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MSc International Business

Organisation: Management, Change and Consultancy Track

***Impact of Telecommuting on Employee Well-Being:
The Role of Job Demands, Job Resources and
Psychological Capital***

Author:

Lodewijk Delhaas

i6143052

EBS4013

Supervisors:

Prof. Dr. Simon B. de Jong

Assoc. Prof. Filipa Castanhiera



Maastricht University

School of Business and Economics

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Abstract

Although organisations are increasingly implementing telecommuting as a new flexible work design, consensus on the consequences for employee well-being is missing. Therefore, using the Job Demands-Resources (JD-R) model as a conceptual basis, this study investigated the impact of the extent of telecommuting on work exhaustion and work engagement. Additionally, to fully grasp the underlying mechanisms governing these effects, this study also analysed the potential mediating process of job characteristics (i.e., job demands and job resources) in the link between telecommuting and employee well-being, the potential moderating impact of personal resources in the form of psychological capital (PsyCap) on perceived job characteristics, as well as the potential moderating role of job resources in the relationship between job demands and work exhaustion. Cross-sectional data were collected from 123 individuals of various organisations working in a telecommuting setting. Results indicated that telecommuting did not directly affect work exhaustion nor work engagement but revealed that it mainly had adverse consequences for perceived job characteristics. Regarding individual differences, it was shown that PsyCap both had a buffering and exacerbating effect on experienced job characteristics. Similar counter directions were established for the moderating effects of job resources on the job demands-work exhaustion relationship. This study contributes to literature by demonstrating the importance of having a holistic overview of both job and individual characteristics when analysing the development of occupational well-being in a telecommuting environment.

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1. Introduction

In light of the transition from a manufacturing to a service industry and the corresponding required organisational agility (Golden & Eddleston, 2020), organisations are increasingly implementing more flexible work arrangements in the form of telecommuting. Telecommuting involves using “computer technology to work from home or another location away from the traditional office for a portion of the workweek” (Sardeshmukh, Sharma & Golden, 2012, p. 194) and displays two main attributes as such (Bailey & Kurland, 2002; Raghuram, Hill, Gibbs & Maruping, 2019; Siha & Monroe, 2006). First, employees have autonomy in determining where to work, either at home or any other remote location. Second, telecommuting is enabled by digital communication, through online channels like e-mail, (instant)messaging and videotelephony. During recent years, the usage of telecommuting has been rapidly expanding, with measured growth rates of 11 to 30% in various regions of the globe (Chokshi, 2017; Eurofound, 2018) amounting to a current total of 55% businesses worldwide providing some ability to telecommute (Global Workplace Analytics, 2020).

Despite telecommuting literature is relatively well-established, a strong academic dispute is displayed within it (Pyöriä, 2011). At its core lays a “telecommuting paradox”, which refers to the contraction of various researchers touting possible advantages of telecommuting (e.g., improved job satisfaction through increased autonomy) that are conflicting with predicted drawbacks (e.g., decreased job satisfaction through deteriorated co-worker relations) brought forward by others (Gajendran & Harrison, 2007, p. 1526). Likewise, Kraut et al. (2002) argued for an internet paradox, since computed-based interaction is set to both improve individuals’ well-being (e.g., through increased accessibility) as well as worsen it (e.g., through increased unpredictability). In a similar vein, empirical findings also demonstrate an inconsistent overview. On the one hand, extant literature has found advantageous effects for telecommuting, like increased efficiency, flexibility and employee satisfaction, and decreased turnover intentions and job strain (Gajendran & Harrison, 2007). Conversely, telecommuting has also been associated with detrimental outcomes for workers, such as decaying workplace relationships (Golden, Veiga & Dino, 2008), increased professional isolation (Cooper & Kurland, 2002) and restricted career success (Golden & Eddleston, 2020).

As such, at least three notable flaws are present in current telecommuting research. First, the majority of literature misses a conceptual base to investigate the effects of telecommuting. Also, these studies usually included a restricted collection of job demand or job resources,

suggesting a comprehensive overview of the psychological consequences of telecommuting for workers is non-existent. Second, little research has been conducted on the impact of telecommuting on occupational well-being, i.e. work exhaustion and work engagement (for an exception, see Sardeshmukh et al., 2012), despite these psychological states being related to vital health (e.g., increased cardiovascular and depression issues) and organisational (e.g., decreased retention rates and job performance) consequences (Maslach, Schaufeli & Leiter, 2001; Schaufeli & Greenglass, 2001). Hence, possible alterations in work exhaustion and engagement as a result of adopting a telecommuting work design may crucially impact workers' health and performance. Lastly, prior telecommuting literature has rarely accounted for personal differences, making it unclear whether the consequences of telecommuting are similar for each worker. Although organisational research has demonstrated the role of personal characteristics in managing changed work experiences (Avey, Wernsing & Luthans, 2008), analysis is missing whether certain personal dispositions enable workers to better operate in a telecommuting work mode.

Therefore, to address the aforementioned gaps, the current study examines the following research question: *What is the impact of telecommuting on work exhaustion and work engagement and what are the roles of job demands, job resources and psychological capital within these effects?* As such, the first goal of this study is to analyse whether telecommuting affects employees' perceived job characteristics and in turn their well-being. The Job Demands-Resources (JD-R) model (Bakker & Demerouti, 2007; Demerouti, Bakker, Nachreiner & Schaufeli, 2001) is used to analyse the differential impact of telecommuting on various job resources and job demands as well as the subsequent multidimensional effects on work engagement and work exhaustion. Second, this study aims to explore the role of workers' personal resources in the form of psychological capital (PsyCap; Luthans, Avolio, Avey & Norman, 2007; Luthans & Youssef, 2007), which prior studies have shown to be an important concept in assessing employee well-being (Avey, Luthans, Smith & Palmer, 2010). More specifically, the present study analyses whether increased levels of PsyCap moderate the impact of telecommuting on employees' perceived job demands and job resources.

By investigating the preceding research question, the present study advances past research by not only analysing whether telecommuting influences work engagement and work exhaustion but as well how this impact occurs through the examination of alterations in job demands and job resources as key antecedents of these psychological outcomes. As such, this research

illuminates the latent, intertwined system of job characteristics governing the impact of telecommuting on employee well-being. In addition, this research has the opportunity to show generic distinctions among workers based on their personal resources. Better comprehending the impact of telecommuting on different kinds of workers equips managers with knowledge on how to facilitate more favourable work conditions for this increasingly prevalent job design.

2. Literature review

The JD-R model is adopted as a conceptual basis for analysing the impact of telecommuting on employee well-being, as it enables analysis of the specific job factors governing these effects. Two premises lay at the heart of this psychological work model (Bakker & Demerouti, 2007; Demerouti et al., 2001). First, the characteristics of work designs can be categorised into two general groups, job demands and job resources, which comprise various demands and resources, contingent on the respective work environment. Job demands refer to “those physical, psychological, social or organisational aspects of the job that require sustained physical and/or psychological effort and are, therefore, associated with certain physiological and/or psychological costs”, whereas job resources entail “those physical, social or organisational aspects of the job that are functional in achieving work-related goals, reduce job demands and the associated physiological and psychological costs, and stimulate personal growth and development” (Bakker & Demerouti, 2007, p. 312). Second, these two types of work factors elicit two distinct mental processes that lead to work exhaustion and work engagement. The first is the health impairment process in which job demands (e.g., workload) exhaust the individual by utilising psychological and physical energy, ultimately causing work exhaustion. Second is the motivational process, consisting of job resources (e.g., autonomy) that can lead to work engagement. In addition to these main effects, job resources may also buffer the impact of high job demands on work exhaustion, as proposed by the JD-R model (Bakker, Demerouti & Verbeke, 2004) and shown by empirical research (Bakker, Demerouti & Euwema, 2005; Hakanen, Bakker & Demerouti, 2005).

Literature has demonstrated that a modified work environment can substantially alter job demands and job resources (Wegman et al., 2018), which, according to the JD-R model, can in turn have profound implications for individuals’ work exhaustion and work engagement (Bakker & Demerouti, 2007). Since telecommuting entails working from a remote location and is facilitated by digital communication, the way where and how employees work is modified.

As such, telecommuting alters the nature of employees' work, thereby impacting their perceived job demands and job resources and, in turn, their well-being. Thus, given telecommuting decreases commuting time, involves being physically separated from co-workers and increases usage of electronic communication (Bailey & Kurland, 2002; Gajendran & Harrison, 2007), the present study specifically included mental demands, workload and role ambiguity as job demands and autonomy, social support and opportunities for professional development as job resources to capture the multifaceted effects of telecommuting on work exhaustion and work engagement. On top of that, extant literature listed these work-related factors as main antecedents of occupational well-being (Schaufeli & Taris, 2014), thereby underscoring the importance to also analyse their effects within a telecommuting environment.

However, not only job characteristics play a role in predicting employee well-being. Over the years, research within the domain of the JD-R model has been extended by the inclusion of personal resources to capture the effects of individual differences (Bakker & De Vries, 2020). Personal resources refer to positive self-beliefs regarding how much control a person has over their work environment (Hobfoll, 2002) and are, due to their positive nature, commonly found to beneficially impact employees' experiences of job characteristics (Schaufeli & Taris, 2014). Therefore, through the pro-active shaping of job design (Van Den Heuvel, Demerouti, Bakker & Schaufeli, 2010), personal resources are deemed to aid employees in coping with altered work conditions present in a telecommuting work approach. To capture these coping effects, the present study analyses the potential moderating role of personal resources in the relationships between telecommuting and job demands and job resources. More specifically, the four main elements within the field personal resources, optimism, hope, resilience and self-

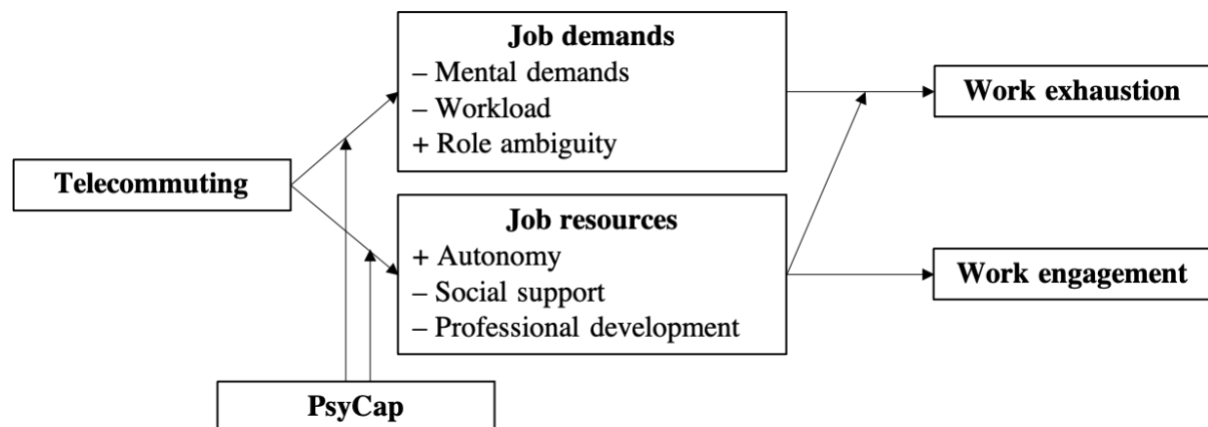


Figure 1 Research model of how telecommuting relates to job demands, job resources, PsyCap, as well as work exhaustion and work engagement

efficacy, jointly described as PsyCap, are examined (Luthans, Avolio, et al., 2007; Luthans & Youssef, 2007). Figure 1 displays the research model of this study. In the upcoming section, telecommuting is related to work exhaustion and work engagement, continued by the description of job demands and job resources as mediators and PsyCap and job resources as moderators of these relationships.

2.1. Telecommuting and work exhaustion

Work exhaustion represents the main component of job burnout, a psychological syndrome of chronic stress and describes the outcome of continuous emotional pressure (Maslach et al., 2001). Work exhaustion specifically refers to the depletion of mental resources caused when employees believe they are unable to fulfil the demands placed on them (Maslach et al., 1986). Telecommuting has been related to decreased levels of work exhaustion, due to saved energy-depleting commuting time (Bailey & Kurland, 2002; Sardeshmukh et al., 2012). Additionally, telecommuting entails greater scheduling flexibility, thereby allowing other personal and work demands to be fulfilled (Sánchez, Pérez, De Luis Carnicer & Jiménez, 2007), which in turn lowers the urge for recovery (Hahn, Binnewies, Sonnentag & Mojza, 2011; Sonnentag & Krueger, 2006). Hence, work exhaustion should decrease as the level of telecommuting increases.

H1: Telecommuting is negatively related to work exhaustion.

2.2. Telecommuting and work engagement

Work engagement refers to a “positive, full-filling, work-related state of mind that is characterised by vigour, dedication and absorption” (Schaufeli, Salanova, González-Romá & Bakker, 2002, p. 74). Regarding the effect of telecommuting on work engagement, academic literature reveals mixed results. Originally, Mann and Holdsworth (2003) and Sardeshmukh et al. (2012) argued for a negative relationship. They stated telecommuters’ physical and psychological separation from the office results in less identification with the firm’s workspace and decaying social work relationships, which ultimately causes a decrease in work engagement. Over time, however, academic research has been shifting position towards a positive standing regarding the direction of the telecommuting-work engagement relationship (Peters et al., 2014; Sewell & Taskin, 2015). It was shown that enhanced levels of autonomy related to telecommuting offset the detrimental consequences associated with it, thereby providing employees with coping capabilities against the negative effects of working remotely

(e.g., deteriorating workplace relationships). This is in line with Gajendran and Harrison (2007), who listed autonomy in their meta-analysis on telecommuting as the key predictor of employee well-being. Thus, work engagement is expected to increase due to telecommuting.

