucial role, especially in times of economic crises when many workers fear dismissal and judgment if reporting sick-absence, such as the situation triggered by the pandemic. Low compensation and qualifying days might prevent employees from taking or reporting sick-leave. Therefore,

countries with no or limited benefits for paid sick-leave show the lowest number of days lost due to sickness. This includes countries such as the United States, which lacks any national program for paid sick-leave, or the United Kingdom, where no income-related replacement exists (Scheil-Adlung and Sandner, 2010). Such regulations might impact workers' decisions to continue working while sick.

Other examples of different regulations affecting sickness absence can be found among European countries. The European working conditions surveys (Eurofound, 2012, 2017) report a broad range of indicators that illustrate the differing labor conditions among European countries, which influence and are influenced by the health and safety regulations, and affect people's wellbeing, productivity, and the occurrence of presenteeism.

Although some labor statistics provide evidence of the different patterns across countries and regions all over the world (e.g., Eurofound, 2012, 2017, 2021; International Labour Organization [ILO], 2012, Working Conditions Laws Database), there are still very few empirical cross-national studies that include the societal and cross-cultural context in their research models.

The Cross-Cultural Context

Cross-cultural differences and national values play a crucial role in the occurrence of presenteeism (Cooper and Lu, 2016). Among cross-cultural dimensions, the value given to the job well done (e.g., Protestant work ethic), or the shared value of hard work, long hours (Lu et al., 2020), and endurance (Confucian culture), or the perceived legitimacy of absenteeism across cultures (Addae et al., 2013), among others, may play a determinant role in explaining the decision of working during illness. Cross-cultural issues are therefore considered in our health equation.

Country characteristics and culture play a pivotal role in how people react to health conditions and consequently to presenteeism (e.g., Maaravi et al., 2021). Traditionally, studies on presenteeism have focused on two regions – North America and Scandinavia – each entailing a somewhat different research paradigm (Böckerman and Laukkanen, 2010; Johns, 2010). The dominant approach used in the first region is on the productivity losses at work due to presenteeism, whereas in the second region is more often modeled as a lack of job security and risk for future health. The coexistence of these two distinct – and sometimes conflicting – perspectives on presenteeism is essential for a better understanding of its complexities. Johns (2010) sought to connect the two perspectives and bodies of literature into a single, unified theory and also equate presenteeism to absenteeism.

Poverty and Precarious Work During the Pandemic

The COVID-19 outbreak has highlighted poverty, precarious work, and job inequalities, as it has different effects on individuals and organizations, depending on the type of jobs, social status, or even the level of poverty in the country. In fact, the pandemic made it even more difficult to reach important Sustainable Development Goals (SDGs), such as reducing poverty (SDG1) and achieving decent work (SDG8). Allan et al. (2021) identify three psychological states of work precarity that increased due to the pandemic phenomenon. The first is *precarity of work* and refers to the insecurity about the employee's continuity of work, which is associated with job, employment, and workplace uncertainty. The second state refers to *precarity at work,* which is associated with the uncertainty in work due to discrimination, harassment, and unsafe working conditions. Workers perceive lack of psychological safety, social rejection, discrimination, and alienation. Finally, *precarity from work* is associated with low salaries, poverty-level wages, perceived income inadequacy, and lack of need satisfaction due to the uncertainty derived from having a job that does not meet the individual's or family's basic needs.

Matilla-Santander et al. (2021) identified five important consequences of the COVID-19 crisis among workers in precarious employment: (i) an increased number of precarious jobs; (ii) workers in precarious employment became more precarious; (iii) workers in precarious employment faced more unemployment without being officially laid off; (iv) workers in precarious employment were more exposed to serious stressors and dramatic life changes that may lead to a rise of more infections and diseases; and (v) precarious employment was associated with more uncontrolled contagion and may disrupt or even prevent the control of new COVID-19 outbreaks.