H2: Telecommuting is positively related to work engagement.

2.3. Job demands as a mediator

The present study argues that job demands have a mediating role in the relationship between telecommuting and work exhaustion. Specifically, it is predicted that telecommuting results in changes in job demands in the form of mental demands, workload and role ambiguity, which in turn predict work exhaustion.

a. Mental demands

Mental demands involve emotional or psychological pressures placed on an individual (Kegan, 1994) and causes stress when a person is unable to cope with these demands (Baethge & Rigotti, 2013). Telecommuting is apt to ease mental demands through reduced opportunities for workflow interruptions. Specifically, being physically separated from the office, telecommuting provides individuals with greater control over their work environment by enabling them to choose their location of work, work more independently and experience less managerial control (Bailey & Kurland, 2002; Siha & Monroe, 2006), which curbs the possibility for workflow interruptions by peers and supervisors (Sardeshmukh et al., 2012). Since workflow interruptions require additional effort and deplete cognitive resources through task switching (Hacker, 1994, 2003), reducing their occurrence results in less experienced mental demands and subsequent lower work exhaustion (Baethge & Rigotti, 2013). Hence, by creating a work setting with reduced possibilities of workflow interruptions by co-workers, telecommuting is predicted to ease mental demands, leading to less perceived work exhaustion.

H3a: Mental demands mediate the relationship between telecommuting and work exhaustion: telecommuting negatively relates to mental demands and mental demands positively relate to work exhaustion.

b. Workload

Workload describes to the total volume of work that is required regarding one's job (Spector & Jex, 1998). When confronted with a high workload, employees experience intense time

pressure and exhibit more work exhaustion (Bowling, Alarcon, Bragg & Hartman, 2015). Telecommuting is predicted to lower employees' perceived workload through conservation of commuting time, increased task scheduling flexibility and more efficient communication. By enabling to work remotely, telecommuting eliminates the need for an energy-consuming commute to the office (Bailey & Kurland, 2002; Mann & Holdsworth, 2003) and allows this saved commuting time to be reinvested into professional or personal activities (Guimaraes & Dallow, 1999), thereby jointly decreasing perceived time constraints (Sardeshmukh et al., 2012). Moreover, telecommuting entails more task scheduling flexibility, which makes it possible for employees to arrange work or private demands according to their time availability and preferred daily work rhythm (Pyöriä, 2011), easing time constraints and lowering workload as a result (Raghuram et al., 2019). Lastly, prior research has demonstrated that telecommuting involves more efficient communication, which leads to less experienced workload (Smith, Patmos & Pitts, 2018; Ter Hoeven, Van Zoonen & Fonner, 2016). Thus, as telecommuted is predicted to decrease workload through saved commuting time, optimisation of task scheduling and more efficient communication, work exhaustion is expected to decrease correspondingly.

H3b: Workload mediates the relationship between telecommuting and work exhaustion: telecommuting negatively relates to workload and workload positively relates to work exhaustion.

c. Role ambiguity

Role ambiguity refers to the uncertainty on how to accomplish certain tasks or execute activities regarding one's job position (Katz & Kahn, 1978; King & King, 1990) due to a lack of information (Rizzo, House & Lirtzman, 1970). Role ambiguity is predicted to increase when adopting a telecommuting design, given the physical separation from co-workers and corresponding greater difficulty in obtaining role-essential information. Namely, as telecommuters work from home or any other preferred location, they report increased perceptions of isolation, lack of co-worker support and lessened feedback (Bailey & Kurland, 2002; Golden et al., 2008), which results in more required effort to gather role-essential information crucial for adequate job performance (Sardeshmukh et al., 2012). Consequently, in an attempt to solve task unclarities, additional mental energy is consumed, which contributes to work exhaustion (Van Steenbergen, Van Der Ven, Peeters & Taris, 2018). Therefore, due to greater difficulty in gathering essential job-related information, telecommuters are bound to exhibit more role ambiguity, which in turn leads to an increase in work exhaustion.

H3c: Role ambiguity mediates the relationship between telecommuting and work exhaustion: telecommuting positively relates to role ambiguity and role ambiguity positively relates to work exhaustion.

2.4. Job resources as a mediator

The present study argues that job resources have a mediating role in the relationship between telecommuting and work engagement. Specifically, it is predicted that telecommuting results in changes in job resources in the form of autonomy, social support and opportunities for professional development, which in turn lead to work engagement.

a. Autonomy

Within the realm of work, autonomy represents an individuals' perception of the extent to which they can "structure and control how and when they do their particular job tasks" (Spector, 1986, p. 1006). Telecommuting is apt to increase employees' feelings of autonomy by providing control over timing and location of work under reduced managerial supervision. With greater control over their working times and location of work, employees in a telecommuting context are better equipped to synchronise professional tasks with personal or family demands (Demerouti, Derks, Lieke & Bakker, 2014; Hill, Miller, Weiner & Colihan, 1998), which positively contributes to feelings of control and flexibility (Morganson et al., 2010). In addition, less managerial oversight involved with telecommuting also enlarges employees' perception of autonomy. Specifically, because peers and supervisors no longer proximate in a telecommuting arrangement (Raghuram et al., 2019), telecommuters are "spatially and mentally removed from direct, face-to-face supervision" (Gajendran & Harrison, 2007, p. 1526), which increases perceived freedom and discretion (Dimitrova, 2003; Sewell & Taskin, 2015). Previous research has demonstrated that increased levels of autonomy positively impact work engagement, because people exhibit greater commitment and dedication to their job (Bakker & Demerouti, 2008; Schaufeli & Bakker, 2004). Therefore, by allowing individuals to perform tasks at their preferred time and location under less managerial control, it is predicted that telecommuting increases employees' experienced autonomy, which corresponds to more work engagement.

H4a: Autonomy mediates the relationship between telecommuting and work engagement: telecommuting positively relates to autonomy and autonomy positively relates to work engagement.

b. Social support

Social support entails “a flow of emotional concern, instrumental aid, information and/or appraisal between people” (House, 1983, p. 26) and constitutes an important determinant of employee work engagement (Mauno, Kinnunen & Ruokolainen, 2007; Schaufeli & Bakker, 2004; Schaufeli, Bakker & Van Rhenen, 2009). Telecommuting is bound to harm social support due to greater difficulty in establishing higher-level social contact and increased dependence upon digital communication. Specifically, by working from a remote location, telecommuting involves less face-to-face interactions and informal contacts with colleagues and supervisors (Bailey & Kurland, 2002), who represent the two main sources of social support within one’s organisation (Bakker & Demerouti, 2008; Schaufeli & Bakker, 2004). There are therefore reduced opportunities for telecommuters to receive and provide social support, which results in impaired relationships co-workers (Demerouti et al., 2014). Additionally, being separated from the office, telecommuters rely heavily upon digital communication channels such as e-mail, (instant)messaging and videotelephony (Raghuram et al., 2019). Although this does not hinder telecommuters in contacting co-workers for practical job-related issues, as demonstrated by reported efficient flows of communication (Smith et al., 2018; Ter Hoeven et al., 2016), it does make it tougher for telecommuters to interact with colleagues on a social level (Van Steenbergen et al., 2018), since these digital communication channels entail fewer social cues compared to face-to-face interactions (Daft, Lengel & Trevino, 1987). In turn, this weakened social support is linked to less work engagement (Bentley et al., 2016; Gerards, De Grip & Baudewijns, 2018). Thus, due to lacking supportive social interactions and greater usage of digital communication, telecommuting is likely to result in less social support, which leads to lower work engagement.

H4b: Social support mediates the relationship between telecommuting and work engagement: telecommuting negatively relates to autonomy and social support positively relates to work engagement.

c. Opportunities for professional development

Opportunities for professional development can pertain to one of three types of activities: (1) self-directed learning experiences, (2) formal professional development programs and (3) organisational development strategies (Caffarella & Zinn, 1999). However, as a consequence of limited access to social network and a resulting decrease in learning possibilities, opportunities for professional development are predicted to reduce due to telecommuting.

Generally, social interactions with co-workers provide an important base for professional development (Forret & Dougherty, 2004; Mirvis & Hall, 1996). Since those who telecommute operate in different locations than their office-based colleagues, telecommuters have less access to their work-related social network (Charalampous, Grant, Tramontano & Michailidis, 2019), which results in feelings of being “cut-off” (Kurland & Cooper, 2002, p. 118) and consequential professional isolation (Golden et al., 2008). Moreover, being physically separated from co-workers also leads to reduced potential for telecommuters to engage in learning opportunities such as personal networking, informal learning and mentoring (Cooper & Kurland, 2002), which further hampers their prospects for career advancement (Gajendran & Harrison, 2007; Golden & Eddleston, 2020). Employee development has shown to be a crucial contributing factor to work engagement (AbuKhalifeh & Som, 2013) by making jobs inventive and interesting through the development of new knowledge and skills (Andrew & Sofian, 2012). Therefore, since telecommuting is predicted to negatively impact opportunities for professional development due to restricted social interactions and corresponding reduced learning opportunities, experienced work engagement is expected to decrease as well.

H4c: Opportunities for professional development mediate the relationship between telecommuting and work engagement: telecommuting negatively relates to opportunities for professional development and opportunities for professional development positively relate to work engagement.

2.5. Psychological capital as a moderator

According to the JD-R model, not all jobs are alike, since different work designs entail different job resources and job demands, which together predict employees’ perceived work exhaustion and work engagement (Bakker & Demerouti, 2007; Demerouti et al., 2001). However, next to job characteristics, individual characteristics in the form of personal resources also play a role in determining employee well-being (Xanthopoulou, Bakker, Demerouti & Schaufeli, 2007), since these resources influence individual’s perception of their job characteristics (Schaufeli & Taris, 2014). To examine the potential effects of these individual differences, this present study analyses the moderating role of employees’ personal resources, as a function of their PsyCap, on the perceived changes in job demands and job resources due to telecommuting. Specifically, PsyCap entails the four main dimensions within the field of personal resources: (1) self-efficacy, i.e. “having confidence to take on and put in the necessary effort to succeed at

challenging tasks”; (2) optimism, i.e. “making a positive attribution about succeeding now and in the future”; (3) hope, i.e. “persevering toward goals and, when necessary, redirecting paths to goals in order to succeed”; (4) resiliency, i.e. “when beset by problems and adversity, sustaining and bouncing back and even beyond to attain success” (Luthans, Youssef & Avolio, 2007, p. 3). In contrast to the static nature of personality traits, personal resources are malleable and may be improved through training exercises such as micro-interventions and e-coaching modules (Lupşa, Vîrگا, Maricuţoiu & Rusu, 2020; Luthans, Avey & Patera, 2008). As such, by being open for development, PsyCap represents a potentially interesting method for organisations to aid employees in dealing with changed work experiences exhibited in a telecommuting context.

Since personal resources are positive self-evaluations that predict one’s ability to control and impact upon their environment successfully (Hobfoll, 2002), two things regarding the impact of personal resources (i.e., PsyCap) on the perception of job characteristics can be inferred. On the one hand, PsyCap may buffer against the negative effects of telecommuting on job demands and job resources, i.e. it will attenuate the surge in job demand role ambiguity and soften the declines in job resources social support and opportunities for professional development. On the other hand, PsyCap is predicted to intensify the positive impact of telecommuting on job demands and job resources, i.e. it will bolster the reductions in job demands mental demands and workload and strengthen the increase in job resource autonomy. This is in line with previous research, which has demonstrated the moderating role of personal resources in predicting reduced work exhaustion (e.g., Mäkikangas & Kinnunen, 2003) and increased work engagement (e.g., Xanthopoulou, Bakker, Demerouti & Schaufeli, 2009b). Together, this leads to the prediction that PsyCap moderates the effects of telecommuting on job demands and job resources, in a way that workers with high levels of PsyCap are better in dealing with changes in work conditions due to telecommuting.

H5a: The negative association between telecommuting and mental demands is moderated by PsyCap, such that it is weaker for higher than for lower levels of PsyCap.

H5b: The negative association between telecommuting and workload is moderated by PsyCap, such that it is stronger for higher than for lower levels of PsyCap.

H5c: The positive association between telecommuting and role ambiguity is moderated by PsyCap, such that it is weaker for higher than for lower levels of PsyCap.

H6a: The positive association between telecommuting and autonomy is moderated by PsyCap, such that it is stronger for higher than for lower levels of PsyCap.

H6b: The negative association between telecommuting and social support is moderated by PsyCap, such that it is weaker for higher than for lower levels of PsyCap.

H6c: The negative association between telecommuting and opportunities for professional development is moderated by PsyCap, such that it is weaker for higher than for lower levels of PsyCap.

2.6. Job resources as a moderator

Next to the proposition that work exhaustion and work engagement are developed as a consequence of job demands and job resources, the JD-R model also postulates that work exhaustion could potentially be impacted by interactions between job resources and job demands (Bakker et al., 2005). Specifically, the JD-R buffering hypothesis argues that job resources have a buffering effect on the impact of job demands on work exhaustion such that individuals possessing a high degree of job resources exhibit less work exhaustion in the face of job demands (Bakker, Hakanen, Demerouti & Xanthopoulou, 2007). As such, this premise extends the prior demand-control model (Karasek, 1979) by arguing that various job resources can have a buffering role for various job demands, with the details on which job demands and job resources are relevant being contingent on the characteristics of the respective work design.