A recent study conducted in Bolivia showed that in the poorest regions the number of deaths in July 2020 were seven times higher than in July 2019. In the richest regions the number of deaths in July 2020 were only two times higher than in July 2019. The economic reality of Bolivia shows that 70% of the Bolivian workforce do not have an employment contract. This evidence justifies that most of the COVID-19 cases (between 40 and 50%) were concentrated in the non-formal economy and specifically with market and transportation workers (Hummel et al., 2021).

Also, in South Africa there was evidence that the poorer employees suffered more because of COVID-19 (and the lockdown). The probability of low-wage earners to lose their jobs during the pandemic outbreak was about eight times higher than high-earner employees. These inequalities increased six times more during COVID-19 over what existed before the pandemic (Nwosu and Oyenubi, 2021). Inequities were even more pronounced among women and regarding race. The COVID-19 pandemic appeared as a catalyst of socioeconomic inequalities in health, including migrant workers, and pejorative actions emerged associated with the phenomena of racism, ethnic minority status, and sexism (Côté et al., 2021).

Working under conditions of economic and legal precariousness (e.g., temporary and unpaid work) in contexts where some companies and sectors (e.g., agriculture, transportation) were facing staffing shortages and service disruptions, led owners to hire precarious workers, which in turn increased the risk of virus transmission among employees, other service users/stakeholders, and their communities (Olding et al., 2021). Similar experiences were documented in the United Kingdom among Roma migrants working in the agriculture sector, where a combination of financial hardship, poverty from work, no access to sick leave, high job insecurity, and discrimination led to high levels of presenteeism during

COVID-19 with evident negative implications for individual health and wellbeing (Collins et al., 2021).

During the initial phases of the COVID-19 pandemic workers in general were encouraged to take time off when sick, which was contrary to previous experience in which workers and managers were encouraged to work while ill. However, some precarious workers reported that they did not qualify for sick pay and could not afford to take time off while being ill (The New York Times, 2021). Due to precarious stability and absence of legal protection many employees were also afraid to mention that they were sick and therefore went to work while ill. They were aware that they could lose their jobs and or would not be paid if they had to quarantine. Employees in several contexts hid their symptoms, fearing to be tested and to thereby miss some of their income, or lose it altogether (Loustaunau et al., 2021).

Models of Presenteeism in the Pandemic Context

The literature shows the negative and positive consequences of people's decisions to be at work while ill. However, during the COVID-19 pandemic presenteeism was indeed regarded by some managers and employees as something adaptative but also therapeutic and functional (Karanika-Murray and Biron, 2020). Inclusively, managers and co-workers fostered presenteeism cultures (Simpson, 1998; Johns, 2010) and climates (Ferreira et al., 2019) in which being present at work while ill was strongly encouraged. The situation changed with this new pandemic, as the practices implemented in companies all over the world to control and reduce the spread of the virus changed the rules of the game. Specifically, contagious disease appearing as a health condition that (although mentioned) was not properly accounted for in previous presenteeism models, had now been given proper attention. For example, Johns (2010) mentions in his model that normal levels of productivity at work could be affected by acute (e.g., the flu), episodic (e.g., headache), or chronic conditions (e.g., asthma).

Therefore, in the current study we propose a model that seeks to explain how this pandemic crisis placed acute health conditions in the spotlight of managerial practices. Our model accounts for three types of factors: (1) individual (e.g., fear of contagion, personality traits, attitudes toward the media information, availability to use remote technology, and work-life balance); (2) economic/societal (e.g., employment rates, precarious work and immigration politics, political ideologies, health care protection, societal cultural values); and (3) occupational/sectorial/supervision-related factors (e.g., sector of activity, job crafting and flexibility, organizational financial status, organizational culture, organizational climate, HR practices, abusive and unethical leadership). These factors further influence the relationship between an acute and contagious health event such as COVID-19 and presenteeism (see **Figure 1**).

Regarding individual variables, the literature shows that when employees have greater fear of contagion and perceive health unsafety at work they tend to avoid working while ill (Luksyte et al., 2015). Accordingly, we theorize that employees may have a greater tendency to pressure their supervisors to stay at home and thus to reduce presenteeism in pandemic outbreaks. Moreover, in line with previous studies (see Johns, 2010; Leal and Ferreira, 2021), we propose that personality traits (i.e., obsessive-compulsive disorder personalities, conscientiousness) play an important role in moderating the relationship between acute health conditions in pandemic outbreaks and presenteeism. Specifically, obsessive-compulsive disorder personalities tend to exacerbate the fear of contagion and favor absence behaviors during pandemic contexts (Jalal et al., 2020).

As mentioned by Johns (2010), under normal circumstances (i.e., in the absence of a pandemic), conscientious people might be inclined to attend work while ill. However, we posit that in a pandemic context employees with a clear tendency to be responsible and organized are more inclined to adhere to the institutionalized norms and rules imposed by the national health services and, therefore, stay at home while ill.

Also, even for those employees who do not possess the required skills (nor the equipment) to work remotely (Harford, 2020), the possibility to benefit from the advantages of remote work and family work balance allowed a very substantial reduction in attendance while sick (Darouei and Pluut, 2021; Kim et al., 2021). Therefore, we included in our model the availability to use and adopt new remote work technology and work-life balance strategies as important moderators in the relationship between the health condition and presenteeism behavior.

Along with these individual moderators, economic or societal variables may also play a pivotal role in moderating the relationship between employees' health conditions in a pandemic context and presenteeism. As discussed above, employees facing job insecurity or working in countries with a lack of alternative employment options (and perhaps coping with fewer rights to receiving a salary while ill) are more prone to presenteeism frequency (Johns, 2010; Lu et al., 2013b; Miraglia and Johns, 2016; Kim et al., 2020).

Also, the economic labor market conditions (i.e., rate of employment) and work regulations, including social security for those who need sick-leave financial support (Lohaus and Habermann, 2019), motivates employees in precarious work conditions to go to work while sick (Hummel et al., 2021). Hence, countries with political ideologies that support the absence of a national program for paid sick-leave (i.e., low social health protection) or impose tight restrictions in terms of immigration policies might influence employees' decisions to remain working while ill (Scheil-Adlung and Sandner, 2010). Moreover, countries that value job well-done or long hours endurance (Addae et al., 2013) typically promote the occurrence of presenteeism, as discussed above in relation to national cultural values with specific regard to masculine and individualistic values, as well as collectivistic or individualistic cultures.

Our model also considers that the relationship between acute health conditions related to pandemic outbreaks and presenteeism was affected by occupational/sectorial and supervision-related factors. A study in presenteeism among self-employed and organizationally employed in Northwestern Europe (Nordenmark et al., 2019), found that the self-employed reported a significantly higher level of presenteeism than