Over time, this buffering hypothesis of job resources has aggregated empirical support. For example, Bakker et al. (2003) demonstrated that the negative effects of job demands (e.g., workload) on work exhaustion were lower when participants processed a high degree of job resources (e.g., opportunities for professional development). Similarly, Bakker et al. (2005) showed in a large study among teachers that the impact of multiple job demands on job burnout was contingent on participants' low degree of job resources. Therefore, to capture these potential buffering effects of job resources on the job demand-work exhaustion relationship, this present study analyses the potential moderating role of several telecommuting-specific job resources within the effects of several telecommuting-specific job demands on work exhaustion. More specifically, derived from the JD-R buffering hypothesis, it is expected that the negative effects of the job demands mental demands, workload and role ambiguity on work exhaustion are lower for employees with increased levels of the job resources autonomy, social support and opportunities for professional development.

H7a: Autonomy moderates the positive relationship between mental demands (7a1); workload (7a2); role ambiguity (7a3) and work exhaustion, such that is weaker for higher than for lower levels of autonomy.

H7b: Social support moderates the positive relationship between mental demands (7b1); workload (7b2); role ambiguity (7b3) and work exhaustion, such that is weaker for higher than for lower levels of social support.

H7c: Opportunities for professional development moderates the positive relationship between mental demands (7c1); workload (7c2); role ambiguity (7c3) and work exhaustion, such that is weaker for higher than for lower levels of opportunities for professional development.

3. Method

3.1. Participants and procedure

To empirically employ the conceptual model, a quantitative research design has been executed. Specifically, following recommendations from Simsek and Veiga (2001), a confidential web-based survey was administered to individuals at various organisations to acquire cross-sectional primary data. As a convenience sampling technique was used, the survey was provided in both English and Dutch to improve response rates, resulting in a total of 123 usable responses. On average, participants had a workweek of 33.77 hours ($SD = 10.18$) of which they spent 23.34 hours telecommuting ($SD = 12.74$). 52% of the participants were male, 51% of the participants were aged between 20 and 29 years, 75% had completed or were expected to complete a Bachelor's degree or higher, 19% worked in the education sector, 74% resided in the Netherlands and 16% had one or more dependent children at home.

3.2. Measures

See Appendix for an overview of the construction of variables. *Telecommuting* was measured with the variable extent of telework (Golden & Veiga, 2005). Adopted in various studies (e.g., Golden & Eddleston, 2020; Golden et al., 2008), it requests participants to state their absolute weekly working hours spent telecommuting. Furthermore, to assess the reliability of this scale, participants were also requested to list the percentage of their workweek spent telecommuting.

Job demands. *Mental demands* ($\alpha = .82$) was measured with four items constructed by Van Veldhoven and Meijman (1994), with an example item being: "My work requires a high level

of concentration” (1 = ‘never’; 5 = ‘always’). *Workload* ($\alpha = .71$) was measured with four items from the Job Content Instrument (JCI) by Karasek et al. (1998). A sample item is: “I have to work very fast” (1 = ‘never’; 5 = ‘always’). *Role ambiguity* ($\alpha = .90$) was measured using four items developed by Van Veldhoven and Meijman (1994), of which an example item is: “I know what others at work expect of me” (1 = ‘never’; 5 = ‘always’). Items have been reverse-coded, so a higher score indicates more ambiguity.

Job resources. *Autonomy* ($\alpha = .74$) was measured with three items adapted from the JCI by Karasek et al. (1998). An example item is: “I can decide myself how I execute my work” (1 = ‘never’; 5 = ‘always’). *Social support* ($\alpha = .91$) was measured using two subscales constructed by Van Veldhoven and Meijman (1994). Both consisting of three items, these subscales measured the social support from both co-workers ($\alpha = .86$) and supervisor ($\alpha = .90$) in a parallel order: “I can ask my colleagues for help if necessary” and “I can ask my supervisor for help if necessary” (1 = ‘never’; 5 = ‘always’). *Opportunities for professional development* ($\alpha = .86$) were measured with the three-item scale by Bakker et al. (2003), of which an example item is: “My work offers me the opportunity to learn new things” (1 = ‘strongly disagree’; 5 = ‘strongly agree’).

Work exhaustion ($\alpha = .84$) was measured using a five-item scale based on the Maslach Burnout Inventory (Maslach et al., 1986), with an example item being: “I feel used up at the end of the workday” (1 = ‘never’; 7 = ‘always’). *Work engagement* ($\alpha = .91$) was measured using the nine items of the shortened Utrecht Work Engagement Scale (UWES-9) developed by Schaufeli, Bakker and Salanova (2006). Validated in multiple countries (Schaufeli et al., 2006) and occupations (Nerstad, Richardsen & Martinussen, 2010), the UWES-9 was used to assess the three core dimensions of work engagement with three items each – vigour ($\alpha = .85$): “I am enthusiastic about my job”, dedication ($\alpha = .84$): “I am enthusiastic about my job”, and absorption ($\alpha = .72$): “Time flies when I am working” (1 = ‘never’; 7 = ‘always’).

PsyCap ($\alpha = .90$) was measured by means of the four personal resources, optimism, hope, resilience and self-efficacy. Optimism, hope and resilience were measured adopting the Psychological Capital Questionnaire (PCQ; Luthans, Avolio, et al., 2007; Luthans, Youssef, et al., 2007). Consisting of six items each, sample items included for optimism ($\alpha = .73$): “I always look on the bright side of things regarding my job”; for hope ($\alpha = .75$): “Right now I see myself as being pretty successful at work”; and for resilience ($\alpha = .70$): “I usually take stressful things

at work in stride” (1 = ‘strongly disagree’; 5 = ‘strongly agree’). Self-efficacy ($\alpha = .75$) was the only component not measured with the PCQ, as these items for self-efficacy were aimed at managers (Luthans, Avolio, et al., 2007; Luthans, Youssef, et al., 2007), which is not the target group of this study. Instead, self-efficacy was measured using the five-item Work Self-Efficacy scale (Schwarzer & Jerusalem, 1995), of which an example item is: “If there are problems at work, I know how to solve them” (1 = ‘strongly disagree’; 5 = ‘strongly agree’). Following Luthans, Norman, Avolio and Avey (2008), the item results of each scale were first averaged. Next, the four computed subscale means were averaged to obtain the final result for PsyCap.

Control variables were included in all analyses. Specifically, the effects of telecommuting on work engagement and work exhaustion may be influenced by demographic variables such as gender (Parasuraman & Greenhaus, 2002), age (Bailey & Kurland, 2002; Baruch, 2001) and presence of dependent children at home (Maruyama, Hopkinson & James, 2009).

3.3. Analyses

Several data cleaning steps have been undertaken to enable adequate data analysis. First, following recommendations from Katz (2011) on how to deal with missing data, 33 incomplete cases were removed. Second, respondents who stated that they have not worked to some extent in a telecommuting arrangement within the past twelve months, were omitted from the sample size. Third, persons who reported total working hours that were smaller than their listed total hours spent telecommuting were removed, since they did not understand at least one of the questions adequately. Next, based on executed univariate outliers detections for respondents’ total working hours and hours spend telecommuting, one respondent reporting a Z-score larger than three was excluded (Ben-Gal, 2005). Lastly, a verification index of respondents’ total hours spent telecommuting per week was calculated by multiplying respondents’ total working hours with their percentage spent telecommuting. Analysis revealed a significant difference between to measures ($p = .01$). Therefore, to improve reliability of the reported hours telecommuting (Golden & Veiga, 2005; Golden et al., 2008; Golden, Veiga & Simsek, 2006), participants with one standard deviation ($SD = 12.81$) difference between the two measurements were removed, as these participants were unable to report coherent absolute hours and proportion spent telecommuting, indicating they did not fully comprehend at least one of the two questions. Afterwards, no discernible difference between the two measurements was reported ($p = .853$). Altogether, this resulted in a total sample set of 123 cases.

After data cleaning had been executed, two types of analyses were conducted to test the research model: multiple hierarchical regression analysis to test for direct effects and PROCESS macro for SPSS – a well-renowned software tool that uses ordinary least squares (OLS) regression (Hayes, 2017) – was adopted to examine indirect effects. Due to the nature of the stated hypotheses, a stable method for examining indirect effects (i.e., mediation, moderated mediation and moderated moderated mediation effects) was required. PROCESS macro was selected, since the incorporated bootstrapping approach is the favoured technique for analysing indirect effects (Bauer, Preacher & Gil, 2006; Preacher & Hayes, 2004). As such, PROCESS macro advantageously calculates estimations for all total, direct and indirect effects within the research model. Additionally, PROCESS macro has the benefit of not requiring a normal sampling distribution and ensuring reliable results, especially for rather low sample sizes as present within the current study (Hayes, 2017, 2018; Preacher & Hayes, 2008).

As such, four stages of analyses were conducted. First, multiple hierarchical regression was executed to examine the direct effects of telecommuting on work exhaustion and work engagement. Second, PROCESS macro model 4 was applied to test the mediation effects of job demands and job resources between telecommuting and work exhaustion and work engagement. Third, PROCESS macro model 7 was used to test for moderated mediation effects of PsyCap on the effects of telecommuting on job demands and job resources. Fourth, PROCESS macro model 21 was conducted to test for moderated moderated mediation effects of job resources on the impact of job demands on work exhaustion. For all PROCESS models, bias-corrected 95% confidence intervals were calculated based on 5,000 bootstrapped (Hayes, 2009, 2018; Preacher, Rucker & Hayes, 2007). Significant interactions were plotted with one standard deviation below and above the mean (Aiken, West & Reno, 1991).

4. Results

Table 1 presents the means, standard deviations, reliabilities and correlations among the variables. Hypothesis 1 proposed that telecommuting is negatively related to work exhaustion, whereas Hypothesis 2 stated that telecommuting is positively related to work engagement. Table 2 shows the outcomes of the hierarchical multiple regression analyses. After controlling for gender, age and presence of dependent children at home, telecommuting was not significantly related to work exhaustion ($\beta = .006, p = .441$; Step 2) nor work engagement ($\beta = .001, p = .829$; Step 4), thereby not lending support for Hypotheses 1 and 2.

Table 1 Means, standard deviations, reliabilities and correlations of study variables

| <i>Variable</i> | <i>M</i> | <i>SD</i> | <i>1</i> | <i>2</i> | <i>3</i> | <i>4</i> | <i>5</i> | <i>6</i> | <i>7</i> | <i>8</i> | <i>9</i> | <i>10</i> | <i>11</i> | <i>12</i> | <i>13</i> |
|-----------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|
| 1 Gender | 1.48 | 0.50 | – | | | | | | | | | | | | |
| 2 Age | 2.89 | 1.14 | .13 | – | | | | | | | | | | | |
| 3 Dependent children | 1.16 | 0.37 | .11 | .43** | – | | | | | | | | | | |
| 4 Telecommuting | 23.34 | 12.74 | –.10 | –.08 | –.11 | – | | | | | | | | | |
| 5 Mental demands | 3.63 | 0.88 | .01 | –.09 | .05 | –.16 | (.82) | | | | | | | | |
| 6 Workload | 2.89 | 0.69 | –.02 | .02 | .11 | –.12 | .58** | (.71) | | | | | | | |
| 7 Role ambiguity | 2.49 | 0.96 | –.22* | .11 | –.08 | .25** | –.55** | –.33** | (.90) | | | | | | |
| 8 Autonomy | 4.01 | 0.68 | –.04 | .25** | .20* | .00 | –.05 | –.28** | .04 | (.74) | | | | | |
| 9 Social support | 4.01 | 0.96 | .23** | –.15 | .10 | –.20** | .61** | .38** | –.79** | .00 | (.91) | | | | |
| 10 Professional development | 3.73 | 1.02 | .17 | –.06 | .20* | –.23** | .64** | .35** | –.73** | .07 | .81** | (.86) | | | |
| 11 PsyCap | 3.80 | 0.45 | –.34** | .08 | .15 | .16 | –.21* | –.33** | .18 | .48** | –.22* | –.16 | (.90) | | |
| 12 Work exhaustion | 3.00 | 1.00 | .16 | –.12 | –.09 | .06 | .31** | .33** | –.10 | –.41** | .17 | .19* | –.59** | (.84) | |
| 13 Work engagement | 4.95 | 0.96 | –.28** | .28** | .08 | .04 | –.07 | –.13 | .05 | .45** | –.13 | .01 | .61** | –.61** | (.91) |

Notes: reliabilities are reported on the diagonal.

* $p < .05$. ** $p < .01$.

Gender: 1 = male, 2 = female; Age: 1 = 19 or younger, 2 = 20-29, 3 = 30-39, 4 = 40-49, 5 = 50-59, 6 = 60 or older; Dependent children: 1 = 0, 2 = 1 or more.