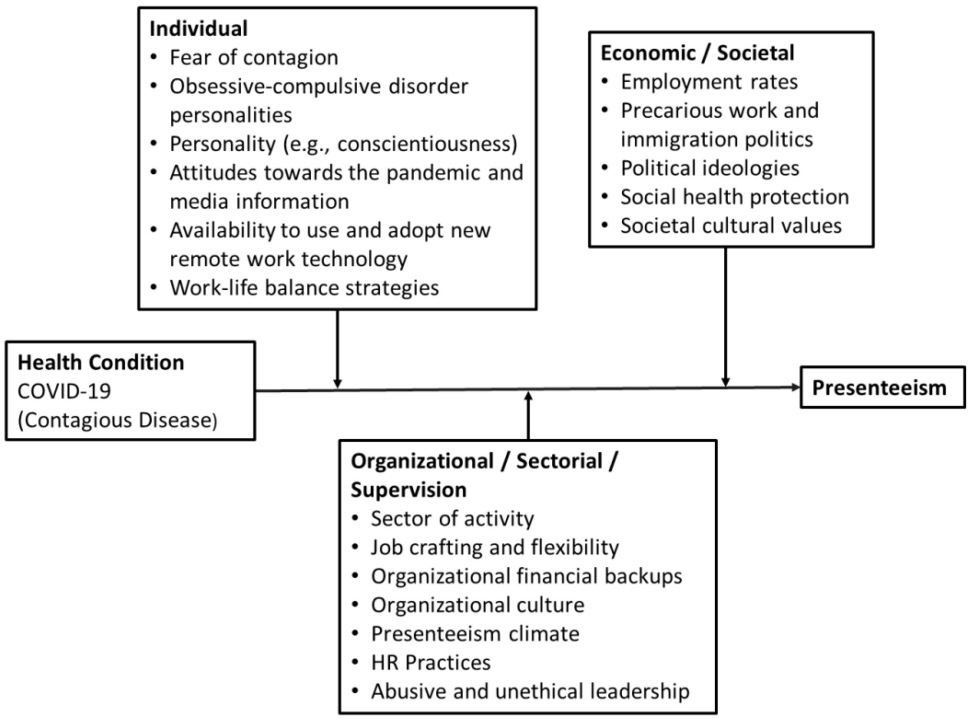

FIGURE 1 | A conceptual model of presenteeism in pandemic context.

employees working for large companies. This difference is to a high degree explained by the variables measuring time demands, which indicate that the self-employed have a higher risk of reporting presenteeism, as they experience greater time demands. Other research confirms that self-employed individuals, especially self-employed women, report higher levels of time restraints compared to the organizationally employed (Hagqvist et al., 2015). Moreover, in sectors considered essential (e.g., public transport, health care services, pharmaceuticals sector, agriculture, food retail), employees were also more exposed to the virus (Bapuji et al., 2020). Additionally, the lack of flexibility and job crafting in some occupational settings prevented employees from adjusting their workplace to a safer remote-work setting, and thus this situation caused the employees to be more prone to work while ill (Lopes and Ferreira, 2020). The above-mentioned research shows that, even in countries with well-developed social welfare systems, differences in presenteeism across sectors were found within the same country.

Moreover, there is evidence that some companies and supervisors promote presenteeism climates (e.g., Hummel et al., 2021), which tends to pressure employees to work even during the peak of the COVID-19 pandemic and thus to increase the frequency of presenteeism. The HR digital phenomenon was in a certain way accelerated with the COVID-19 pandemic. However, some employees feel pressured by time tracking systems and control mechanisms (Leonardi, 2021) employed by abusive and unethical supervisors (George et al., 2020). This new phenomenon associated to abusive HR practices and unethical behaviors accelerated processes leading to reduced wellbeing (Holman et al., 2002), increased burnout (Cristea and Leonardi, 2019), and WFC (Wang et al., 2021), which can have severe repercussions on attendance behavior and presenteeism.

The New (Ab)normal Context – Implications for Home and Work Life

The responses of leaders to the volatile, uncertain, complex, and ambiguous (VUCA) conditions imposed by the COVID-19 pandemic outbreak required a collective effort to rethink the meaning of work and implications of leaders' decisions at the individual, departmental, and organizational levels (Antonacopoulou and Georgiadou, 2021). However, most companies were not ready to take the best advantages of remote work (for all parties involved: employees, departments, and the companies themselves). This new (ab)normal context created by the pandemic introduced new routines and habits and, as a result, new challenges to human resource managers – essentially, the need to introduce more support mechanisms for employees' wellbeing.

Drawing upon the event system theory (Morgeson et al., 2015), which introduces a conceptual framework in which events appear as a discontinuous and discrete happening that diverges from the stable routines of employees and managers, we are convinced that the COVID-19 outbreak amounts to a profound event affecting the way people live and work. COVID-19 can be considered an enormous social experiment to study how radical and swift the call for work redesign has

become, introducing notions such as agility, resilience, and renewal into the mainstream focus not only of business and organizational practices, but of social structures around which "normal" routines were configured (Mukhtar, 2020).

Employees faced profound shifts in their personal lives, interfering with the balance between work and family and the boundaries between the personal and work spheres of life. These changes had momentous social, economic, environmental, and political impacts. Accordingly, it is important to actively study and seek to understand the lessons that the collective responses to the COVID-19 crisis have demanded from managers in general (Antonacopoulou and Georgiadou, 2021) and human resource managers in particular.