Table 2 Regression analyses of telecommuting on work exhaustion and work engagement

| <i>Independent variables</i> | <i>Work exhaustion</i> | | <i>Work engagement</i> | |
|---------------------------------------|------------------------|-------------------|------------------------|----------------------|
| | <i>Step 1</i> | <i>Step 2</i> | <i>Step 3</i> | <i>Step 4</i> |
| Gender | .304 | .314 [†] | -.559 ^{***} | -.556 ^{***} |
| Age 30-39 | -.240 | -.233 | .372 [†] | .374 [†] |
| Age 40-49 | -.456 | -.471 | .860 ^{***} | .856 ^{***} |
| Age 50 and older | -.201 | -.184 | .744 ^{***} | .748 ^{***} |
| Dependent children | -.099 | -.081 | -.127 | -.123 |
| Telecommuting | | .006 | | .001 |
| F | 1.430 | 1.288 | 5.427 ^{***} | 4.494 ^{***} |
| ΔF | | .599 | | .047 |
| R ² (Adj. R ²) | .058 (.017) | .062 (.014) | .188 (.154) | .189 (.147) |

Notes: [†] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

Hypothesis 3 projected that the relationship between telecommuting and work exhaustion is mediated by the job demands mental demands (H3a), workload (H3b) and role ambiguity (H3c). Table 3 displays the results of the mediation analyses. Steps 1, 2 and 3 show that telecommuting was non-significantly related to mental demands ($\beta = -.010$, $p = .097$) and workload ($\beta = -.006$, $p = .220$), but significantly positively related to role ambiguity ($\beta = .016$, $p < .01$). Step 4 shows that workload was significantly positively related to work exhaustion ($\beta = .395$, $p < .05$), whereas the effects of mental demands ($\beta = .263$, $p = .052$) and role ambiguity ($\beta = .198$, $p = .103$) were non-significant. Further, the indirect effects of telecommuting on work exhaustion via mental demands (coeff. = $-.003$, CI $[-.009; .001]$), workload (coeff. = $-.002$, CI $[-.009; .001]$) and role ambiguity (coeff. = $.003$, CI $[-.002; .011]$) were all non-significant, as indicated by the fact that the confidence intervals included zero. In sum, Hypotheses 3a, 3b and 3c were not supported.

Hypothesis 4 stated that the relationship between telecommuting and work engagement is mediated by the job resources autonomy (H4a), social support (H4b) and opportunities for professional development (H4c). Table 4 depicts the results of the mediation analyses. Steps 1, 2 and 3 demonstrate that telecommuting was non-significantly related to autonomy ($\beta = .001$, $p = .808$), yet significantly negatively related to social support ($\beta = -.013$, $p < .05$) and opportunities for professional development ($\beta = -.015$, $p < .05$). Step 4 shows that only autonomy significantly positively related to work engagement ($\beta = .520$, $p < .001$), as the effects of social support ($\beta = -.166$, $p = .238$) and opportunities for professional development ($\beta = .228$, $p = .074$) were non-significant. Additionally, the indirect effects of telecommuting on work engagement via autonomy (coeff. = $.001$, CI $[-.004; .007]$), social support (coeff. = $.002$, CI $[-.002; .008]$) and opportunities for professional development

Table 3 Results of mediation hypotheses job demands

| <i>Step 1: Mediator variable model</i> | | <i>Dependent variable: Mental demands</i> | | | | <i>R</i> ² |
|--|---------------|--|-----------|----------|-----------|-----------------------|
| | | <i>Bootstrapped CI [95%]</i> | | <i>p</i> | | |
| | <i>Coeff.</i> | <i>SE</i> | <i>LL</i> | | <i>UL</i> | |
| Gender | -.132 | .158 | -.445 | .180 | .403 | .146 |
| Age 30-39 | -.580 | .198 | -.971 | -.188 | <.01 | |
| Age 40-49 | -.862 | .258 | -1.373 | -.351 | <.01 | |
| Age 50 and older | -.095 | .263 | -.615 | .425 | .718 | |
| Dependent children | .434 | .236 | -.034 | .901 | .069 | |
| Telecommuting | -.010 | .006 | -.022 | .002 | .097 | |
| <i>Step 2: Mediator variable model</i> | | <i>Dependent variable: Workload</i> | | | | |
| | | <i>Bootstrapped CI [95%]</i> | | <i>p</i> | | |
| | <i>Coeff.</i> | <i>SE</i> | <i>LL</i> | | <i>UL</i> | |
| Gender | -.071 | .130 | -.330 | .187 | .586 | .034 |
| Age 30-39 | -.113 | .164 | .492 | .211 | .492 | |
| Age 40-49 | -.162 | .213 | -.585 | .260 | .448 | |
| Age 50 and older | -.039 | .217 | -.469 | .391 | .857 | |
| Dependent children | .262 | .195 | -.124 | .649 | .182 | |
| Telecommuting | -.006 | .005 | -.016 | .004 | .220 | |
| <i>Step 3: Mediator variable model</i> | | <i>Dependent variable: Role ambiguity</i> | | | | |
| | | <i>Bootstrapped CI [95%]</i> | | <i>p</i> | | |
| | <i>Coeff.</i> | <i>SE</i> | <i>LL</i> | | <i>UL</i> | |
| Gender | -.211 | .150 | -.509 | .087 | .163 | .341 |
| Age 30-39 | 1.023 | .188 | .650 | 1.396 | <.001 | |
| Age 40-49 | 1.216 | .246 | .729 | 1.703 | <.001 | |
| Age 50 and older | .261 | .250 | -.234 | .757 | .298 | |
| Dependent children | -.636 | .225 | -1.081 | -.190 | <.01 | |
| Telecommuting | .016 | .006 | .005 | .027 | <.01 | |
| <i>Step 4: Outcome variable model</i> | | <i>Dependent variable: Work exhaustion</i> | | | | |
| | | <i>Bootstrapped CI [95%]</i> | | <i>p</i> | | |
| | <i>Coeff.</i> | <i>SE</i> | <i>LL</i> | | <i>UL</i> | |
| Gender | .419 | .176 | .070 | .769 | <.05 | .214 |
| Age 30-39 | -.239 | .245 | -.724 | .247 | .332 | |
| Age 40-49 | -.421 | .316 | -1.048 | .205 | .185 | |
| Age 50 and older | -.195 | .289 | -.768 | .378 | .501 | |
| Dependent children | -.173 | .268 | -.703 | .358 | .520 | |
| Telecommuting | .007 | .007 | -.006 | .021 | .277 | |
| Mental demands | .263 | .134 | -.002 | .528 | .052 | |
| Workload | .395 | .152 | .094 | .695 | <.05 | |
| Role ambiguity | .198 | .121 | -.041 | .437 | .103 | |
| Direct effect of telecommuting on work exhaustion | .007 | .007 | 1.091 | .021 | .277 | |
| Indirect effect of telecommuting on work exhaustion via mental demands | -.003 | .003 | -.009 | .001 | | |
| Indirect effect of telecommuting on work exhaustion via workload | -.002 | .003 | -.009 | .001 | | |
| Indirect effect of telecommuting on work exhaustion via role ambiguity | .003 | .003 | -.002 | .011 | | |

Notes: N = 123. Bootstrap sample size = 5,000. Abbreviations: CI, confidence interval; LL, lower limit; UL, upper limit.

Table 4 Results of mediation hypotheses job resources

| <i>Step 1: Mediator variable model</i> | | <i>Dependent variable: Autonomy</i> | | | | <i>R²</i> |
|--|---------------|---|-----------|-----------|----------|----------------------|
| | | <i>Bootstrapped CI [95%]</i> | | | | |
| | <i>Coeff.</i> | <i>SE</i> | <i>LL</i> | <i>UL</i> | <i>p</i> | |
| | | | | | | .088 |
| Gender | -.071 | .126 | -.320 | .178 | .573 | |
| Age 30–39 | .274 | .158 | -.038 | .586 | .084 | |
| Age 40–49 | .359 | .206 | -.048 | .766 | .083 | |
| Age 50 and older | .377 | .209 | -.037 | .791 | .074 | |
| Dependent children | .165 | .188 | -.208 | .537 | .383 | |
| Telecommuting | .001 | .005 | -.008 | .011 | .808 | |
| <i>Step 2: Mediator variable model</i> | | <i>Dependent variable: Social support</i> | | | | <i>R²</i> |
| | | <i>Bootstrapped CI [95%]</i> | | | | |
| | <i>Coeff.</i> | <i>SE</i> | <i>LL</i> | <i>UL</i> | <i>p</i> | |
| | | | | | | .349 |
| Gender | .262 | .150 | -.035 | .558 | .083 | |
| Age 30-39 | -1.126 | .188 | -1.498 | -.754 | <.001 | |
| Age 40-49 | -1.224 | .245 | -1.709 | -.739 | <.001 | |
| Age 50 and older | -.506 | .249 | -.999 | -.012 | <.05 | |
| Dependent children | .762 | .224 | .319 | 1.206 | <.001 | |
| Telecommuting | -.013 | .006 | -.024 | -.001 | <.05 | |
| <i>Step 3: Mediator variable model</i> | | <i>Dependent variable: Professional development</i> | | | | <i>R²</i> |
| | | <i>Bootstrapped CI [95%]</i> | | | | |
| | <i>Coeff.</i> | <i>SE</i> | <i>LL</i> | <i>UL</i> | <i>p</i> | |
| | | | | | | .281 |
| Gender | .143 | .166 | -.186 | .471 | .392 | |
| Age 30-39 | -.936 | .208 | -1.349 | -.524 | <.001 | |
| Age 40-49 | -1.150 | .272 | -1.687 | -.612 | <.001 | |
| Age 50 and older | -.412 | .276 | -.960 | .135 | .138 | |
| Dependent children | .997 | .248 | .505 | 1.489 | <.001 | |
| Telecommuting | -.015 | .006 | -.028 | -.003 | <.05 | |
| <i>Step 4: Outcome variable model</i> | | <i>Dependent variable: Work engagement</i> | | | | <i>R²</i> |
| | | <i>Bootstrapped CI [95%]</i> | | | | |
| | <i>Coeff.</i> | <i>SE</i> | <i>LL</i> | <i>UL</i> | <i>p</i> | |
| | | | | | | .345 |
| Gender | -.508 | .154 | -.813 | -.204 | <.001 | |
| Age 30-39 | .259 | .221 | -.179 | -.204 | .244 | |
| Age 40-49 | .729 | .278 | .178 | 1.281 | <.01 | |
| Age 50 and older | .562 | .260 | .047 | 1.078 | <.05 | |
| Dependent children | -.310 | .241 | -.788 | 1.206 | .202 | |
| Telecommuting | .002 | .006 | -.010 | .014 | .718 | |
| Autonomy | .520 | .113 | .297 | .744 | <.001 | |
| Social support | -.166 | .140 | -.442 | .111 | .238 | |
| Professional development | .228 | .127 | -.022 | .479 | .074 | |
| Direct effect of telecommuting on work engagement | .002 | .006 | -.010 | .014 | .718 | |
| Indirect effect of telecommuting on work engagement via autonomy | .001 | .003 | -.004 | .007 | | |
| Indirect effect of telecommuting on work engagement via social support | .002 | .002 | -.002 | .008 | | |
| Indirect effect of telecommuting on work engagement via professional development | -.004 | .002 | -.009 | .001 | | |

Notes: N = 123. Bootstrap sample size = 5,000. Abbreviations: CI, confidence interval; LL, lower limit; UL, upper limit.

(coeff. = -.004, CI [-.009; .001]) were all non-significant, as shown by the zero-including confidence intervals for these coefficients. Thus, Hypotheses 4a, 4b and 4c were not supported.

Hypothesis 5 predicted that PsyCap moderates the relationships between telecommuting and the job demands mental demands (H5a), workload (H5b) and role ambiguity (H5c). Table 5 depicts the results of the moderation mediation analyses. In support of Hypothesis 5a, PsyCap interacted with telecommuting in relation to mental demands ($\beta = -.038, p < .05$). Figure 2 shows that for employees with high PsyCap, telecommuting was negatively related to mental demands ($\beta = -.048, p < .01$), while the relationship was non-significant for employees with low PsyCap ($\beta = .029, p = .075$). Further, Hypotheses 5b and 5c are rejected, since PsyCap did not moderate the relationships between telecommuting and workload ($\beta = -.010, p = .414$) and telecommuting and role ambiguity ($\beta = .025, p = .096$). In addition, moderated mediation effects were tested, but were all found to be insignificant for mental demands (coeff. = $-.010$, CI [$-.033; .004$]), workload (coeff. = $-.004$, CI [$-.014; .006$]) and role ambiguity (coeff. = $.005$, CI [$-.005; .017$]), as indicated by confidence intervals containing zero. In sum, Hypothesis 5a was supported, Hypotheses 5b and 5c were not.

Hypothesis 6 projected that PsyCap moderates the relationships between telecommuting and the job resources autonomy (H6a), social support (H6b) and opportunities for professional development (H6c). Table 6 displays the results of the moderation mediation analyses. Hypothesis 6a is rejected, since PsyCap did not moderate the relationship between telecommuting and autonomy ($\beta = -.013, p = .222$). Moreover, although PsyCap interacted with telecommuting in relation to social support ($\beta = -.048, p < .01$), Hypothesis 6b was also rejected. Namely, contrary to previous expectations, Figure 3 shows that for employees with high PsyCap, telecommuting was negatively related to social support ($\beta = -.035, p < .001$), while the relationship was non-significant for employees with low PsyCap ($\beta = .008, p = .337$). Similarly, Hypothesis 6c was also rejected, despite PsyCap moderating the relationship between telecommuting and opportunities for professional development ($\beta = -.056, p < .001$). Opposite to previously expected, Figure 4 demonstrates that for employees with high PsyCap, telecommuting was negatively related to opportunities for professional development ($\beta = -.073, p < .001$), while the relationship was positive for employees with low PsyCap ($\beta = .041, p < .05$). In addition, moderated mediation effects were tested. However, as the confidence intervals for the indexes of moderated mediation for autonomy (coeff. = $-.007$, CI [$-.018; .005$]), social support (coeff. = $.008$, CI [$-.007; .028$]) and opportunities for professional development (coeff. = $-.013$, CI [$-.032; .002$]) contained zero, these effects were not supported. Thus, Hypotheses 6a, 6b and 6c were not supported.

Table 5 Results of moderation hypotheses PsyCap in relation to job demands

| <i>Step 1: Mediator variable model</i> | | <i>Dependent variable: Mental demands</i> | | | | <i>R²</i> |
|---|-----------|--|-----------|----------|-------|----------------------|
| <i>Coeff.</i> | <i>SE</i> | <i>Bootstrapped CI [95%]</i> | | <i>p</i> | | |
| | | <i>LL</i> | <i>UL</i> | | | |
| Gender | -.298 | .162 | -.618 | .023 | .068 | .224 |
| Age 30-39 | -.337 | .207 | -.747 | .073 | .106 | |
| Age 40-49 | -.605 | .263 | -1.126 | -.084 | <.05 | |
| Age 50 and older | .075 | .260 | -.440 | .590 | .774 | |
| Dependent children | .369 | .236 | -.099 | .837 | .121 | |
| Telecommuting | -.009 | .006 | -.021 | .002 | .118 | |
| PsyCap | -.319 | .179 | -.675 | .037 | .078 | |
| Telecommuting * PsyCap | -.038 | .015 | -.068 | -.009 | <.05 | |
| <i>Step 2: Mediator variable model</i> | | <i>Dependent variable: Workload</i> | | | | |
| <i>Coeff.</i> | <i>SE</i> | <i>Bootstrapped CI [95%]</i> | | <i>p</i> | | |
| | | <i>LL</i> | <i>UL</i> | | | |
| Gender | -.267 | .130 | -.525 | -.010 | <.05 | .174 |
| Age 30-39 | .002 | .166 | -.326 | .331 | .989 | |
| Age 40-49 | -.048 | .211 | -.467 | .370 | .819 | |
| Age 50 and older | .020 | .209 | -.394 | .433 | .925 | |
| Dependent children | .346 | .190 | -.029 | .722 | .070 | |
| Telecommuting | -.003 | .005 | -.013 | .006 | .488 | |
| PsyCap | -.595 | .144 | -.880 | -.309 | <.001 | |
| Telecommuting * PsyCap | -.010 | .012 | -.033 | .014 | .414 | |
| <i>Step 3: Mediator variable model</i> | | <i>Dependent variable: Role ambiguity</i> | | | | |
| <i>Coeff.</i> | <i>SE</i> | <i>Bootstrapped CI [95%]</i> | | <i>p</i> | | |
| | | <i>LL</i> | <i>UL</i> | | | |
| Gender | -.155 | .160 | -.471 | .161 | .333 | .358 |
| Age 30-39 | .883 | .204 | .479 | 1.287 | <.001 | |
| Age 40-49 | 1.066 | .259 | .552 | 1.580 | <.001 | |
| Age 50 and older | .156 | .256 | -.352 | .664 | .543 | |
| Dependent children | -.560 | .233 | 1.022 | -.099 | <.05 | |
| Telecommuting | .016 | .006 | .005 | .028 | <.01 | |
| PsyCap | .036 | .177 | -.314 | .387 | .837 | |
| Telecommuting * PsyCap | .025 | .015 | -.004 | .054 | .096 | |
| <i>Step 4: Outcome variable model</i> | | <i>Dependent variable: Work exhaustion</i> | | | | |
| <i>Coeff.</i> | <i>SE</i> | <i>Bootstrapped CI [95%]</i> | | <i>p</i> | | |
| | | <i>LL</i> | <i>UL</i> | | | |
| Gender | .419 | .176 | .070 | .769 | <.05 | .214 |
| Age 30-39 | -.239 | .245 | -.724 | .247 | .332 | |
| Age 40-49 | -.421 | .316 | -1.048 | .205 | .185 | |
| Age 50 and older | -.195 | .289 | -.768 | .378 | .501 | |
| Dependent children | -.173 | .268 | -.703 | .358 | .520 | |
| Telecommuting | .007 | .007 | -.006 | .021 | .277 | |
| Mental demands | .263 | .134 | -.002 | .528 | .052 | |
| Workload | .395 | .152 | .094 | .695 | <.05 | |
| Role ambiguity | .198 | .121 | -.041 | .437 | .103 | |
| Direct effect of telecommuting on work exhaustion | .007 | .007 | 1.091 | .021 | .277 | |
| Conditional indirect effects of telecommuting on work exhaustion via mental demands | | | | | | |
| Low PsyCap (1 SD below mean) | .002 | .003 | -.003 | .011 | | |
| High PsyCap (1 SD above mean) | -.007 | .006 | -.021 | .002 | | |
| Index of moderated mediation | -.010 | .009 | -.033 | .004 | | |
| Conditional indirect effects of telecommuting on work exhaustion via workload | | | | | | |
| Low PsyCap (1 SD below mean) | .000 | .003 | -.005 | .008 | | |
| High PsyCap (1 SD above mean) | -.003 | .004 | -.012 | .003 | | |
| Index of moderated mediation | -.004 | .006 | -.019 | .006 | | |
| Conditional indirect effects of telecommuting on work exhaustion via role ambiguity | | | | | | |
| Low PsyCap (1 SD below mean) | .001 | .003 | -.002 | .009 | | |
| High PsyCap (1 SD above mean) | .005 | .005 | -.004 | .017 | | |
| Index of moderated mediation | .005 | .005 | -.005 | .017 | | |

Notes: N = 123. Bootstrap sample size = 5,000. Abbreviations: CI, confidence interval; LL, lower limit; UL, upper limit.

Table 6 Results of moderation hypotheses PsyCap in relation to job resources

| <i>Step 1: Mediator variable model</i> | | <i>Dependent variable: Autonomy</i> | | | | <i>R²</i> |
|---|---------------|---|-----------|----------|-----------|----------------------|
| | | <i>Bootstrapped CI [95%]</i> | | <i>p</i> | | |
| | <i>Coeff.</i> | <i>SE</i> | <i>LL</i> | | <i>UL</i> | |
| | | | | | | .309 |
| Gender | .141 | .118 | -.092 | .374 | .234 | |
| Age 30-39 | .267 | .150 | -.031 | .565 | .079 | |
| Age 40-49 | .365 | .191 | -.014 | .744 | .059 | |
| Age 50 and older | .410 | .189 | .035 | .785 | <.05 | |
| Dependent children | -.035 | .172 | -.376 | .305 | .838 | |
| Telecommuting | -.003 | .004 | -.012 | .005 | .456 | |
| PsyCap | .787 | .131 | .529 | 1.046 | <.001 | |
| Telecommuting * PsyCap | -.013 | .011 | -.035 | .008 | .222 | |
| <i>Step 2: Mediator variable model</i> | | <i>Dependent variable: Social support</i> | | | | <i>R²</i> |
| | | <i>Bootstrapped CI [95%]</i> | | <i>p</i> | | |
| | <i>Coeff.</i> | <i>SE</i> | <i>LL</i> | | <i>UL</i> | |
| | | | | | | .417 |
| Gender | .138 | .153 | -.164 | .440 | .366 | |
| Age 30-39 | -.850 | .195 | -1.237 | -.464 | <.001 | |
| Age 40-49 | -.929 | .248 | -1.420 | -.437 | <.001 | |
| Age 50 and older | -.301 | .245 | -.786 | .185 | .222 | |
| Dependent children | .626 | .223 | .185 | 1.067 | <.01 | |
| Telecommuting | -.013 | .006 | -.024 | -.002 | <.05 | |
| PsyCap | -.120 | .169 | -.455 | .215 | .479 | |
| Telecommuting * PsyCap | -.048 | .014 | -.076 | -.020 | <.01 | |
| <i>Step 3: Mediator variable model</i> | | <i>Dependent variable: Professional development</i> | | | | <i>R²</i> |
| | | <i>Bootstrapped CI [95%]</i> | | <i>p</i> | | |
| | <i>Coeff.</i> | <i>SE</i> | <i>LL</i> | | <i>UL</i> | |
| | | | | | | .361 |
| Gender | .016 | .168 | -.318 | .349 | .927 | |
| Age 30-39 | -.618 | .215 | -1.045 | -.192 | <.01 | |
| Age 40-49 | -.807 | .274 | -1.350 | -.265 | <.01 | |
| Age 50 and older | -.173 | .271 | -.709 | .363 | .523 | |
| Dependent children | .825 | .246 | .337 | 1.312 | <.01 | |
| Telecommuting | -.016 | .006 | -.028 | -.004 | <.05 | |
| PsyCap | -.082 | .187 | -.452 | .288 | .661 | |
| Telecommuting * PsyCap | -.056 | .016 | -.087 | -.025 | <.001 | |
| <i>Step 4: Outcome variable model</i> | | <i>Dependent variable: Work engagement</i> | | | | <i>R²</i> |
| | | <i>Bootstrapped CI [95%]</i> | | <i>p</i> | | |
| | <i>Coeff.</i> | <i>SE</i> | <i>LL</i> | | <i>UL</i> | |
| | | | | | | .345 |
| Gender | -.508 | .154 | -.813 | -.204 | <.01 | |
| Age 30-39 | .259 | .221 | -.179 | .696 | .244 | |
| Age 40-49 | .729 | .278 | .178 | 1.281 | <.05 | |
| Age 50 and older | .562 | .260 | .047 | 1.078 | <.05 | |
| Dependent children | -.310 | .241 | -.788 | .169 | .202 | |
| Telecommuting | .002 | .006 | -.010 | .014 | .718 | |
| Autonomy | .520 | .113 | .297 | .744 | <.001 | |
| Social support | -.166 | .140 | -.442 | .111 | .238 | |
| Professional development | .228 | .127 | -.022 | .479 | .074 | |
| Direct effect of telecommuting on work engagement | .002 | .006 | -.010 | .014 | .718 | |
| Conditional indirect effects of telecommuting on work engagement via autonomy | | | | | | |
| Low PsyCap (1 SD below mean) | .001 | .003 | -.005 | .007 | | |
| High PsyCap (1 SD above mean) | -.005 | .004 | -.013 | .003 | | |
| Index of moderated mediation | -.007 | .006 | -.018 | .005 | | |
| Conditional indirect effects of telecommuting on work engagement via social support | | | | | | |
| Low PsyCap (1 SD below mean) | -.001 | .003 | -.008 | .002 | | |
| High PsyCap (1 SD above mean) | .006 | .006 | -.005 | .020 | | |
| Index of moderated mediation | .008 | .009 | -.007 | .028 | | |
| Conditional indirect effects of telecommuting on work engagement via professional development | | | | | | |
| Low PsyCap (1 SD below mean) | .002 | .003 | -.001 | .008 | | |
| High PsyCap (1 SD above mean) | -.010 | .006 | -.023 | .002 | | |
| Index of moderated mediation | -.013 | .009 | -.032 | .002 | | |

Notes: N = 123. Bootstrap sample size = 5,000. Abbreviations: CI, confidence interval; LL, lower limit; UL, upper limit.

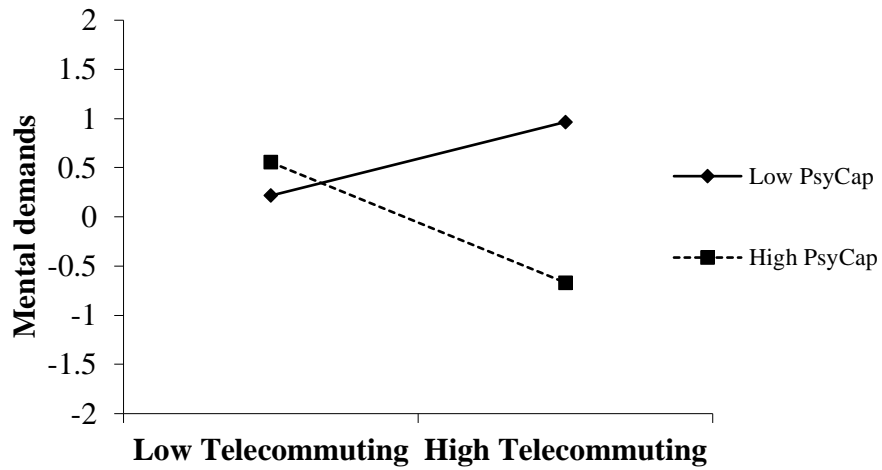


Figure 2 Interaction between telecommuting and PsyCap in relation to mental demands

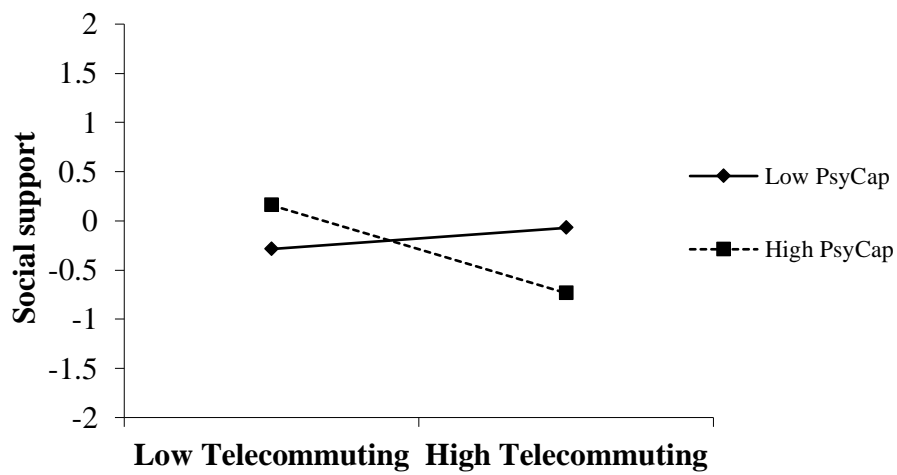


Figure 3 Interaction between telecommuting and PsyCap in relation to social support