The literature has shown *pros* and *cons* regarding the use of remote or distance work with the adoption of new technologies. For example, previous research reports that working from home was less correlated with family work conflict and social isolation during the pandemic outbreak. Moreover, the productivity from those who worked from home was positively related to self-leadership and autonomy (Galanti et al., 2021). Another study revealed that effective supervision (i.e., increased efforts through communication and stronger ties with employees) explained the positive link between remote work activities and organizational performance (Kim et al., 2021). There is also evidence that when employees worked remotely, work was less likely to interfere with the family domain. Employees perceived less WFC and exhaustion levels, thus revealing higher levels of engagement the following morning (Darouei and Pluut, 2021).

In general, there is evidence of emotion trajectories that include the rise and fall of joy toward working from home, and that these ups and downs were influenced by different environment events (Min et al., 2021). The study conducted by Min et al. (2021) showed that stay-at-home government directives affected employees' transition emotions and their recovery effects. As predicted by Drucker (2012), more than ever supervisors needed to recognize the changes in their subordinates' lives and adapt their leadership skills to facilitate these emotional and behavioral transitions to a new, unpredicted, and unexpected work model.

Despite the positive benefits (among which we can mention reduced carbon footprints), working from home also brought negative impacts to employees. Personal and professional identities needed to be reconstructed as the boundaries between family and work started to blur. The literature has identified important antecedent risk factors of cardiovascular diseases due to remote work, such as more physical inactivity, social isolation, and loneliness (Sachdeva et al., 2021).

Other studies have reinforced how these detrimental changes could have an impact on non-workday sedentary behavior, poorer sleep quality, an increase in negative mood disorder, reduced perceptions of quality of life, and a considerable decrease in work-related health (Barone Gibbs et al., 2021). Another recent study conducted with higher education scholars revealed that the levels of stress were higher among those who worked remotely several times per week than those working remotely once per month (Heiden et al., 2021). In fact, other empirical studies have suggested that when people combine both daily job demands and daily home demands during remote work, they may experience increased emotional exhaustion (Abdel Hadi et al., 2021).

According to the Conservation of Resources theory (Hobfoll, 1989), employees who perceive a good supply of resources will identify better strategies to cope with the adversities of working from home and have less stress. A study developed by Merino et al. (2021) revealed that the level of stress is dependent upon variables of employment situation, work satisfaction, and the time employees devote to work, as well as the amount of space available in the home and interference from children or other persons there.

Framed on the work-family spillover theory (Staines, 1980), we argue that positive or negative experiences developed in remote work activities can transfer the same positive or negative valences to the home environment. The solution seems to be related with flexibility, as workplace flextime use can decrease employees' cognitive failures at work and home, because employees are able to increase their levels of perceived control regarding home and work duties more consistently (Hsu et al., 2021).

In general, managers should endeavor to reduce the detrimental relationship between job and home demands with emotional exhaustion. Findings from previous studies suggest that a supportive organizational culture (e.g., open communication, empowerment, teamwork, and participation) can generate positive spillover effects on employees (Sok et al., 2014). It is vital to diagnose each employee's needs regarding remote work considering different aspects. For example, employees living alone may have very different virtual working demands when compared to employees living with children or others. The supervisor profile must be redefined to face the challenges in motivating employees in distant or virtual working contexts. Moreover, HR professionals must adjust their training proposals, performance appraisals systems, incentives, and occupational health support (Kniffin et al., 2021).