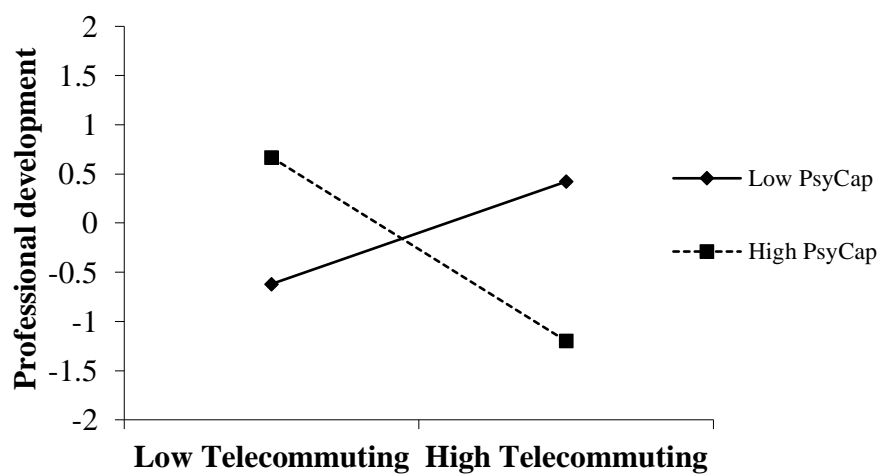


Figure 4 Interaction between telecommuting and PsyCap in relation to opportunities for professional development

Hypothesis 7 stated that the relationship between job demands (mental demands, workload and role ambiguity) and work exhaustion is moderated by job resources (autonomy, social support and opportunities for professional development). Firstly, Table 7 depicts the results of the moderated moderated mediation analyses for autonomy. Hypothesis 7a1 and 7a2 were not supported, as autonomy did not moderate the impact of mental demands ($\beta = .003, p = .987$) and role ambiguity ($\beta = -.096, p = .604$) on work exhaustion. Supporting Hypothesis 7a3, autonomy moderated the relationship between role ambiguity and work exhaustion ($\beta = -.321, p < .05$). Figure 5 shows that the slope of role ambiguity for people high in autonomy was not significant ($\beta = -.106, p = .518$), whereas the relationship was positive for people with low autonomy ($\beta = .332, p < .05$). Additionally, moderated moderated mediation effects were tested, but were all found to be insignificant for mental demands (coeff. = .000, CI [-.022; .017]), workload (coeff. = .001, CI [-.008; .011]) and role ambiguity (coeff. = -.008, CI [-.021; .003]), as these confidence intervals did span zero. In sum, Hypothesis 7a3 was supported, Hypotheses 7a1 and 7a2 were not.

Secondly, Table 8 depicts the results of the moderated moderated mediation analyses for social support. Hypotheses 7b1 and 7b2 were not supported, since social support did not moderate the effects of mental demands ($\beta = -.230, p = .067$) and workload ($\beta = .196, p = .201$) on work exhaustion. Further, social support moderated the relationship between role ambiguity and work exhaustion ($\beta = .313, p < .01$). However, contrary to previous expectations, Figure 6 shows that for employees with high social support, role ambiguity was positively related to work exhaustion ($\beta = .461, p < .05$), whereas the relationship was non-significant for employees with low social support ($\beta = -.141, p = .399$). Therefore, Hypothesis 7b3 was not supported. Also, moderated moderated mediation effects were tested, but were all found to be insignificant for mental demands (coeff. = .009, CI [-.001; .029]), workload (coeff. = -.002, CI [-.011; .004]) and role ambiguity (coeff. = .008, CI [-.002; .022]), since these confidence intervals did contain zero. In conclusion, Hypotheses 7b1, 7b2 and 7b3 were not supported.

Lastly, Table 9 depicts the results of the moderated moderated mediation analyses for opportunities for professional development. Hypotheses 7c1 and 7c2 were not supported, since opportunities for professional development did not moderate the impact of mental demands ($\beta = .043, p = .676$) and workload ($\beta = -.136, p = .322$) on work exhaustion. Furthermore, Hypothesis 7b3 was not supported, even though opportunities for professional development moderated the relationship between role ambiguity and work exhaustion ($\beta = .381, p < .001$).

Table 7 Results of moderated moderated mediation hypotheses autonomy

| | Dependent variable: Work exhaustion | | | | | <i>R</i> ² |
|---|-------------------------------------|------|-----------------------|-------|----------|-----------------------|
| | Coeff. | SE | Bootstrapped CI [95%] | | <i>p</i> | |
| | | | LL | UL | | |
| <i>Step 4: Outcome variable model^a</i> | | | | | | .339 |
| Gender | .331 | .168 | -.001 | .663 | .051 | |
| Age 30-39 | .018 | .240 | -.457 | .493 | .940 | |
| Age 40-49 | -.067 | .307 | -.676 | .541 | .828 | |
| Age 50 and older | -.006 | .275 | -.551 | .539 | .982 | |
| Dependent children | -.108 | .252 | -.607 | .392 | .670 | |
| Telecommuting | .011 | .007 | -.002 | .024 | .085 | |
| Mental demands | .291 | .131 | .032 | .550 | <.05 | |
| Workload | .083 | .158 | -.231 | .397 | .600 | |
| Role ambiguity | .113 | .120 | -.124 | .350 | .348 | |
| Autonomy | -.538 | .131 | -.798 | -.278 | <.001 | |
| Mental demands * autonomy | .003 | .170 | -.335 | .340 | .987 | |
| Workload * autonomy | -.096 | .184 | -.462 | .270 | .604 | |
| Role ambiguity * autonomy | -.321 | .136 | -.590 | -.053 | <.05 | |
| Conditional effects of role ambiguity on work exhaustion moderated by autonomy ^b | | | | | | |
| Low autonomy (1 <i>SD</i> below mean) | .332 | .137 | .060 | .604 | <.05 | |
| High autonomy (1 <i>SD</i> above mean) | -.106 | .164 | -.431 | .219 | .518 | |
| Direct effect of telecommuting on work exhaustion | .011 | .007 | -.002 | .024 | .085 | |
| Conditional indirect effects of telecommuting on work exhaustion via mental demands | | | | | | |
| Index of moderated moderated mediation | .000 | .009 | -.022 | .017 | | |
| Conditional moderated mediation PsyCap | | | | | | |
| Low autonomy (1 <i>SD</i> below mean) | -.011 | .010 | -.032 | .008 | | |
| High autonomy (1 <i>SD</i> above mean) | -.011 | .011 | -.039 | .004 | | |
| Conditional indirect effects of telecommuting on work exhaustion via workload | | | | | | |
| Index of moderated moderated mediation | .001 | .004 | -.008 | .011 | | |
| Conditional moderated mediation PsyCap | | | | | | |
| Low autonomy (1 <i>SD</i> below mean) | -.001 | .004 | -.012 | .004 | | |
| High autonomy (1 <i>SD</i> above mean) | .000 | .005 | -.013 | .009 | | |
| Conditional indirect effects of telecommuting on work exhaustion via role ambiguity | | | | | | |
| Index of moderated moderated mediation | -.008 | .006 | -.021 | .003 | | |
| Conditional moderated mediation by PsyCap | | | | | | |
| Low autonomy (1 <i>SD</i> below mean) | .008 | .007 | -.004 | .024 | | |
| High autonomy (1 <i>SD</i> above mean) | -.003 | .006 | -.015 | .010 | | |

Notes: N = 123. Bootstrap sample size = 5,000. Abbreviations: CI, confidence interval; LL, lower limit; UL, upper limit.

^aMediator outcome variables steps 1, 2 and 3 are excluded, as these are identical to the ones in Table 5.

^bAs autonomy only had a significant moderation effect on the relationship between role ambiguity and work exhaustion, only the conditional effects of autonomy for this relationship are reported.

Namely, counter to prior expectations, Figure 7 shows that the slope of role ambiguity for people with high opportunities for professional development was positive ($\beta = .760, p < .001$), whereas the relationship was non-significant for employees with low opportunities for professional development ($\beta = -.014, p = .921$). In addition, moderated moderated mediation

Table 8 Results of moderated moderated mediation hypotheses social support

| <i>Step 4: Outcome variable model^a</i> | <i>Dependent variable: Work exhaustion</i> | | | | | <i>R²</i> |
|---|--|-----------|------------------------------|-----------|----------|----------------------|
| | <i>Coeff.</i> | <i>SE</i> | <i>Bootstrapped CI [95%]</i> | | <i>p</i> | |
| | | | <i>LL</i> | <i>UL</i> | | |
| | | | | | | .348 |
| Gender | .246 | .172 | -.094 | .586 | .154 | |
| Age 30-39 | -.107 | .241 | -.585 | .370 | .657 | |
| Age 40-49 | -.264 | .305 | -.868 | .339 | .388 | |
| Age 50 and older | -.106 | .275 | -.650 | .439 | .702 | |
| Dependent children | -.178 | .257 | -.688 | .332 | .491 | |
| Telecommuting | .013 | .007 | .000 | .026 | <.05 | |
| Mental demands | .158 | .133 | -.105 | .422 | .237 | |
| Workload | .237 | .149 | -.059 | .533 | .115 | |
| Role ambiguity | .160 | .140 | -.117 | .437 | .254 | |
| Autonomy | -.293 | .159 | -.609 | .023 | .068 | |
| Mental demands * social support | -.230 | .125 | -.477 | .017 | .067 | |
| Workload * social support | .196 | .152 | -.106 | .498 | .201 | |
| Role ambiguity * social support | .313 | .108 | .098 | .527 | <.01 | |
| Conditional effects of role ambiguity on work exhaustion moderated by social support ^b | | | | | | |
| Low social support (1 <i>SD</i> below mean) | -.141 | .166 | -.470 | .189 | .399 | |
| High social support (1 <i>SD</i> above mean) | .461 | .182 | .101 | .821 | <.05 | |
| Direct effect of telecommuting on work exhaustion | .013 | .007 | .000 | .026 | <.05 | |
| Conditional indirect effects of telecommuting on work exhaustion via mental demands | | | | | | |
| Index of moderated moderated mediation | .009 | .008 | -.001 | .029 | | |
| Conditional moderated mediation PsyCap | | | | | | |
| Low social support (1 <i>SD</i> below mean) | -.014 | .013 | -.047 | .001 | | |
| High social support (1 <i>SD</i> above mean) | .002 | .009 | -.018 | .022 | | |
| Conditional indirect effects of telecommuting on work exhaustion via workload | | | | | | |
| Index of moderated moderated mediation | -.002 | .004 | -.011 | .004 | | |
| Conditional moderated mediation PsyCap | | | | | | |
| Low social support (1 <i>SD</i> below mean) | .000 | .004 | -.009 | .006 | | |
| High social support (1 <i>SD</i> above mean) | -.004 | .007 | -.022 | .007 | | |
| Conditional indirect effects of telecommuting on work exhaustion via role ambiguity | | | | | | |
| Index of moderated moderated mediation | .008 | .006 | -.002 | .022 | | |
| Conditional moderated mediation by PsyCap | | | | | | |
| Low social support (1 <i>SD</i> below mean) | -.003 | .007 | -.021 | .009 | | |
| High social support (1 <i>SD</i> above mean) | .011 | .009 | -.003 | .033 | | |

Notes: N = 123. Bootstrap sample size = 5,000. Abbreviations: CI, confidence interval; LL, lower limit; UL, upper limit.

^aMediator outcome variables steps 1, 2 and 3 are excluded, as these are identical to the ones in Table 5.

^bAs social support only had a significant moderation effect on the relationship between role ambiguity and work exhaustion, only the conditional effects of social support for this relationship are reported.

effects were tested and were all found to be insignificant for mental demands (coeff. = -.002, CI [-.014; .011]), workload (coeff. = .001, CI [-.005; .012]) and role ambiguity (coeff. = .009, CI [-.002; .023]), as these confidence intervals did span zero. In sum, no support was found for Hypotheses 7c1, 7c2 and 7c3.

Table 9 Results of moderated moderated mediation hypotheses opportunities for professional development

| <i>Step 4: Outcome variable model^a</i> | <i>Dependent variable: Work exhaustion</i> | | | | | <i>R²</i> |
|---|--|-----------|------------------------------|-----------|----------|----------------------|
| | <i>Coeff.</i> | <i>SE</i> | <i>Bootstrapped CI [95%]</i> | | <i>p</i> | |
| | | | <i>LL</i> | <i>UL</i> | | |
| | | | | | | .383 |
| Gender | .195 | .168 | -.138 | .527 | .249 | |
| Age 30-39 | -.144 | .231 | -.603 | .315 | .536 | |
| Age 40-49 | -.396 | .291 | -.973 | .182 | .177 | |
| Age 50 and older | -.043 | .264 | -.566 | .481 | .872 | |
| Dependent children | -.064 | .254 | -.567 | .439 | .801 | |
| Telecommuting | .013 | .006 | .001 | .026 | <.05 | |
| Mental demands | .196 | .142 | -.085 | .476 | .170 | |
| Workload | .206 | .145 | -.081 | .492 | .158 | |
| Role ambiguity | .373 | .128 | .119 | .627 | <.01 | |
| Autonomy | -.070 | .131 | -.330 | .191 | .598 | |
| Mental demands * professional development | .043 | .103 | -.160 | .246 | .676 | |
| Workload * professional development | -.136 | .137 | -.407 | .135 | .322 | |
| Role ambiguity * professional development | .381 | .085 | .212 | .550 | <.001 | |
| Conditional effects of role ambiguity on work exhaustion moderated by social support ^b | | | | | | |
| Low professional development (1 <i>SD</i> below mean) | -.014 | .140 | -.292 | .264 | .921 | |
| High professional development (1 <i>SD</i> above mean) | .760 | .168 | .427 | 1.093 | <.001 | |
| Direct effect of telecommuting on work exhaustion | .013 | .006 | .001 | .026 | <.05 | |
| Conditional indirect effects of telecommuting on work exhaustion via mental demands | | | | | | |
| Index of moderated moderated mediation | -.002 | .006 | -.014 | .011 | | |
| Conditional moderated mediation PsyCap | | | | | | |
| Low professional development (1 <i>SD</i> below mean) | -.006 | .008 | -.026 | .009 | | |
| High professional development (1 <i>SD</i> above mean) | -.009 | .012 | -.035 | .012 | | |
| Conditional indirect effects of telecommuting on work exhaustion via workload | | | | | | |
| Index of moderated moderated mediation | .001 | .004 | -.005 | .012 | | |
| Conditional moderated mediation PsyCap | | | | | | |
| Low professional development (1 <i>SD</i> below mean) | -.003 | .006 | -.018 | .007 | | |
| High professional development (1 <i>SD</i> above mean) | -.001 | .005 | -.014 | .009 | | |
| Conditional indirect effects of telecommuting on work exhaustion via role ambiguity | | | | | | |
| Index of moderated moderated mediation | .009 | .006 | -.002 | .023 | | |
| Conditional moderated mediation by PsyCap | | | | | | |
| Low professional development (1 <i>SD</i> below mean) | .000 | .005 | -.010 | .010 | | |
| High professional development (1 <i>SD</i> above mean) | .019 | .013 | -.004 | .046 | | |

Notes: N = 123. Bootstrap sample size = 5,000. Abbreviations: CI, confidence interval; LL, lower limit; UL, upper limit.

^aMediator outcome variables steps 1, 2 and 3 are excluded, as these are identical to the ones in Table 5.

^bAs opportunities for professional development only had a significant moderation effect on the relationship between role ambiguity and work exhaustion, only the conditional effects of opportunities for professional development for this relationship are reported.

5. Discussion

Although organisations have increasingly implemented telecommuting work designs (Chokshi, 2017; Eurofound, 2018), the specific consequences for employee outcomes as well as the underlying job and personal mechanisms of these effects have remained unclear. Therefore, to

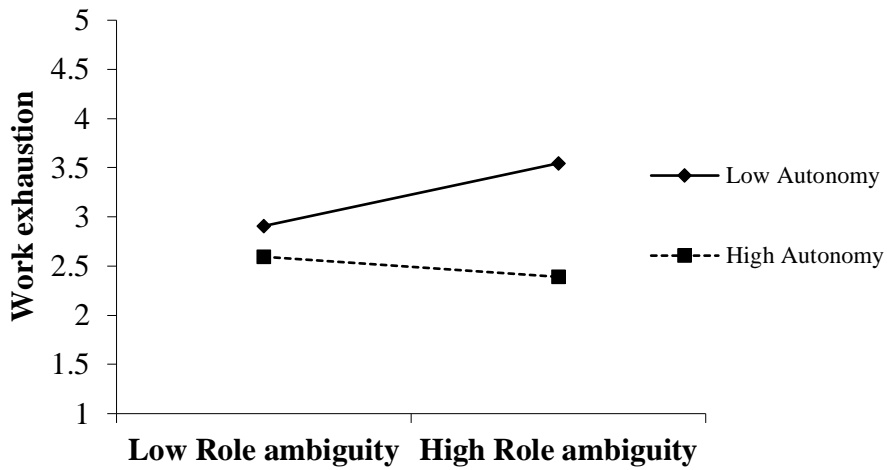


Figure 5 Interaction between role ambiguity and autonomy in relation to work exhaustion

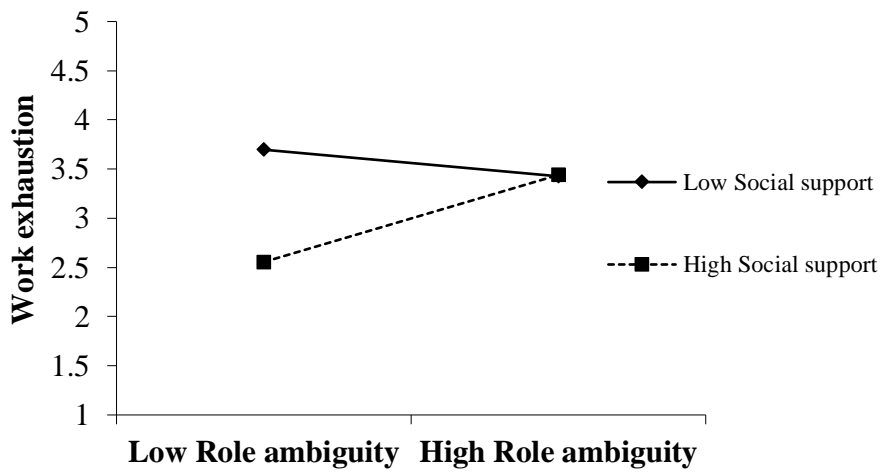


Figure 6 Interaction between role ambiguity and social support in relation to work exhaustion

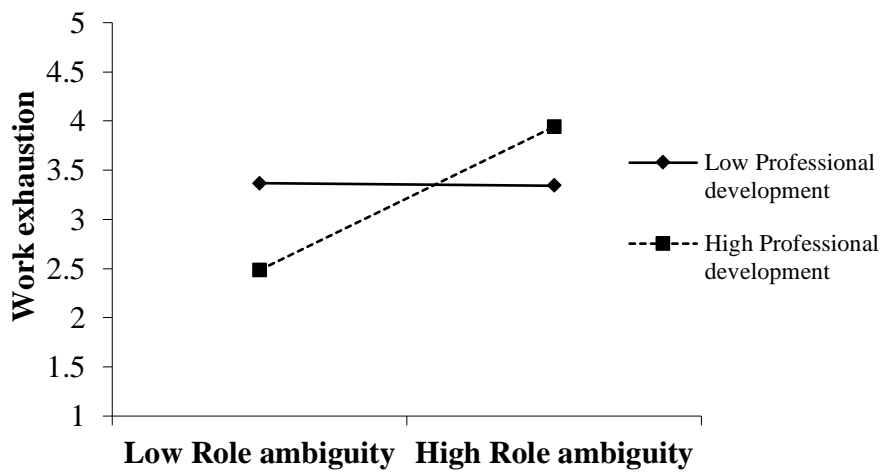


Figure 7 Interaction between role ambiguity and opportunities for professional development in relation to work exhaustion

address these flaws present in extant telecommuting research, this study conducted a theory-driven examination on how telecommuting is associated with employee well-being. More specifically, by taking the JD-R model (Bakker & Demerouti, 2007; Demerouti et al., 2001) as a conceptual basis, the following research question was analysed: *What is the impact of telecommuting on work exhaustion and work engagement and what are the roles of job demands, job resources and psychological capital within these effects?*

Interestingly, the results of this study show that, contrary to prior expectations, telecommuting does not lead to a decrease in work exhaustion or an increase in work engagement. Possibly, this could be explained by the relatively little changes in job characteristics telecommuting exhibits, thereby making perceived work exhaustion and work engagement more stable. An alternative explanation might be the context and timing in which data was collected. Specifically, at the time of this study, the COVID-19 (i.e., coronavirus) pandemic and subsequently imposed national lockdowns forced the majority of organisations to let their employees work from home (i.e. telecommute; Bick, Blandin & Mertens, 2020; Gardner, 2020), which consequently changed the nature of implementing telecommuting as a work design from initially voluntary to mandatory in nature (Belzunegui-Eraso & Erro-Garcés, 2020). Prior research has shown that this decreased level of freedom whether to telecommute has a dampening effect on the positive consequences of telecommuting for employee work exhaustion and work engagement (Van Steenbergen et al., 2018).

Next to the analysing the impact of telecommuting on perceived work exhaustion and work engagement, this study also investigated whether these effects were mediated by job characteristics. Opposite to prior predictions, it was found that job demands do not mediate the relationship between telecommuting and work exhaustion, whereas job resources do not act a mediator in the link between telecommuting and work engagement. However, results do show that telecommuting changes employees' perceptions of multiple job characteristics. First, regarding job demands, a predicted positive effect of telecommuting on experienced role ambiguity was found. A potential explanation for this result may be telecommuters' constrained communication with colleagues and consequential difficulty in obtaining role-essential information (Bailey & Kurland, 2002). However, contrary to prior expectations and literature (e.g., Van Steenbergen et al., 2018), telecommuting does not reduce employees' experiences of mental demands or workload, which can possibly be traced back to a replacement of workplace demands and workload by family ones. Specifically, although

working from home decreases the potential of workflow interruptions by co-workers, it increases the opportunity for added demands and interruptions by telecommuters' other household members, thereby still inhibiting telecommuters to follow their preferred work rhythm (Maruyama et al., 2009). As such, the initially anticipated benefits of telecommuting may have been equalled out by 'additional' family-related cost.

Second, mixed results were found concerning the effects of telecommuting on perceived job resources. On the one hand, this study confirmed prior expectations by establishing a negative link between telecommuting and social support, which can potentially be attributed to the replacement of face-to-face interactions by less information-rich digital communication (Golden et al., 2008). Moreover, parallel to this decrease in social support is the reduction of perceived opportunities for professional development as a consequence of telecommuting, thereby reinforcing the notion that telecommuting represses career prospects because of reduced learning opportunities (Cooper & Kurland, 2002). On the other hand, no effect was found between telecommuting and autonomy. This is an important finding, since increased autonomy has been listed as one of the key anticipated benefits of telecommuting (e.g., Gajendran & Harrison, 2007). Possibly, this disconfirming result may be ascribed to the aforementioned context of this study, which was conducted during the COVID-19 pandemic. More specifically, as employees were forced to work from home due to this pandemic, the freedom telecommuting normally entailed regarding deciding the location of work has been eliminated (Belzunegui-Eraso & Erro-Garcés, 2020). In turn, this reduction in freedom may have cancelled the increases in perceived autonomy normally associated with telecommuting.

In addition to exploring the effects of telecommuting on experienced job characteristics, this study responded to calls of extant literature to analyse the role of individual characteristics in a telecommuting context (e.g., Sardeshmukh et al., 2012) by examining the impact of employees' personal resources as a function of their PsyCap on perceived job demands and job resources. The conducted analyses revealed three important findings regarding the role of PsyCap. First, it was found that PsyCap alleviates the positive effect of telecommuting on experienced mental demands, thereby confirming the suggested buffering role of personal resources in managing altered work conditions (Van Den Heuvel et al., 2010). Second, on the contrary prior expectations, PsyCap do not moderate the effects of telecommuting on employees' perceived workload, role ambiguity and autonomy. Based on Xanthopoulou et al. (2007), these absent effects may possibly be attributed to the nature of the specific personal

resources included in this study. In their research on personal resources, the scholars argued that personal resources performing at an ‘affective/cognitive’ stage (e.g., hope) have less impact on employees’ management of pragmatic job demands compared to personal resources that have a more ‘behavioural/practical’ disposition (e.g., time management abilities). Since PsyCap encompasses optimism, hope, resilience and self-efficacy, it could potentially be that PsyCap is not sufficiently practical in character to have an advantageous impact in a telecommuting environment. Third, and most surprising, was the finding was that perceptions of social support and opportunities for professional development are lower for high-PsyCap individuals, which is opposite to the buffering effects of PsyCap normally argued by research (e.g., Avey et al., 2008). Since, in contrast to the alleviation of mental demands, increasing social support and opportunities for professional development require social interactions with colleagues, a possible explanation for this reversed impact is that PsyCap is only beneficial when being in direct contact with others, which is not the case in a telecommuting work design.

Lastly, the JD-R hypothesis was tested by examining the potential moderating role of job resources in the relationship between job demands and work exhaustion. Contrary to previous expectations, no moderating role was found for the majority of job resources, thereby supporting the argument that only specific job resources can have a buffering impact for specific job demands, depending on the work context under study (Bakker et al., 2007). However, results do confirm prior predictions by indicating that autonomy attenuates the positive relationship between role ambiguity and work exhaustion. This reinforces the notion that high autonomy enables employees to cope with increased role ambiguity by proactively shaping their job, which in turn reduces experiences of work exhaustion (Bakker et al., 2005). Furthermore, social support and opportunities for professional development were also found to moderate the relationship between role ambiguity and work exhaustion, but the direction of these moderating influences run counter to prior expectations, such that a higher degree of these job resources results in more work exhaustion in the case of high role ambiguity. Regarding social support, a possible explanation might be that the instrumental help provided by peers and supervisors deviates from employees’ original understanding of their job, thereby compounding perceived task unclarity and consequential work exhaustion. A similar potential justification may be provided for the exacerbating impact of opportunities for professional development. Namely, when experiencing low role ambiguity, employees have a good understanding of their original tasks, which provides them with a solid knowledge base upon which they can add and develop new skills and expertise through provided opportunities for

professional development. However, when role ambiguity is high, workers lack this basic understanding of their original tasks and hence may perceive opportunities to expand their professional knowledge in new areas as mentally exhausting.