The New (Ab)normal – Remote-Work Presenteeism Behavior

As mentioned above, more than ever companies are adopting remote work, essentially those in which their employees assessed their remote work practices as positive (Espitia et al., 2021). Remote working can be used to the advantage of the employer. For example, companies such as Twitter see remote work as a possibility to reduce costs (Kresge, 2021). Moreover, we assume that countries, regions, and companies with masculine and individual cultures (Martinez et al., 2018) may have a greater tendency to promote remote work when their employees are sick. Also, companies that value long hours at work and stimulate highly competitive environments (e.g., Simpson, 1998) would be more prone to adopt remote work as a new way of presenteeism. Accordingly, with the advance and use of new remote work technologies during the pandemic, being sick will no longer be a sufficient "excuse" not to complete tasks according to some companies and supervisors. In certain cases, employees would no longer have the opportunity to recover at home from acute, episodic, or even chronic health conditions – they would now

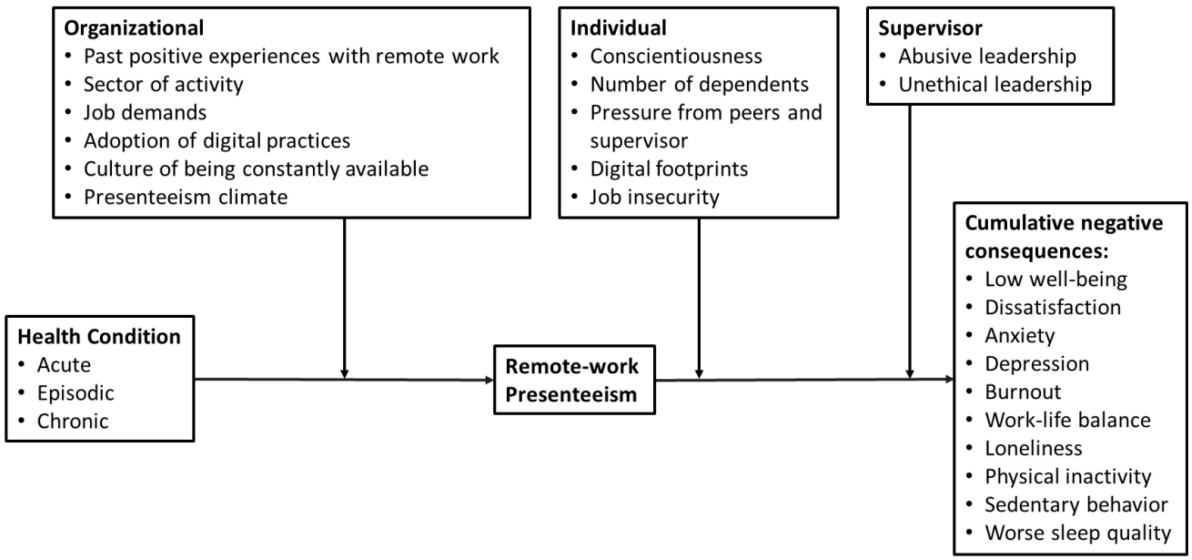

FIGURE 2 | Remote-working presenteeism behavior model.

be compelled to complete their tasks (while at home). Therefore, herein we conceptualize the appearance of a new construct named remote-work presenteeism behavior, in which employees are invited to stay at home and work remotely while being ill. This conceptualization draws on previous studies that emphasize the possibility of presenteeism in domestic work activities, affecting both male and female partners' organizational productivity while ill (Leal and Ferreira, 2021).

In Model 2 (see **Figure 2**), we conceptualize a framework in which individuals with different health conditions (i.e., acute, episodic, or chronic) are "invited" to develop remote work presenteeism. This behavior is influenced by several organizational variables (e.g., past positive experience with remote work, sector of activity, adoption of digital practices, cultures of being permanently available, and presenteeism climate).

Companies with presenteeism climate stimulate competition among employees and develop extra-time valuation, and employees perceive that their supervisors do not trust them when they mention that they are having a health problem (Ferreira et al., 2015). This behavior has serious consequences, and employees tend to be more pressured and tempted to develop presenteeism remote work. Additionally, companies that develop cultures of being permanently available (Simpson, 1998), whereby managers could adopt new digital practices and use time tracking systems, continuous communication channels, and intrusive surveillance devices (George et al., 2020) may also create implications for presenteeism remote work behaviors. These requirements could promote a perception of increased job demands associated with a culture of being always available (Parker et al., 2020), thus generating more pressure by increasing anxiety, depression, and job dissatisfaction (Holman et al., 2002).

During the COVID-19 outbreak, several companies around the world made huge investments in remote work technologies and new occupational norms regulating attendance in specific sectors (e.g., services; gig economy; self-employees). This circumstance, in our opinion, could motivate employees to work at home while ill (Bapuji et al., 2020).

Our model also shows that remote-work presenteeism and cumulative negative consequences appear as a consequence of several supervisor and individual characteristics. Concerning individual variables, Johns (2010) states that employees with conscientiousness personality traits might be inclined to go to work while ill. In fact, conscientious individuals may show perseverance in the face of adversity and strong work ethic values that encourage them to develop presenteeism remote-work behaviors and thus enter a spiral of negative work outcomes associated with productivity losses due to illness. This could be even more reinforced in contexts in which working remotely while ill occurs while surrounded by dependents such as children or elderly parents. Moreover, when employees recognize that the company has their daily activities under scrutiny, they may perceive high job insecurity and perceive low well-being, dissatisfaction, anxiety, and burnout (Cristea and Leonardi, 2019).

While working remotely with a health problem, the absence of social support (from peers and supervisor) and high job demands imposed by abusive and unethical leadership (both at the supervisory level) may lead to physical inactivity, social isolation, low work-life balance, procrastination, and loneliness (Sachdeva et al., 2021; Wang et al., 2021). We therefore conceptualize a model in which remote-work presenteeism may lead to cumulative negative consequences (e.g., low well-being, anxiety, depression, burnout, loneliness, sedentary behavior, and poorer sleep quality), and that these consequences may be reinforced when associated with individual, supervisory, and organizational variables mentioned above and depicted in **Figure 2**.

CONCLUSION

With the emergence of COVID-19, pandemic researchers developed theoretical conceptual frameworks to understand how to cope with the undesirable consequences and promote wellbeing (e.g., Ramkissoon, 2020). This paper highlights the emerging trends in the field of presenteeism following the increased use of digitalization and the fast shift to remote work that the COVID-19 pandemic has accelerated everywhere. We reviewed organizational determinants (i.e., changes in the workplace, presenteeism climate), occupational sector differences in presenteeism, and the societal context (i.e., legislative, employment, economic conditions, and cultural values). This allows us to broaden the scope and consider not only the individual determinants of the act of presenteeism behavior (Johns, 2010), but also the social determinants of attendance at work during the COVID-19 pandemic times. In our opinion, these findings constitutes and advancement in the event system theory (Morgeson et al., 2015) as it explains how organizations and individuals (motivated by the COVID-19 pandemic) changed their concept of work while ill. We integrated all these factors in a multi-level model that looks at the relationships between an acute health condition (i.e., COVID-19 contagious disease) and the choice between absenteeism or presenteeism, by accounting for individual, organizational, managerial, economic, and societal factors, to shed light on the behavior of presenteeism at work. Furthermore, due to the remote-working presenteeism behavior developed during the pandemic lockdown, whereby employees remain at home but feel pressure to continue working virtually while being sick (Sachdeva et al., 2021; Wang et al., 2021), we have proposed a second multi-level model to capture this new normality, and the potential cumulative negative consequences that remote-work presenteeism could have for individuals and organizations. Based on our findings, we are strongly convinced that governments, policymakers, managers, and healthcare professionals should introduce regulations and interventions for employees to deliver better equipped people to cope in the post-pandemic world (Ramkissoon, 2021). We invite scholars and practitioners to push forward these contributions to the presenteeism field by considering the different angles and the different levels of analyses of the phenomenon, as well as longitudinal research designs, cross country, and between sector comparisons – with the goal of better capturing the new patterns of attendance at work with the exponential implementation of digitalization and remote working practices. Lastly, we encourage researchers to test empirically the proposed presenteeism models to understand how this new remote-work presenteeism behavior and this apparently "new (ab)normality" may bring negative consequences for individuals and organizations.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article, further inquiries can be directed to the corresponding author.

AUTHOR CONTRIBUTIONS

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

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