5.1. Theoretical implications

This study contributes to current research in the following ways. First, this study spearheads investigation into the consequences of telecommuting for occupational well-being by showing that telecommuting does not directly impact work exhaustion and work engagement. Further, it extends literature by examining the specific impact telecommuting has on perceived working conditions. It was shown that telecommuting either has no or detrimental effects (i.e., increased role ambiguity, decreased social support and opportunities for professional development) on experienced job demands and resources. As such, this research challenges the current positive view on telecommuting (e.g., Peters et al., 2014; Sewell & Taskin, 2015) by showing that the effects of telecommuting for workers' job characteristics and well-being may not be as favourable as generally claimed.

Second, this study is one of the first to analyse the effects of individual differences in a telecommuting context by examining the potential moderating impact of the personal resource PsyCap on perceived job characteristics. Against the dominant perception, analysis shows that employees who are high in PsyCap do not necessarily perceive fewer job demands (except for mental demands) or more job resources. Furthermore, one of the key contributions of this study is that it was demonstrated that PsyCap exacerbates the adverse effects of telecommuting on perceived social support and opportunities for professional development. Jointly, these results indicate that the normally favourable impact of PsyCap may not be as present in a telecommuting context as expected. As such, (the lack of) significant interactions between PsyCap and perceived job characteristics provide more insight into the implications of individual differences for employee well-being when telecommuting. In addition, these findings underline the need for more research on the consequences of the specific nature of personal resources within a telecommuting context (see suggestions for further research).

Finally, by exploring the existence of the JD-R buffer hypothesis (Bakker et al., 2005; Bakker et al., 2007) in a telecommuting environment, this study sheds more light on the complex web of interconnected working conditions present in a telecommuting work modality. More

specifically, whereas extant telecommuting literature only examined the main effects of job demands in predicting work exhaustion (e.g., Sardeshmukh et al., 2012), the current research also took into account possible interactions between job demands and job resources to understand the true working conditions of telecommuting that may result in exhausted individuals. By showing that specific job resources reduce the impact of job demands on work exhaustion, whereas other job resources are shown to exacerbate the effect of job demands on work exhaustion, a more precise picture is provided concerning the telecommuting work factors responsible for experiences of work exhaustion. As such, these results emphasise the importance of analysing combinations in work characteristics when explaining the emergence of work exhaustion, since telecommuters never experience these job factors in isolation.

5.2. Practical implications

The present study provides a number of practical implications. Findings indicate that the adoption of telecommuting entails mainly negative consequences for the perception of job characteristics. Specifically, it is shown that increased telecommuting relates to increased role ambiguity and reduced feelings of social support and opportunities for professional development. As such, organisations should carefully consider whether to adopt a telecommuting work design, since findings of this study suggest that telecommuting does not live up to its promised benefits. When organisations nonetheless still opt for implementing a telecommuting work approach (or forced to as a consequence of the current COVID-19 pandemic), it is important to mitigate the adverse effects of telecommuting on job characteristics established in this study. As such, to reduce role ambiguity experienced when telecommuting, it is vital to provide clearer job design. This can be done through the provision of thoroughly documented work guidelines, which in turn should be effectively communicated to telecommuters. Moreover, since findings suggest that telecommuting has a detrimental impact on social support, organisations are advised to implement structured social interactions through information-rich digital communication channels like videoconferencing to prevent feelings of isolation among telecommuters. Lastly, to combat indicated negative effects on opportunities for professional development, organisations need to prioritise employee growth. As such, human resource departments are advised to formulate a clear strategy to ensure adequate professional development, whereas managers should periodically review progress with their employees to prevent the experiences of hampered career prospects for those who telecommute.

However, organisations should not only focus on job characteristics, as results of this study suggest that individual differences among employees have important consequences for the perception of job characteristics when telecommuting. On the one hand, findings indicate that PsyCap has a buffering role in the positive relationship between telecommuting and mental demands. On the other hand, it is also shown that PsyCap worsens perceptions of social support and opportunities for professional development when telecommuting intensively. Since PsyCap is trainable, organisations may therefore opt for arranging more PsyCap training applications to support employees when adopting a telecommuting work design. However, management should remain cautious, as results of this study indicate that PsyCap may have adverse effects for certain job characteristics in a telecommuting context. Based on prior research (Xanthopoulou et al., 2007), it is suggested that the affective/cognitive nature of PsyCap make it not always the most favourable type of personal resource to have when telecommuting. Rather, it is potentially more interesting for management to invest in the development of practical personal resources (e.g., time management skills) of employees, since this kind of personal resources is predicted to be more beneficial when telecommuting.

Lastly, this research demonstrates that is crucial for management to not see job characteristics in isolation but to have a holistic overview of potential interactions between job demands and job resources when understanding the consequences of implementing telecommuting work designs for employee well-being. Specifically, findings suggest that the provision of certain job resources (i.e., autonomy) tempers the impact of certain job demands (i.e., role ambiguity), hence averting posing workers at risk to exhaustion. However, organisations should be thoughtful concerning which job resources to invest in, because some job resources (i.e., social support and opportunities for professional development) are shown to exacerbate the effect of job demands (i.e., role ambiguity) on work exhaustion. Therefore, as the mechanics of the moderating role of job resources are contingent on the respective work setting, the primary task of management is to establish which specific job resources can effectively buffer the impact of which specific job demands within their organisation. Next, the selected adequate job resources should be allocated to their workers.

5.3. Limitations and suggestions for further research

Despite the theoretical and practical contributions of this study, multiple limitations require to be noted. First, as variables were measured at a single point in time, data collected was cross-

sectional in nature, which inhibits causal inferences. One could argue that more engaged employees have a more positive view of their work and therefore perceive their job resources more positively. Contrarily, it could be proposed that more exhausted workers view their work more negatively, leading them to experience their job demands more negatively. As such reverse-causal relationships have been demonstrated in traditional work settings between job characteristics, personal resources and occupational well-being (Demerouti, Bakker & Bulters, 2004; Hakanen, Perhoniemi & Toppinen-Tanner, 2008; Xanthopoulou, Bakker, Demerouti & Schaufeli, 2009a), longitudinal research is encouraged to also disentangle these potential reversed causal processes in a telecommuting context.

Second, since data was collected during the global COVID-19 pandemic, important implications concerning the degree of freedom and frequency in adopting telecommuting work designs could be present. Before the COVID-19 crisis, telecommuting arrangements were generally voluntary in nature, since they were normally adopted after consultation between employee and employer (Pyöriä, 2011). However, the worldwide COVID-19 crisis and subsequently imposed national lockdowns forced the overwhelming majority of organisations to swiftly implement telecommuting work designs (Bick et al., 2020; Gardner, 2020). This not only changed the implementation of telecommuting from voluntary in character with employee consent to forced adoption without individual agreement, but also dramatically increased the extent of telecommuting from traditionally occasional before COVID-19 to generally full-time since the start of the pandemic (Belzunegui-Eraso & Erro-Garcés, 2020). Prior studies have shown that the degree of freedom and extent of telecommuting have important implications for employees' perceived work-life balance (Maruyama et al., 2009), job satisfaction (Golden & Veiga, 2005) and work engagement (Van Steenbergen et al., 2018). Since the COVID-19 pandemic is predicted to remain present in the upcoming months (Anastassopoulou, Russo, Tsakris & Siettos, 2020; Perc, Gorišek Miksić, Slavinec & Stožer, 2020), future research is therefore recommended to further examine what the exact consequences of this forced adoption of telecommuting are for employee well-being.

Moreover, although this study aimed to have a comprehensive overview of the underlying mechanisms governing the impact of telecommuting on employee well-being by not only taking job characteristics into account but also individual differences in the form PsyCap, there is still room for analysing additional factors affecting employees' telecommuting arrangements. For instance, other dimensions of the telecommuter's home environment, like

work-life conflict as a consequence of being at home (Golden et al., 2006), could be important aspects to explore. Similarly, since this study solely investigated the role of PsyCap, which represent the main four components within the area of personal resources (Luthans, Avolio, et al., 2007; Luthans & Youssef, 2007), additional personality traits and personal resources could still be analysed. For example, practical personal resources such as flexibility and boundary management potentially have a buffering effect on work-family conflict (Kossek, Lautsch & Eaton, 2006), which would make individuals possessing these resources more capable of dealing with a telecommuting work design.

Finally, with 123 useable responses, the total number of participants within this study was relatively small. Therefore, to still ensure stable results, PROCESS macro was adopted as the main tool of analysis for this study (Hayes, 2017, 2018; Preacher & Hayes, 2008). However, this relatively small sample size may still explain why some of the direct and indirect effects of telecommuting and PsyCap on job demands and job resources and, in turn, work exhaustion and work engagement were not significant. Future studies are therefore recommended to use larger sample sizes to further investigate mediation, moderated mediation and moderated moderated mediation effects between these variables.

6. Conclusion

In addressing current academic shortcomings on the potential consequences of telecommuting for occupational well-being, the present study has shown that telecommuting is not directly related to work exhaustion nor work engagement, while also no mediating role was found for job demands and job resources within these predicted relationships. However, this study did demonstrate that telecommuting has adverse ramifications for employees' perceptions of job characteristics, through increases in role ambiguity and decreases in social support and opportunities for professional development. Moreover, PsyCap was found to moderate relationships between telecommuting and certain job characteristics in opposite directions, as PsyCap both has a buffering and aggravating effect on perceived work conditions. Surprisingly, this study found similar contradictory moderation directions for job resources on the relationship between job demands and work exhaustion. All in all, this study underlines the importance of having an integrated overview of both job and individual characteristics when analysing the development of work-related well-being in a telecommuting context.

Appendix Construction of variables

| Variable | Statements | Source |
|---------------------------------|--|----------------------------------|
| Telecommuting | | |
| <i>Extent of telecommuting</i> | Average number of hours per week consistently spent away from the office working as a telecommuter Percentage of an average workweek spent telecommuting | Golden and Veiga (2005) |
| Job demands | | |
| <i>Mental demands</i> | My job requires a high level of concentration I have to work very precisely I have to pay attention to many things at the same time during my work | Van Veldhoven and Meijman (1994) |
| <i>Workload</i> | My job requires me to pay constant attention to it I have to work very fast My work requires me working very hard I have enough time to complete my work (R) I have too much work to do | Karasek et al. (1998) |
| <i>Role ambiguity</i> | I know what others at work expect of me (R) I know what I am responsible for and what not (R) It is clear to me what my task is (R) I know what to expect from other people in my department (R) | Van Veldhoven and Meijman (1994) |
| Job resources | | |
| <i>Autonomy</i> | I can decide myself how I execute my work On my job, I have freedom to decide how I do my work I have a lot of say on the job | Karasek et al. (1998) |
| <i>Social support</i> | | |
| <i>Co-worker support</i> | I can ask my colleagues for help if necessary I can count on my colleagues when I face difficulties at work I have a good relationship with my colleagues | Van Veldhoven and Meijman (1994) |
| <i>Supervisor support</i> | I can ask my supervisor for help if necessary I can count on my supervisor when I face difficulties at work I have a good relationship with my supervisor | Van Veldhoven and Meijman (1994) |
| <i>Professional development</i> | My work offers me the opportunity to learn new things I have sufficient possibilities to develop myself at work At work I have the opportunity to develop my | Bakker et al. (2003) |
| Work exhaustion | | |
| | I feel emotionally drained from my work I feel used up at the end of the workday I feel fatigued when I get up in the morning and have to face another day on the job I feel burned out from my work I feel frustrated by my job | Maslach et al. (1986) |
| Work engagement | | |
| <i>Vigour</i> | At my work, I feel bursting with energy At my job, I feel strong and vigorous When I get up in the morning, I feel like going to work | Schaufeli et al. (2006) |
| <i>Dedication</i> | I find the work that I do full of meaning and purpose I am enthusiastic about my job My job inspires me | Schaufeli et al. (2006) |
| <i>Absorption</i> | Time flies when I am working When I am working, I forget everything else around me I feel happy when I am working intensely | Schaufeli et al. (2006) |
| <i>(Continued)</i> | | |

Appendix Continued

| Variable | Statements | Source |
|----------------------|--|---|
| PsyCap | | |
| <i>Optimism</i> | When things are uncertain for me at work, I usually expect the best If something can go wrong for me work-wise, it will (R) I always look on the bright side of things regarding my job I am optimistic about what will happen to me in the future as it pertains to work In this job, things never work out the way I want them to (R) I approach this job as if “every cloud has a silver lining” | Luthans, Avolio, et al. (2007); Luthans, Youssef, et al. (2007) |
| <i>Hope</i> | If I should find myself in a jam at work, I could think of many ways to get out of it At the present time, I am energetically pursuing my work goals There are lots of ways around any problem at work Right now, I see myself as being pretty successful at work I can think of many ways to reach my current work goals At this time, I am meeting the work goals that I have set for myself | Luthans, Avolio, et al. (2007); Luthans, Youssef, et al. (2007) |
| <i>Resilience</i> | When I have a setback at work, I have trouble recovering from it, moving on (R) I usually manage difficulties one way or another at work I can be “on my own”, so to speak, at work if I have to I usually take stressful things at work in stride I can get through difficult times at work because I have experienced difficulty before I feel I can handle many things at a time at this job | Luthans, Avolio, et al. (2007); Luthans, Youssef, et al. (2007) |
| <i>Self-efficacy</i> | If there are problems at work, I know how to solve them I can always manage to solve difficult problems at work if I try hard enough I am confident that I could deal efficiently with unexpected events at work Thanks to my resourcefulness, I know how to handle unforeseen situations at work At work, I can usually handle whatever comes my way | Schwarzer and Jerusalem (1995) |

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Date: **January 4, 2021**

First and last name: **Lodewijk Onno Delhaas**

Study programme: **MSc International Business, Organisation: Management, Change and Consultancy**

ID number: **i6143052**

Signature:

