An examination of remote e-working and flow experience: The role of technostress and loneliness

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ABSTRACT

Since early 2020, the Covid-19 pandemic has led to numerous businesses around the world making use of information and communication technologies (ICT) more frequently than ever to help transition operations to remote e-working. As a result, using multiple technologies on a daily basis has become the norm for many employees across the world. While it is evident that working remotely may trigger higher ICT demands and reduced face-to-face interaction, less is known about how this exposure may influence employees' subjective mental experiences related to concentration and satisfaction at work (i.e., flow). The aim of this present study is to gain insights and to explore the relationship between remote e-working and employee flow experiences by introducing two key stressors; technostress and loneliness. Data were collected from a survey of 202 employees from the financial services sector in Turkey. The results revealed that remote e-working experience had a significant and positive effect on the flow levels of employees. Technostress and loneliness serially mediated the relationship between remote e-working and flow. The findings contribute to remote e-working research by exploring the consequences of such experiences and introducing two important key stressors, which result in lower levels of flow at work. Practical implications are provided for improving remote e-working conditions and employee well-being.

1. Introduction

In recent years, working remotely has become increasingly prevalent across the majority of working sectors. In particular, the Covid-19 global pandemic, which started in early 2020, has somewhat accelerated the shift to working from home using communication and information technologies. In order to implement social distancing during the pandemic, an overwhelming majority of individuals have started to work from home (Kniffin, Narayanan, Anseel, Antonakis, Ashford, Bakker, Bamberger, Bapuji, Bhave, Choi, Creary, Demerouti, Flynn, Gelfand, Greer, Johns, Kesebir, Klein, & Lee, 2021). In many cases, organizations are considering whether to continue the working from home regime in the aftermath of the pandemic (Molino, Ingusci, Signore, Manuti, Giancaspro, Russo, & Cortese 2020). Thus, in the future, remote e-working will most likely be the potential norm for work. The digitalization of working and the prevalent use of Information and Communication Technologies (ICT) has led to a substantial growth in research

into its impact from a psychological as well as physical standpoint (Stadin et al., 2021).

While remote e-working has several benefits, such as flexibility (Mann & Holdsworth, 2003), it has also created various challenges and stressors on employees for reasons such as boundarylessness between work and non-work and lack of space to attend to work. In particular, exposure to technostress, which is caused by the use of ICT technology, has been associated with negative feelings such as anxiety (Salanova, Llorens, & Cifre, 2013), reduced user satisfaction (Jena, 2015; Tarafdar, Darcy, Turel, & Gupta, 2015), as well as health-related outcomes such as symptoms of burnout (Barber & Santuzzi, 2015; Hennington, Janz, & Poston, 2011).

Although there has been a plethora of studies related to the remote e-working experience, these studies have focused on a rather narrow definition of the concept, i.e., teleworkers (those workers who usually work from home), which are not necessarily applicable to all types of remote e-workers. Clearly, it is important to identify and reveal the

possible synergies across different dimensions of remote e-working; yet, very few studies have made the attempt to provide a holistic view of e-working in terms of an assessment of aspects related to well-being, work-life balance, and job effectiveness (e.g., see Charalampous, Grant, Tramontano, & Michailidis, 2019, for exceptions). Existing studies have not yet studied flow as an outcome of remote e-working, despite its importance to employees particularly during challenging times, of which the current pandemic is clearly one. Informed by job-demands-resources (JD-R) theory, we explore the relationship between remote e-working and employee flow experience by introducing to key stressors (loneliness and technostress). While previous research has shown that lonely individuals are more likely to develop problematic Internet use behaviour (Caplan, 2002), the impact of remote e-working on loneliness remains unclear. Thus, research to date provides a limited understanding of the technology-induced stressors related to remote e-working that are likely to influence employees' psychological outcomes (Tams, 2015). Nevertheless, it is imperative to examine the effects of remote e-working because when individuals feel stressed due to perceived loneliness and increased use of ICT technology, this may have an impact on their flow levels, a key positive mental experience related to enhanced concentration at work (Ozkara, Ozmen, & Kim, 2016).

In light of the explanations above, the aim of the present study is to fill an important gap in the literature by gaining new insights into ICT-induced stressors on employee flow experience in the context of remote e-working during lockdown. We posit that when employees have a negative remote e-working experience, they will experience higher levels of technostress and loneliness, resulting in lower levels of flow at work. The focus is on technostress and loneliness for two reasons: first, spending long hours using ICT may impact employees' engagement in a work activity and optimal experience (i.e., flow) (Suh & Lee, 2017); second, although loneliness is considered as an important work-related stressor and distraction (Mann & Holdsworth, 2003), the mechanisms through which it may relate to flow – a positive state of full concentration – has not to date been explored. Thus, the study explores the relationship between remote e-working and flow using two key stressors: technostress and loneliness. The research model is shown in Fig. 1.

2. Theoretical background

2.1. Job-demands-resources theory

The JD-R framework is one the most widely used stress models that includes a broad range of job demands as well as resources (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001). The model was first developed to explain the antecedents of burnout and was later revised, on various occasions, to include a variety of individual and organisational level factors (Schaufeli & Taris, 2014). According to this framework, job resources refer to "those physical, social or organizational aspects of the job that may do any of the following: (a) be functional in achieving work goals, (b) reduce job demands and the associate physiological and psychological costs, (c) stimulate personal growth and development" while job demands refer to "those physical, social or organisational aspects of the job that require sustained mental effort and therefore associated with certain physiological and psychological costs" (Demerouti et al.,

2001). These resources help employees to deal with job demands when attempting to achieve work-related goals (Mäkikangas, Leiter, Kinnunen, & Feldt, 2020).

In the current study, remote e-working is considered a job resource. Work-related resources mainly have supportive functions in the psychological regulation of work demands (Glaser, Seubert, Hornung, & Herbig, 2015). Organizations offering remote e-work without ensuring formal processes and procedures are often subsequently confronted with negative outcomes (Wheatley, 2012). On the other hand, researchers have shown that remote e-working may cause poor well-being and workplace pressure, which in turn will affect job effectiveness and performance (Barber & Santuzzi, 2015; Mann & Holdsworth, 2003).

Due to the prevalent diffusion of remote e-working there has been a growing interest in developing a measure to assess the quality and complexity of this experience. In order to contribute to this line of research, we adopt the E-Work Life (EWL) scale of Grant, Wallace, Spurgeon, Tramontano, and Charalampous (2019) to evaluate remote e-working as it assesses a range of theoretically relevant aspects of the remote e-working experience including work/life interference, organizational trust, effectiveness/productivity, and flexibility, all of which can be considered the support provided by the organization. According to the JD-R framework, job resources are critical to conducting tasks and achieving objectives by acting as a buffer against the negative impact of job stress (Adamovic, 2018; Halbesleben, Neveu, Paustian-Underdahl, & Westman, 2014; Hobfoll, 1989). Thus, it can be argued that if an organization provides support to the employee remote e-work experience, this can improve the employees' resources and their ability to handle job stresses.

Job demands are divided into challenge and hindrance demands (Cavanaugh, Boswell, Roehling, & Boudreau, 2000; Crawford, LePine, & Rich, 2010). While both kinds of job demands have adverse effects, challenge demands have the potential to advance personal growth and future gain, whereas hindrance demands restrain personal growth and achievement of goals (Cavanaugh et al., 2000; Schaufeli & Taris, 2014). According to the JD-R model, work circumstances can be demands/stressors or resources (Demerouti et al., 2001). The JD-R model does not limit the specific types of job demands or resources that one might consider; any demand or resource can have an effect on employees' well-being (Schaufeli & Taris, 2014).

Stressors can be considered hindrance job demands, which damage optimal behaviour (Wei, Zhu, & Chen, 2020). Relatedly, technology-related stressors are job demands that result from the specific characteristics of a given technology (Ayyagari, Grover, & Purvis, 2011). Research has shown that technostress directly affects employees' individual and organizational productivity (Suh & Lee, 2017). In particular, in the absence of situational coping mechanisms, technostress gradually exhausts individuals, leading to burnout (Mahapatra & Pati, 2018). To contribute to this line of research, we contend that technostress is a hindrance demand that is negatively associated with employees' state of flow. Despite the importance of technostress and its impact on employees, little research exists that reveals the effects of hindrance demands in the context of technology use (Wei et al., 2020).

In the current study, loneliness is also introduced as a hindrance demand, as loneliness is considered a work-related circumstance and stressor. The underlying reason is that the nature of remote e-working includes being isolated because of working away from the office (Mann & Holdsworth, 2003). Previous research suggests that work stress demands affect work outcomes (Cavanaugh et al., 2000; Podsakoff, LePine, & LePine, 2007). Thus, loneliness, together with technostress, may negatively affect flow as an outcome.

Flow is defined as being in a state of full concentration on one's work and all other distractions being removed (Slavec Gomezel & Aleksić, 2020), and is very useful for the growth and improvement of organizations and employees (Sharma, Misra, & Gupta, 2020). Studies show that flow is a crucial work-related outcome associated with job resources such as social support (Fagerlind, Gustavsson, Johansson, & Ekberg,
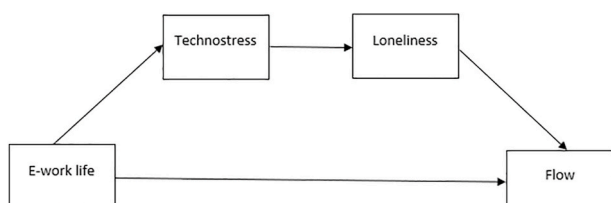

Fig. 1. Research model.

2013; Mäkikangas, Bakker, Aunola, & Demerouti, 2010; Salanova, Bakker, & Llorens, 2006). Organizations benefit when their employees experience flow at work, as it is a desired experience that helps them to perform better (Engeser & Rheinberg, 2008). It is important to study the antecedents of flow, as these need more empirical investigation due to their complex nature (Knight & Waples, 2017), and as research that specifically focuses on the antecedents of flow at work are still scarce in the literature (van Oortmerssen, Caniëls, & van Assen, 2020). To date, challenge-skill balance (Csikszentmihalyi, 1990), daily recovery (Demerouti, Bakker, Sonnentag, & Fullagar, 2012), leadership (Sosik, Kahai, & Avolio, 1999), job characteristics (Demerouti, 2006), and job resources (Fagerlind et al., 2013; Kasa & Hassan, 2013) have been studied as the antecedents of flow within the literature.

In line with JD-R theory, research has found that flow can be extensively disrupted in the presence of hindrance demands (van Oortmerssen et al., 2020), due to the strong relationship between flow and engagement (Medhurst & Albrecht, 2016). To illustrate, if employees feel threatened by job (hindrance) demands, they may feel less motivated and this may result in a lack of the challenge-skill balance that is essential for flow (van Oortmerssen et al., 2020). Thus, we investigate flow as the outcome affected by job resources such as remote e-working, and job (hindrance) demands as technostress and loneliness.

3. Hypotheses development

3.1. The relationship between remote e-working and flow at work

The global remote e-working trend due to the current pandemic has paved the way for a sudden reconfiguration of work, resulting in a number of implications for both organizations and employees (Drabek & McEntire, 2003). Due to the sudden shift, some organizations were, quite understandably, not well prepared. Organizations offering remote e-work without ensuring formal processes and procedures were subsequently confronted with negative outcomes (Wheatley, 2012). As suggested by Grant et al. (2019), the complexity of remote e-working experience requires an assessment based on work effectiveness, work-life balance, and well-being. In line with JD-R theory, such necessary conditions provided by the organizations can be regarded as resources to explain flow at work. This is because job resources initiate motivation and strongly predict employee engagement and commitment (Bakker, 2015).

A fully experienced flow occurs when an individual has the impression of control and when their concentration is completely on the task at hand (Nakamura, Csikszentmihalyi, Snyder, & Lopez, 2002). The main condition for the development of a flow during an activity is that the individual perceives a balance between challenges and skills (van Oortmerssen et al., 2020). According to Csikszentmihalyi (1997), if employees are clearly informed about the objectives and are fully aware of how to perform the assigned tasks, they are more likely to experience flow. In turn, this may reflect on the employees' perception of remote e-working as a positive experience provided by the organization.

In this current study, we explore what happens when employees experience remote e-working and the mechanisms that operate behind experiences of flow as an outcome. Until now, flow has not been studied within the context of remote e-working. The focus is on flow as the outcome, as it is a crucial work-related state that can successfully increase emotional well-being during stressful times of uncertainty (Rankin, Walsh, & Sweeny, 2019). For these reasons, flow is suggested as an outcome of a positive remote e-work experience and the following hypothesis accordingly proposed:

H1. Remote e-working is positively associated with flow at work.

3.2. The relationship between remote e-working and technostress

The proliferation of ICTs has impacted work in all sectors. These

technological advancements have allowed work environments to be flexible, distributed, and distanced from conventional workplaces, such as home offices (Vasconcelos, Furtado, & Pinheiro, 2015). Consequently, empirical studies have shown that ICTs have resulted in increased stress levels amongst employees due to increased expectations of being constantly available, renewing their technical skills and working at a faster pace (Ayyagari et al., 2011; Ragu-Nathan, Tarafdar, & Ragu-Nathan, 2008; Wang, Shu, & Tu, 2008). However, there has been limited research in the literature on stress due to technology and, particularly, its antecedents (Tams, 2015).

A widely accepted definition of technostress is the "stress experienced by end users in organizations as a result of their use of ICTs" (Ragu-Nathan et al., 2008). According to this classification, the term includes five dimensions, (i) techno-overload (related to ICTs potential to require users to work faster and longer), (ii) techno-invasion (related to ICTs ability to invade users' personal lives), (iii) techno-complexity (related to ICT's complex features' potential to make users feel inadequate with their current skills), (iv) techno-insecurity (related to users feeling threatened with replacement due to automation or others with better ICT knowledge), and (v) techno-uncertainty (related to the disturbance users experience due to continuous upgrade and changes in ICTs).

We draw on the JD-R framework to contend the negative association between remote e-working experiences experienced by employees and technostress. The JD-R framework is one the most widely used stress models that includes a broad range of job demands as well as resources (Demerouti et al., 2001). The model was first developed to explain the antecedents of burnout and was later revised multiple times to include a variety of individual and organisational levels factors (Schaufeli & Taris, 2014). As previous studies have shown the positive relationship with remote e-working and the well-being of individuals (e.g., Grant et al., 2019) and in line with the JD-R framework, we argue that employees' remote e-working experience is a key resource that stimulates employee growth as well as achievement of work goals. Therefore, it is expected that employees who have positive remote e-working experiences will have reduced experience of technostress. Similarly, postulating from the perspective of JD-R, technostress is considered a key job demand that may result in significant psychological and physiological costs to employees. From the perspectives of employees, ICT intensifies pressures on individuals as it creates expectations for constant availability (Ayyagari et al., 2011; Hung, Chen, & Lin, 2015).

While recent years have witnessed a surge in studies that focus on demands related to workload, time pressure, and responsibility (LePine, Podsakoff, & LePine, 2005; Webster, Beehr, & Love, 2011), research on technostress, especially in the context of JD-R, is still in its infancy. For example, Mahapatra and Pati (2018) demonstrated that, in the absence of individual and situational coping mechanisms, technostress gradually exhausts individuals, leading to burnout. Thus, due to the widespread use of ICT in today's organizations, technostress may act as an essential component of the existing JD-R models. Hence, we propose that remote e-working is a key resource job resource and, due to its characteristics such as work-life balance, productivity, organisational trust, and flexibility, may induce a motivational process that reduces the effects of technostress on employees, and thus hypothesize that:

H2. Remote e-working is negatively associated with technostress.

3.3. The relationship between technostress and loneliness

Loneliness is one of the most devastating problems people might suffer in social life (Gierveld, Tilburg, & Dykstra, 2006; Jeong & Kim, 2021; Singh, 1991). Described as a modern 'epidemic', loneliness has many physical, psychological, and social effects (Alberti, 2019). While loneliness has already been a public health issue within society, it has become one of the biggest struggles during the COVID-19 crisis (Luchetti et al., 2020). Mandatory social distancing and 'stay-at-home' orders

have increased feelings of loneliness during the coronavirus outbreak (Luchetti et al., 2020). When the compelling circumstances of the pandemic and the proliferation of working from home are banded together, loneliness seems to be an inevitable consequence for employees.

Loneliness is defined as a subjective feeling about the deprivation of social relations, whereas social isolation is accepted as an objective lack of social companionships, especially where the quantity of social contact is important (Gierveld et al., 2006; Valtorta & Hanratty, 2012). In other words, loneliness is a subjective feeling that includes limited social skills and not having the desired social relations in terms of their number and quality. The state of loneliness has two generally accepted characteristics (Peplau & Perlman, 1982). First, it is a negative emotional state that occurs when individuals feel estranged from social interactions and emotional intimacy (Hazer & Boylu, 2010). Second, it is distinct from social isolation as individuals can feel lonely even if there is no social isolation, experience both of them together, or be socially isolated without feeling lonely (Valtorta & Hanratty, 2012). Previous research has shown that loneliness is associated with many negative attitudes and behaviours in the organizational context. For example, loneliness has an impact on various outcomes such as organizational commitment (Ayazlar & Güzel, 2014), employee performance (Ozcelik & Barsade, 2011), and intention to leave (Ertosun & Erdil, 2012).

Due to the nature of remote e-working and the mandatory circumstances of coronavirus pandemic, it is argued that people have frequently experienced the feeling of loneliness during this period (Kniffin et al., 2021). Relatedly, spending a long time using ICTs results in deteriorating social skills and leads to spending more time alone, being isolated from others, and introversion (Jaradat, Jibreel, & Shaik, 2020). Together, we contend that technostress and loneliness might be associated in the context of remote e-working. Remote e-working employees could suffer from technostress because of their excessive dependency on technology (Suh & Lee, 2017), whilst at the same time this context may hinder employees from establishing and maintaining social relationships, which results in loneliness.

H3. Technostress is positively associated with loneliness.

3.4. The relationship between loneliness and flow

Remote e-workers may develop feelings of loneliness due to having fewer interactions and a diminished relationship with their co-workers (Fonner & Roloff, 2010; Ozcelik, Beetz, & Barsade, 2020). Mostly, remote e-workers do not see other colleagues very often compared to those performing conventional office work practices. The recent pandemic, however, has exacerbated this effect as mandatory work from home practices were put in place.

In the present study, loneliness is expected to prevent employees from being in flow when working, as flow is assumed to be an optimal state related to positive emotional and motivational experiences (Hektner, Schmidt, & Csikszentmihalyi, 2007). Since hindrance demands can have both psychological and social consequences (Bakker & Demerouti, 2007), loneliness can be considered a hindrance demand, which is regarded as work circumstances constraining employees' ability to achieve goals (Li, Taris, & Peeters, 2020). Hindrance demands negatively affect performance both directly and indirectly through strains and motivation (Bakker & Sanz-Vergel, 2013; Korunka, Kubicek, Paškvan, & Ulferts, 2015; LePine et al., 2005). Several studies have found that high-quality social interactions, such as daily discussions among colleagues, are critical to mental health (Mogilner, Whillans, & Norton, 2018). Yet, remote e-working decreases such high-quality interactions, including social networking (Klopotek, 2017). Particularly when the work is complex and ambiguous, remote e-working, during a global pandemic in our case, results in the inability to communicate, get support, and learn from others that can negatively affect employees. As employees cannot have the social interactions that they had in an office

setting, they may suffer from loneliness during remote e-working (Larson, Vroman, & Makarius, 2020).

When people feel lonely, they become less committed to their organization and consequently perform worse (Ozcelik & Barsade, 2018). Thus, when e-workers experience increased feeling of isolation, they are less likely to maintain their productiveness or even feel that they are working effectively (Gajendran & Harrison, 2007). Isolated e-workers are less prone to rely on their own abilities and this can impair their job performance (Golden, Veiga, & Dino, 2008). Flow is perceived as a high-performance experience that is incompatible with negative emotions (Quinn, 2005; Rankin et al., 2019). In the presence of hindrance demands, flow is largely destroyed (van Oortmerssen et al., 2020). Thus, loneliness can be considered a hindrance demand that prevents efficient flow at work. Hence, the following hypothesis is suggested:

H4. Loneliness is negatively associated with flow at work.

3.5. Remote e-working, flow, technostress and loneliness

According to the JD-R model, employee well-being results from a balance between job resources and demands (Schaufeli & Taris, 2014). In line with the JD-R framework, employees' remote e-working experiences are a key resource that stimulates well-being as well as achievement of work goals. It has been suggested that people look for the retention and protection of key resources (e.g., social support, self-esteem, knowledge) and are less motivated when they lose them, as resources hold employees responsible for work (Salanova et al., 2006). On the other hand, some work-related demands that constrain an employee's achievements and potential gains may emerge, which are described as hindrance demands (Cavanaugh et al., 2000). Accordingly, an imbalance between job resources and demands can lead to negative outcomes (i.e., loss of flow). Hence, for the purposes of our study, remote e-working is considered a job resource, technostress and loneliness as hindrance job demands, and flow as an outcome.

The relationship between e-work and flow is explored via our serial mediation model. Empirical evidence for the serial mediation process of technostress and loneliness remains unexplored. It is important to investigate this serial mediation because such an explanation would add to a detailed understanding of flow and its underlying mechanisms. We propose that, in the presence of a negative remote e-working experience, employees might well be expected to experience high levels of technostress and loneliness in turn, together resulting in lower levels of flow at work.

H5. Changes in technostress and loneliness serially mediate the relationship between remote e-working and flow.

4. Methods

4.1. Sample

The questionnaire prepared to collect data was applied to professionals from the financial sector in Turkey who started working from home as of the outbreak of the pandemic. With regard to the respondents, the convenience sampling method was used. Participants were specifically financial sector professionals, as research into the management of current pandemic in European and Asian companies revealed that service industries doing knowledge work such as insurance businesses, banking services, and technological companies were those implementing higher rates of telework (Belzunegui-Eraso & Erro-Garcés, 2020; Charalampous et al., 2019). In addition, the results of a recent PWC report (2020) on remote working practices during the pandemic indicated that financial services executives are determined to make remote e-work more manageable for the employees. Participants were informed that participation was voluntary and anonymous. To provide better insight into the sample, participant demographic information, including sex, age, and education were requested in the

questionnaires. Table 1 presents the demographic characteristics of the sample.

4.2. Data collection

The survey method was used to collect the data, with an online questionnaire used as the instrument. Data were collected via e-mail with the consent of the respondents by explaining the objective of the questionnaire. The process netted a total of 202 questionnaires, out of 511 initially sent via e-mail, giving a response rate of 40%. Our research model includes four constructs, and thus the questionnaire contained four scales: e-work life, technostress, loneliness, and flow at work.

4.3. Measurement

All the original scales used were first translated from English to Turkish and then back translated to English by experts, as suggested by Brislin (1980). The e-work life scale was derived from the measure developed by Grant et al. (2019). Respondents were asked to choose, on a five-point Likert scale, their degree of agreement or disagreement with the items (1 = strongly disagree, 5 = strongly agree). The scale contains 17 survey items (Cronbach's α = 0.88) and has a mean of 3.42 (SD = 0.77). Sample items include "I trust my organisation to provide good e-working facilities to allow me to e-work effectively" and "E-working makes me more effective to deliver against my key objectives and deliverables".

First, exploratory factor analysis (EFA) was conducted to test the variables and to define them with regard to their underlying factors (Hair, Black, Babin, Anderson, & Tatham, 2006). Accordingly, for e-work life, EFA explained 68% of the variance and the KMO measure showed a high sampling adequacy (KMO = 0.85), meaning that the data were suitable for factor analysis. Next, confirmatory factor analysis (CFA) was conducted to test the construct validity and to evaluate how well the data fitted the measurement model. CFA revealed that the original four-factor e-work life model showed good and acceptable fit indices (χ^2/sd = 2.16, CFI = 0.94, GFI = 0.90, RMSEA = 0.076). All item loadings on the theorized construct were significant at the p < 0.001 level and no modifications were conducted.

The technostress scale was derived from the measure developed by Tarafdar, Tu, and Ragu-Nathan (2010). Respondents were asked to choose, on a five-point Likert scale, their degree of agreement or disagreement with the items (1 = strongly disagree, 5 = strongly agree). The scale consists of 23 survey items (Cronbach's α = 0.85) and has a mean of 2.49 (SD = 0.57). Sample items include "I am forced to change my work habits to adapt to new technologies" and "I often find it too complex for me to understand and use new technologies".

For technostress, EFA explained 66% of the variance and the KMO measure showed a high sampling adequacy (KMO = 0.82). In addition, CFA indicated that the original five-factor model showed good and acceptable fit indices (χ^2/sd = 1.97, CFI = 0.94, GFI = 0.90, RMSEA = 0.070). All item loadings on the theorized construct were significant at

the p < 0.000 level and no modifications were conducted.

The loneliness scale was derived from Russell's (1996) measure. Respondents were asked to choose, on a four-point Likert scale, their degree of agreement or disagreement with the items (1 = never, 4 = always). The scale contains 20 survey items (Cronbach's α = 0.93) and has a mean of 1.95 (SD = 0.61). Sample items include "How often do you feel that there is no one you can turn to?" and "How often do you feel left out?".

For loneliness, the analyses showed that EFA explained 65% of the variance and the KMO measure showed a high sampling adequacy (KMO = 0.92). CFA indicated that the original one-factor model showed good and acceptable fit indices (χ^2/sd = 2.21, CFI = 0.95, GFI = 0.92, RMSEA = 0.078). All item loadings on the theorized construct were significant at the p < 0.000 level and no modifications were conducted.

The flow scale was derived from Bakker's (2008) measure. Respondents were asked to choose, on a seven-point Likert scale, their degree of agreement or disagreement with the items (1 = never, 7 = always). The scale consists of 13 survey items (Cronbach's α = 0.92) and has a mean of 5.23 (SD = 1.09). Sample items include "When I am working, I forget everything else around me and "When I am working on something, I am doing it for myself".

According to the analyses results for flow, EFA explained 71% of the variance and the KMO measure showed a high sampling adequacy (KMO = 0.91). CFA indicated that the original three-factor model showed good and acceptable fit indices (χ^2/sd = 1.61, CFI = 0.98, GFI = 0.97, RMSEA = 0.056). All item loadings on the theorized construct were significant at the p < 0.001 level and no modifications were conducted.

4.4. Data analysis

The PROCESS macro was used to test the direct and indirect relations (Hayes, 2013; model 6). This statistical tool is employed to conduct serial mediation analyses (Diehl, Weeks, & Gil de Zuniga, 2016). It relies on bootstrapping methods which draw subsamples from the posterior sample distribution and aggregates estimates across the samples. This method has been regarded as more efficient and less biased with regard to indirect effects (Hayes, 2009). The PROCESS macro computes the direct effects with a least-squares regression and tests the indirect effects with bootstrap confidence intervals at the same time. The number of bootstrap samples for the bias-corrected bootstrap confidence interval was set at 5,000 and the confidence level at 95% to test the indirect effects.

5. Results

5.1. Common method bias test

Using common method factors may lead to bias such as halo effects, social desirability, or leniency effects (Bagozzi & Yi, 1991; Lindell & Whitney, 2001). In particular, data obtained from the same respondents with a self-reporting survey may bring about concerns regarding common methods bias (MacKenzie & Podsakoff, 2012). To uncover whether common method bias would have any effects on our results, a number of statistical approaches were employed, as suggested by Podsakoff, MacKenzie, Lee, and Podsakoff (2003). First, Harman's single-factor test was conducted to examine whether a single factor would emerge from the factor analysis and explain the majority of the variance (Podsakoff et al., 2003). The results showed that the first main factor only explained 18.5% of the total variance. Since this is below the recommended threshold value (<50%) (Saris & Gallhofer, 2014), the single factor result did not explain the majority of the variance. In addition, Bagozzi and Yi (2012) contended that using a single method to control common variance bias is not adequate for disentangling true variation from measurement error and method bias. Thus, the common latent factor was also tested in the current study to check for common methods bias

Table 1
Demographics of respondents.

Demographics	Items	Percent (%)
Gender	Male	48.5%
	Female	51.5%
Age	18–25	2.4%
	26–35	25.7%
	36–45	42.2%
	46 and above	29.7%
Education	Bachelor's degree	73.4%
	Master's degree	23.6%
	Doctorate degree	3%
Tenure	Less than 10 years	28.2%
	Between 10 and 20 years	43.1%
	Greater than 20 years	28.7%

following Podsakoff et al. (2003). To perform this approach, we inserted a common latent factor (CLF) into the structural model using AMOS. For models with and without CLF, we examined and compared the standardized regression weights of all items. To confirm that common method bias is not a major issue, the differences among regression weights should be below the recommended cut-off of 0.2 (Archimi, Reynaud, Yasin, & Bhatti, 2018; Gaudioso, Turel, & Galimberti, 2017). The regression weight differences of our two models were less than 0.2. Moreover, to reinforce this test result, we also follow the recommendation by Podsakoff et al. (2003) to control the effects of the unmeasured latent method factor. To perform this approach, we firstly conducted a CFA with the unconstrained common latent factor (CLF), and then conducted a CFA with the zero constrains common latent factor (CLF). We compared the chi-square test and the results show that there is no significant difference in the chi-square test. Based on these the above, common method bias was not considered a serious concern in the current study.

As a procedural remedy for our CFA results, we followed recommendations to minimize common method bias in the design of our study (e.g. Podsakoff et al., 2003), assuring participants that their responses would be treated confidentially, using randomized items within question blocks, separating independent and moderator variables in the survey and using different response scales for different variables.

As a last step, in line with suggestions (Podsakoff, MacKenzie, & Podsakoff, 2012) and recent research (e.g., Bal, De Jong, Jansen, & Bakker, 2012) we conducted a marker-variable analysis (Lindell & Whitney, 2001). We did this by subtracting the lowest positive correlation between self-report variables which can be considered a proxy for common method bias, from each correlation value. Each of these values was then divided by $1 -$ the lowest positive correlation between self-report variables. The resulting correlation values reflect common method bias adjusted correlations. Large differences between the unadjusted and common method bias adjusted correlations suggest that common method bias is a problem. The absolute differences were relatively minimal in our sample, ranging between 0.002 and 0.001. Hence, from this perspective, it can be concluded that CMB was not an issue in our analyses.

5.2. Descriptive analyses

Means, standard deviations, and correlation numbers in relation to each variable appear in Table 2 below. The results showed that remote e-working was positively correlated with flow ($r = 0.22$, $p < 0.01$), but it was negatively correlated with technostress ($r = -0.17$, $p < 0.05$) and loneliness ($r = -0.30$, $p < 0.01$). Technostress was positively associated with loneliness ($r = 0.27$, $p < 0.01$), but there was no significant association found between technostress and flow ($r = -0.06$, $p > 0.01$). Loneliness was negatively related with flow ($r = -0.26$, $p < 0.01$). For technostress, the R^2 was 0.030 and $p < 0.010$. For loneliness, $R^2 = 0.137$ and $p < 0.000$. For flow, the total effects model had $R^2 = 0.090$ and $p < 0.000$. All R^2 values were found to be significant.

5.3. Hypotheses testing

The first hypothesis predicted that remote e-working was positively associated with flow. The results showed that those who had a good

remote e-working experience were more likely to experience flow at work ($b = 0.16$, $SD = 0.07$, $p < 0.05$). Thus, Hypothesis 1 was supported. Looking at the relationships between remote e-working and technostress, as stated in the second hypothesis, those who had a good remote e-working experience tended to have lower levels of technostress ($b = -0.17$, $SD = 0.06$, $p < 0.01$). This result supported Hypothesis 2. The third hypothesis suggested that technostress was negatively related to loneliness. The results showed that those experiencing technostress were likely to feel lonely ($b = 0.23$, $SD = 0.06$, $p < 0.001$). This supported Hypothesis 3. The fourth hypothesis contended that loneliness was be negatively related with the flow at work. The results revealed that the more employees felt lonely, the less they experienced flow ($b = -0.22$, $SD = 0.07$, $p < 0.002$). Thus, Hypothesis 4 was supported. The fifth hypothesis stated that technostress and loneliness serially mediated the relationship between remote e-working and flow at work. The indirect effect of remote e-working on flow at work through the negative mediation of technostress and loneliness was significant ($b = 0.009$, $SE = 0.005$, $p < 0.000$). Table 3 below shows the indirect effects of remote e-working on flow as mediated by technostress and loneliness.

6. Discussion

6.1. Key findings

In the current study, we integrated JD-R theory to develop our understanding of the influences of remote e-working on employees' flow experiences and posited that technostress and loneliness were two key stressors that had a negative impact on this key association.

Our results provided supporting evidence for our hypotheses. Firstly, our results revealed that remote e-working is positively associated with flow (H1). This finding expands research which explores the consequences of remote e-working which revealed that remote e-working negatively affects concentration (Vander Elst et al., 2017; Vittersø, Akselsen, Evjem, Julsrud, Yttri, & Bergvik, 2003). Our study extends this line of research by identifying flow as an important yet overlooked source that is positively associated with remote e-working. Studies have revealed flow is a crucial work-related state that can successfully determine emotional well-being during stressful and uncertain times (Rankin et al., 2019).

Second, our results revealed that remote e-working is negatively associated with technostress (H2). Employees who were satisfied with their remote e-working experience could be associated with lower levels of technostress. This finding is consistent with the evidence offered by Grant et al. (2019) suggesting that a positive remote e-working experience is associated with improved well-being and the state of one's mental health. Thus, considering technostress to be a sign of deteriorating well-being, our study extends this line of research by investigating how positive remote e-working experience may be linked with reduced levels of technostress.

Third, the results indicated that technostress is positively associated with loneliness (H3). This finding underscores the idea that employees who experience technostress will be more likely to feel lonely as

Table 2
Means, standard deviations, and correlations.

Variables	Mean	SD	(1)	(2)	(3)	(4)
1.Remote e-working	3.42	0.77	1			
2.Technostress	2.49	0.57	−0.17*	1		
3. Loneliness	1.95	0.61	−0.30**	0.27**	1	
4. Flow	5.23	1.09	0.22**	−0.06	−0.26**	1

n = 202, *p < 0.05, **p < 0.01 (two-tailed).

Table 3
Indirect effects of remote e-working on flow, mediated by technostress and loneliness.

Indirect effect paths	b	SE	%95 Bootstrap CI	
			Lower Limit	Upper Limit
1. Total effect	0.060	0.027	0.013	0.118
2. Remote e-working- technostress-flow	−0.004	0.014	−0.033	0.026
3. Remote e-working- loneliness-flow	0.056	0.024	0.015	0.107
4.Remote e-working- technostress-loneliness-flow	0.009	0.005	0.001	0.021

excessive technology usage might hinder them from establishing and maintaining social relationships. Our finding corroborates recent research on technostress (Sarabadani, Compeau, & Carter, 2020) that identifies the outcomes of emotions associated with technostress.

Fourth, the present study makes an important contribution that reveals that feelings of loneliness affect employees' flow levels when working remotely (H4). A recurring finding from the stream of research on remote e-working shows that a lack of social interaction within the work environment can cause employees to suffer from loneliness during remote e-working (Larson et al., 2020; Sardeshmukh, Sharma, & Golden, 2012) and that loneliness can result in reduced employee performance (Ozcelik & Barsade, 2018). Our findings contribute to and expand on these conversations by exploring not only the consequences of remote e-work experiences but also by exploring two important stressors that result in lower levels of flow at work.

6.2. Theoretical implications

The results of the present study indicate that the JD-R framework can provide a useful understanding of the relevance of remote e-working experiences to employees' wellbeing at work. Also, the results provide valuable contributions to the existing literature. First, it utilizes the JD-R framework of resources and demands in the context of remote e-working and flow. Due to the nature of remote e-working and the mandatory circumstances of the coronavirus pandemic, it is argued that employees have had to be exposed to multiple technologies, creating anxiety and stress (Molino et al., 2020), and have frequently experienced feelings of loneliness during this period (Kniffin et al., 2021). Despite the proven negative impact of technostress and loneliness on employees, these two components have previously been neglected in the JD-R framework. Thus, the current study extends the current understanding of JD-R by identifying remote e-working as a personal resource and loneliness and technostress as job demands. By doing so, we respond to existing calls for further knowledge on the interaction of alternative job demands and personal resources (Bakker & Demerouti, 2017).

Second, the present study advances our understanding of remote e-working. Rather than treating remote e-working as a 'black box', we extend previous research by delineating the different aspects of remote e-working and their impacts on technostress. By utilizing the EWL scale (Grant et al., 2019), the current work represents the first study to assess the quality of the remote e-working experience and identifies three key related aspects (i.e., work effectiveness, well-being, and work-life balance) to explores how this relates to individuals' flow experience. To the best of our knowledge, such a holistic understanding of remote e-working has not previously been sought in the context of the work environment. Our results suggest that all three quality-related aspects of remote e-working are important sources of reducing technostress.

Third, the study advances existing studies on the cognitive and emotional states of employees by exploring the exact mechanism of how technostress influences loneliness. Studies in the psychology literature show that emotions are strongly associated with stress (Lazarus, 2006), which means that people have emotional reactions when they go through stressful situations. Furthermore, since the usage of ICTs is so prevalent, it was important to investigate the effects of technostress, the feeling of individual stress triggered by the use of ICT technology. While prior research into technostress has studied its effects on organizational and behavioural outcomes (Ragu-Nathan et al., 2008; Srivastava, Chandra, & Shirish, 2015), the emotional effect of technostress has mostly been ignored (Sarabadani et al., 2020). To fill this gap, the effect of technostress on loneliness – a prominent emotion which individuals have frequently experienced during the pandemic – was investigated. By doing so, this complements previous research by revealing technostress to be an antecedent of loneliness and contributes to a more clear and comprehensive understanding of the negative outcomes of stress caused by being exposed to multiple technologies.

6.3. Practical implications

The current pandemic and its consequences are still prevalent and expected to continue for a long time. The study provides important practical implications for management. Organizations, managers, and employees could well find the results useful when attempting to improve their responses to the current remote e-working trend.

First, our discussion on employees' remote e-working experiences reveals that the technological skills and capabilities of employees should be improved as remote e-working is almost certainly inevitable in the long term. Organizations should provide support and training to their employees to facilitate positive remote e-working experiences.

Second, employee work hours and means of communication should be flexible and based on mutual agreement with supervisors. Furthermore, since remote e-working inevitably leads to a culture that is 'always switched on', management should provide additional coping strategies to help employees navigate such challenges.

Third, organizations need to focus on providing a more sustainable remote e-working life with a strong emphasis on employees' well-being. Improved communication, such as personal contact with employees, may have an important impact when dealing with employees' loneliness problems. It should be noted that the remote e-working trend is likely to become the norm in the workplace and, therefore, associated managerial and organizational support is critical. To conclude, it is apparent that remote e-working practices are neither inherently good or bad, and their success depends on the ways in which the proliferation of technology are managed and experienced (Anderson & Kelliher, 2020).

6.4. Limitations and future research directions

The present study has a number of limitations that may also provide useful ideas for further advancement of research in this field. The cross-sectional nature and limited sample prevent us from generalizing our results. In addition, participant characteristics and social desirability limitations should be taken into consideration in the evaluation of the results. It is recommended that the same research design be used to compare the findings with other industries to enhance the explanatory power of the model.

Future studies can further extend this research by addressing several of the limitations to our research. First, future research could expand the current scope by including other psychological variables such as detachment, resilience, and burnout, and can adopt a broader perspective on remote e-working and its consequences. Finally, future longitudinal research can be conducted to increase the generalizability of the results. The longitudinal impact of the suggested variables on employees' flow experiences would contribute to a further understanding of a positive remote e-working experience.

7. Conclusion

The present study has contributed new knowledge about remote e-working and its effects on employee flow experiences. The aim of the study was to extend remote e-working research by introducing two key stressors: technostress and loneliness. The findings of this research reveal the varying impacts of the remote e-working experience perceived by employees on their psychological outcomes. Accordingly, remote e-working was found to be positively associated with flow at work (H1). The explanation for this association was provided via two key variables: technostress and loneliness. The findings suggested that remote e-working arrangements by organizations are key variables that influence the reduction of technology-induced employee stress (H2). Also, it revealed that high levels of technostress can be associated with employees feeling greater levels of loneliness (H3) and these higher levels of loneliness result in reduced extent of flow (H4).

While five of the four (H1, H2, H3, H4) hypotheses correspond to the direct effects among remote e-working, technostress, loneliness, and

flow; the findings point that technostress and loneliness serially mediate the relationship between remote e-working and flow at work (*H5*). Buttressed by decreased technostress and pillared by reduced loneliness, remote e-working practices by organizations culminate in increased flow experience of employees.

The findings have contributed to the related literature by enhancing the understanding of remote e-working experiences. Given the swift and extensive transition to working from home during the pandemic, it seems that remote e-working will remain a critical issue on the agenda of organizations. Therefore, organizations need to create opportunities to improve the technological knowledge and abilities of their employees to adopt ICTs and overcome the technostress that can be associated with loneliness and low levels of flow.

Credit author statement

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Declaration of competing interest

We declare no conflict of interest. This manuscript is only submitted to *Computers in Human Behavior* and is not under review anywhere else.

References

Adamovic, M. (2018). An employee-focused human resource management perspective for the management of global virtual teams. *The International Journal of Human Resource Management, 29*(14), 2159–2187. https://doi.org/10.1080/09585192.2017.1323227

Alberti, F. B. (2019). *A biography of loneliness: The history of an emotion*. Oxford University Press.

Anderson, D., & Kelliher, C. (2020). Enforced remote working and the work-life interface during lockdown. *Gender in Management: An International Journal, 25*(8), 677–683. https://doi.org/10.1108/GM-07-2020-0224

Archimi, C. S., Reynaud, E., Yasin, H. M., & Bhatti, Z. A. (2018). How perceived corporate social responsibility affects employee cynicism: The mediating role of organizational trust. *Journal of Business Ethics, 151*(4), 907–921.

Ayazlar, G., & Güzel, B. (2014). The effect of loneliness in the workplace on organizational commitment. *Procedia - Social and Behavioral Sciences, 131*(8), 319–325. https://doi.org/10.1016/j.sbspro.2014.04.124

Ayyagari, R., Grover, V., & Purvis, R. (2011). Technostress: Technological antecedents and implications. *MIS Quarterly, 35*(4), 831–858. https://doi.org/10.2307/41409963

Bagozzi, R. P., & Yi, Y. (1991). Multitrait-multimethod matrices in consumer research. *Journal of Consumer Research, 17*, 426–439. https://doi.org/10.1086/208568

Bagozzi, R. P., & Yi, Y. (2012). Specification, evaluation, and interpretation of structural equation models. *Journal of Academic Marketing Science, 40*(1), 8–34. https://doi.org/10.1007/s11747-011-0278-x

Bakker, A. B. (2008). The work-related flow inventory: Construction and initial validation of the WOLF. *Journal of Vocational Behavior, 72*(3), 400–414. https://doi.org/10.1016/j.jvb.2007.11.007

Bakker, A. B. (2015). A job demands–resources approach to public service motivation. *Public Administration Review, 75*(5), 723–732. https://doi.org/10.1111/puar.12388

Bakker, A. B., & Demerouti, E. (2007). The job demands–resources model: State of the art. *Journal of Managerial Psychology, 2*(3), 309–328. https://doi.org/10.1108/02683940710733115

Bakker, A. B., & Sanz-Vergel, A. I. (2013). Weekly work engagement and flourishing: The role of hindrance and challenge job demands. *Journal of Vocational Behavior, 83*(3), 397–409. https://doi.org/10.1016/j.jvb.2013.06.008

Bal, P. M., De Jong, S. B., Jansen, P. G. W., & Bakker, A. B. (2012). Motivating employees to work beyond retirement: A multi-level study of the role of I-deals and unit climate. *Journal of Management Studies, 49*, 306–331. https://doi.org/10.1111/j.1467-6486.2011.01026.x

Barber, L. K., & Santuzzi, A. M. (2015). Please respond ASAP: Workplace tele-pressure and employee recovery. *Journal of Occupational Health Psychology, 20*(2), 172–189. https://doi.org/10.1037/a0038278

Belzunegui-Eraso, A., & Erro-Garcés, A. (2020). Teleworking in the context of the Covid-19 crisis. *Sustainability, 12*(9), 3662. https://doi.org/10.3390/su12093662

Brislin, R. W. (1980). Translation and content analysis of oral and written material. In H. C. Triandis, & J. W. Berry (Eds.), *Handbook of cross-cultural psychology* (pp. 389–444). Allyn and Bacon.

Caplan, S. E. (2002). Problematic Internet use and psychosocial well-being: Development of a theory-based cognitive–behavioral measurement instrument. *Computers in Human Behavior, 18*(5), 553–575. https://doi.org/10.1016/S0747-5632(02)00004-3

Cavanaugh, M. A., Boswell, W. R., Roehling, M. V., & Boudreau, J. W. (2000). An empirical examination of self-reported work stress among U.S. Managers. *Journal of Applied Psychology, 8*(1), 65–74. https://doi.org/10.1037/0021-9010.85.1.65

Charalampous, M., Grant, C. A., Tramontano, C., & Michailidis, E. (2019). Systematically reviewing remote e-workers' well-being at work: A multidimensional approach. *European Journal of Work and Organizational Psychology, 28*(1), 51–73. https://doi.org/10.1080/1359432X.2018.1541886

Crawford, E. R., LePine, J. A., & Rich, B. L. (2010). Linking job demands and resources to employee engagement and burnout: A theoretical extension and meta-analytic test. *Journal of Applied Psychology, 95*(5), 834–848. https://doi.org/10.1037/a0019364

Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. Harper &Row.

Csikszentmihalyi, M. (1997). *Finding flow: The psychology of engagement with everyday life*. Basic Books.

Demerouti, E. (2006). Job characteristics, flow, and performance: The moderating role of conscientiousness. *Journal of Occupational Health Psychology, 11*(3), 266–280. https://doi.org/10.1037/1076-8998.11.3.266

Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology, 86*(3), 499–512. https://doi.org/10.1037/0021-9010.86.3.499

Demerouti, E., Bakker, A. B., Sonnentag, S., & Fullagar, C. J. (2012). Work-related flow and energy at work and at home: A study on the role of daily recovery. *Journal of Organizational Behavior, 33*(2), 276–295. https://doi.org/10.1002/job.760

Diehl, T., Weeks, B. E., & Gil de Zuniga, H. (2016). Political persuasion on social media: Tracing direct and indirect effects of news use and social interaction. *New Media and Society, 18*(9), 1875–1895. https://doi.org/10.1177/1461444815616224

Drabek, T. E., & McEntire, D. A. (2003). Emergent phenomena and the sociology of disaster: Lessons, trends and opportunities from the research literature. *Disaster Prevention and Management: An International Journal, 12*(2), 97–112. https://doi.org/10.1108/09653560310474214

Engeser, S., & Rheinberg, F. (2008). Flow, performance and moderators of challenge-skill balance. *Motivation and Emotion, 32*(3), 158–172. https://doi.org/10.1007/s11031-008-9102-4

Ertosun, Ö. G., & Erdil, O. (2012). The effects of loneliness on employees' commitment and intention to leave. *Procedia-Social and Behavioral Sciences, 41*, 469–476. https://doi.org/10.1016/j.sbspro.2012.04.057

Fagerlind, A. C., Gustavsson, M., Johansson, G., & Ekberg, K. (2013). Experience of work-related flow: Does high decision latitude enhance benefits gained from job resources? *Journal of Vocational Behavior, 83*(2), 161–170. https://doi.org/10.1016/j.jvb.2013.03.010

Fonner, K., & Roloff, M. (2010). Why teleworkers are more satisfied with their jobs than are office-based workers: When less contact is beneficial. *Journal of Applied Communication Research, 38*(4), 336–361. https://doi.org/10.1080/00909882.2010.513998

Gajendran, R. S., & Harrison, D. A. (2007). The good, the bad, and the unknown about telecommuting: meta-analysis of psychological mediators and individual consequences. *Journal of Applied Psychology, 92*(6), 1524–1541. https://doi.org/10.1037/0021-9010.92.6.1524

Gaudioso, F., Turel, O., & Galimberti, C. (2017). The mediating roles of strain facets and coping strategies in translating techno-stressors into adverse job outcomes. *Computers in Human Behavior, 69*, 189–196. https://doi.org/10.1016/j.chb.2016.12.041

Gierveld, J.d., Tilburg, T. G., & Dykstra, P. A. (2006). Loneliness and social isolation. In A. Vangelisti, & D. Perlman (Eds.), *The Cambridge handbook of personal relationships* (pp. 485–500). Cambridge University Press.

Glaser, J., Seubert, C., Hornung, S., & Herbig, B. (2015). The impact of learning demands, work-related resources, and job stressors on creative performance and health. *Journal of Personnel Psychology, 14*(1), 37–48. https://doi.org/10.1027/1866-5888/a000127

Golden, T. D., Veiga, J. F., & Dino, R. N. (2008). The impact of professional isolation on teleworker job performance and turnover intentions: Does time spent teleworking, interacting face-to-face, or having access to communication-enhancing technology matter? *Journal of Applied Psychology, 93*(6), 1412–1421. https://doi.org/10.1037/a0012722

Grant, C. A., Wallace, L. M., Spurgeon, P. C., Tramontano, C., & Charalampous, M. (2019). Construction and initial validation of the e-work life scale to measure remote working. *Employee Relations, 41*(1), 16–33. https://doi.org/10.1108/ER-09-2017-0229

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis*. Pearson Education.

Halbesleben, J. R., Neveu, J. P., Paustian-Underdahl, S. C., & Westman, M. (2014). Getting to the "COR" understanding the role of resources in conservation of resources theory. *Journal of Management, 40*(5), 1334–1364. https://doi.org/10.1177/0149206314527130

Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs, 76*(4), 408–420. https://doi.org/10.1080/03637750903310360

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Press.

Hazer, O., & Boylu, A. A. (2010). The examination of the factors affecting the feeling of loneliness of the elderly. *Procedia-Social and Behavioral Sciences, 9*, 2083–2089. https://doi.org/10.1016/j.sbspro.2010.12.450

Hektner, J. M., Schmidt, J. A., & Csikszentmihalyi, M. (2007). *Experience sampling method: Measuring the quality of everyday life*. Sage.

Hennington, A., Janz, B., & Poston, R. (2011). I'm just burned out: Understanding information system compatibility with personal values and role-based stress in a

nursing context. *Computers in Human Behavior, 27*(3), 1238–1248. https://doi.org/10.1016/j.chb.2011.01.004

Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist, 44*(3), 513–524. https://doi.org/10.1037/0003-066X.44.3.513

Hung, W. H., Chen, K., & Lin, C. P. (2015). Does the proactive personality mitigate the adverse effect of technostress on productivity in the mobile environment? *Telematics and Informatics, 32*(1), 143–157. https://doi.org/10.1016/j.tele.2014.06.002

Jaradat, M., Jibreel, M., & Shaik, H. (2020). Individuals' perceptions of technology and its relationship with ambition, unemployment, loneliness and insomnia in the Gulf. *Technology in Society, 60*, 1–10. https://doi.org/10.1016/j.techsoc.2019.101199

Jena, R. K. (2015). Technostress in ICT enabled collaborative learning environment: An empirical study among Indian academician. *Computers in Human Behavior, 51*, 1116–1123. https://doi.org/10.1016/j.chb.2015.03.020

Jeong, Y., & Kim, S. H. (2021). Modification of socioemotional processing in loneliness through feedback-based interpretation training. *Computers in Human Behavior, 117*, 1–9. https://doi.org/10.1016/j.chb.2020.106668

Kasa, M., & Hassan, Z. (2013). Antecedent and consequences of flow: Lessons for developing human resources. *Procedia-Social and Behavioral Sciences, 97*, 209–213. https://doi.org/10.1016/j.sbspro.2013.10.224

Klopotek, M. (2017). The advantages and disadvantages of remote working from the perspective of young employees. *Scientific Quarterly 'Organization and Management', 4* (40), 39–49. https://doi.org/10.29119/1899-6116.2017.40.3

Kniffin, K. M., Narayanan, J., Anseel, F., Antonakis, J., Ashford, S. P., Bakker, A. B., et al. (2021). COVID-19 and the workplace: Implications, issues, and insights for future research and action. *American Psychologist, 76*(1), 63–77. https://doi.org/10.1037/amp0000716

Knight, P., & Waples, C. (2017). Flow in the context of industrial and organizational psychology: The case of work motivation. In C. J. Fullagar, & A. Delle Fave (Eds.), *Flow at work: Measurement and implications* (pp. 140–156). Routledge/Taylor & Francis Group.

Korunka, C., Kubicek, B., Paškvan, M., & Ulferts, H. (2015). Changes in work intensification and intensified learning: Challenge or hindrance demands? *Journal of Managerial Psychology, 30*(7), 787–800. https://doi.org/10.1108/JMP-02-2013-0065

Larson, B. Z., Vroman, S. R., & Makarius, E. E. (2020). A guide to managing your (newly) remote workers. *Harvard Business Review*.

Lazarus, R. S. (2006). *Stress and emotion: A new synthesis.* Springer Publishing Company.

LePine, J. A., Podsakoff, N. P., & LePine, M. A. (2005). A meta-analytic test of the challenge stressor-hindrance stressor framework: An explanation for inconsistent relationships among stressors and performance. *Academy of Management Journal, 48* (5), 764–775. https://doi.org/10.5465/AMJ.2005.18803921

Lindell, M. K., & Whitney, D. J. (2001). Accounting for common method variance in cross-sectional research designs. *Journal of Applied Psychology, 86*(1), 114–121. https://doi.org/10.1037/0021-9010.86.1.114

Li, P., Taris, T. W., & Peeters, M. C. (2020). Challenge and hindrance appraisals of job demands: One man's meat, another man's poison? *Anxiety, Stress & Coping, 33*(1), 31–46. https://doi.org/10.1080/10615806.2019.1673133

Luchetti, M., Lee, J. H., Aschwanden, D., Sesker, A., Strickhouser, J. E., Terracciano, A., et al. (2020). The trajectory of loneliness in response to COVID-19. *American Psychologist, 75*(7), 897–908. https://doi.org/10.1037/amp0000690

MacKenzie, S. B., & Podsakoff, P. M. (2012). Common method bias in marketing: Causes, mechanisms, and procedural remedies. *Journal of Retailing, 88*(4), 542–555. https://doi.org/10.1016/j.jretai.2012.08.001

Mahapatra, M., & Pati, S. P. (2018). Technostress creators and burnout: A job demands-resources perspective. In *Proceedings of the 2018 ACM SIGMIS Conference on Computers and people research* (pp. 70–77). https://doi.org/10.1145/3209626.3209711

Mäkikangas, A., Bakker, A. B., Aunola, K., & Demerouti, E. (2010). Job resources and flow at work: Modelling the relationship via latent growth curve and mixture model methodology. *Journal of Occupational and Organizational Psychology, 83*(3), 795–814. https://doi.org/10.1348/096317909X476333

Mäkikangas, A., Leiter, M. P., Kinnunen, U., & Feldt, T. (2020). Profiling development of burnout over eight years: Relation with job demands and resources. *European Journal of Work and Organizational Psychology*. https://doi.org/10.1080/1359432X.2020.1790651. Advance online publication.

Mann, S., & Holdsworth, L. (2003). The psychological impact of teleworking: Stress, emotions and health. *New Technology, Work and Employment, 18*(3), 196–211. https://doi.org/10.1111/1468-005X.00121

Medhurst, A. R., & Albrecht, S. L. (2016). Salesperson work engagement and flow. *Qualitative Research in Organizations and Management: An International Journal, 11*(1), 22–45. https://doi.org/10.1108/QROM-04-2015-1281

Mogilner, C., Whillans, A., & Norton, M. I. (2018). Time, money, and subjective wellbeing. In E. Diener, S. Oishi, & L. Tay (Eds.), *Handbook of well-being, Noba scholar handbook series: Subjective well-being.* DEF Publishers.

Molino, M., Ingusci, E., Signore, F., Manuti, A., Giancaspro, M. L., Russo, V., et al. (2020). Wellbeing costs of technology use during COVID-19 remote working: An investigation using the Italian translation of the technostress creators scale. *Sustainability, 12*(15), 5911. https://doi.org/10.3390/su12155911

Nakamura, J., Csikszentmihalyi, M., Snyder, C. R., & Lopez, S. J. (2002). *Handbook of positive psychology.* Oxford University Press.

van Oortmerssen, L. A., Caniëls, M. C. J., & van Assen, M. F. (2020). Coping with work stressors and paving the way for flow: Challenge and hindrance demands, humor, and cynicism. *Journal of Happiness Studies, 21*(6), 2257–2277. https://doi.org/10.1007/s10902-019-00177-9

Ozcelik, H., & Barsade, S. G. (2011). Work loneliness and employee performance. In *Academy of management Annual Meeting Proceedings (AMBPP)* (pp. 1–6). https://doi.org/10.5465/ambpp.2011.65869714

Ozcelik, H., & Barsade, S. G. (2018). No employee an island: Workplace loneliness and job performance. *Academy of Management Journal, 61*(6), 2343–2366. https://doi.org/10.5465/amj.2015.1066

Ozcelik, H., Beetz, A., & Barsade, S. (2020). Understanding an epidemic during a pandemic: A relook at work loneliness in time of covid-19. *Academy of Management Conference*, 1–6.

Ozkara, B. Y., Ozmen, M., & Kim, J. W. (2016). Exploring the relationship between information satisfaction and flow in the context of consumers' online search. *Computers in Human Behavior, 63*, 844–859. https://doi.org/10.1016/j.chb.2016.06.038

Peplau, L. A., & Perlman, D. (1982). Perspectives on loneliness. In L. A. Peplau, & D. Perlman (Eds.), *Loneliness: A Sourcebook of current theory, research, and Therapy* (pp. 1–20). Wiley-Interscience.

Podsakoff, N. P., LePine, J. A., & LePine, M. A. (2007). Differential challenge stressor-hindrance stressor relationships with job attitudes, turnover intentions, turnover, and withdrawal behavior: A meta-analysis. *Journal of Applied Psychology, 92*(2), 438–454. https://doi.org/10.1037/0021-9010.92.2.438

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879–903. https://doi.org/10.1037/0021-9010.88.5.879

Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology, 63*, 539–569. https://doi.org/10.1146/annurev-psych-120710-100452

PWC. (2020). *Financial services firms look to a future that balances remote and in-office work.* Retrieved from: https://www.pwc.com/us/en/industries/financial-services/library/balancing-remote-and-in-office-work.html. (Accessed 3 August 2020).

Quinn, R. W. (2005). Flow in knowledge work: High performance experience in the design of national security technology. *Administrative Science Quarterly, 50*(4), 610–641. https://doi.org/10.2189/asqu.50.4.610

Ragu-Nathan, T. S., Tarafdar, M., & Ragu-Nathan, B. S. (2008). The consequences of technostress for end users in organizations: Conceptual development and empirical validation. *Information Systems Research, 19*(4), 417–433. https://doi.org/10.1287/isre.1070.0165

Rankin, K., Walsh, L. C., & Sweeny, K. (2019). A better distraction: Exploring the benefits of flow during uncertain waiting periods. *Emotion, 19*(5), 818–828. https://doi.org/10.1037/emo0000479

Russell, D. W. (1996). UCLA loneliness scale (version 3): Reliability, validity, and factor structure. *Journal of Personality Assessment, 66*(1), 20–40. https://doi.org/10.1207/s15327752jpa6601_2

Salanova, M., Bakker, A. B., & Llorens, S. (2006). Flow at work: Evidence for an upward spiral of personal and organizational resources. *Journal of Happiness Studies, 7*(1), 1–22. https://doi.org/10.1007/s10902-005-8854-8

Salanova, M., Llorens, S., & Cifre, E. (2013). The dark side of technologies: Technostress among users of information and communication technologies. *International Journal of Psychology, 48*(3), 422–436. https://doi.org/10.1080/00207594.2012.680460

Sarabadani, J., Compeau, D., & Carter, M. (2020). An investigation of IT users' emotional responses to technostress creators. In *Proceedings of the 53rd Hawaii International Conference on System Sciences* (pp. 6113–6122).

Sardeshmukh, S. R., Sharma, D., & Golden, T. D. (2012). Impact of telework on exhaustion and job engagement: A job demands and job resources model. *New Technology, Work and Employment, 27*(3), 193–207. https://doi.org/10.1111/j.1468-005X.2012.00284.x

Saris, W. E., & Gallhofer, I. N. (2014). *Design, evaluation, and analysis of questionnaires for survey research.* John Wiley & Sons.

Schaufeli, W. B., & Taris, T. W. (2014). A critical review of the job demands-resources model: Implications for improving work and health. In G. F. Bauer, & O. Hämmig (Eds.), *Bridging occupational, organizational, and public health* (pp. 43–68). Springer.

Sharma, S., Misra, N., & Gupta, A. (2020). Flow among scientists: A job demands resources perspective. *Defence Life Science Journal, 5*(3), 217–223. https://doi.org/10.14429/dlsj.5.15595

Singh, R. N. (1991). Loneliness: Dynamics, dimensions and many faces. *International Review of Modern Sociology, 21*(1), 109–120.

Slavec Gomezel, A., & Aleksić, D. (2020). The relationships between technological turbulence, flow experience, innovation performance and small firm growth. *Journal of Business Economics and Management, 21*(3), 760–782. https://doi.org/10.3846/jbem.2020.12280

Sosik, J. J., Kahai, S. S., & Avolio, B. J. (1999). Leadership style, anonymity, and creativity in group decision support systems: The mediating role of optimal flow. *The Journal of Creative Behavior, 33*(4), 227–256. https://doi.org/10.1002/j.2162-6057.1999.tb01405.x

Srivastava, S. C., Chandra, S., & Shirish, A. (2015). Technostress creators and job outcomes: Theorising the moderating influence of personality traits. *Information Systems Journal, 25*(4), 355–401. https://doi.org/10.1111/isj.12067

Stadin, M., Nordin, M., Broström, A., Magnusson Hanson, L., Westerlund, H., & Fransson, E. I. (2021). Technostress operationalised as information and communication technology (ICT) demands among managers and other occupational groups – results from the Swedish Longitudinal Occupational Survey of Health (SLOSH). *Computers in Human Behavior, 114*, 1–9. https://doi.org/10.1016/j.chb.2020.106486

Suh, A., & Lee, J. (2017). Understanding teleworkers' technostress and its influence on job satisfaction. *Internet Research, 27*(1), 140–159. https://doi.org/10.1108/IntR-06-2015-0181

Tams, S. (2015). Challenges in technostress research: Guiding future work. In *Proceedings of the Twenty-first Americas Conference on information Systems, Puerto Rico* (pp. 77–83).

Tarafdar, M., Darcy, J., Turel, O., & Gupta, A. (2015). The dark side of information technology. *MIT Sloan Management Review, 56*(2), 600–623.

Tarafdar, M., Tu, Q., & Ragu-Nathan, T. S. (2010). Impact of technostress on end-user satisfaction and performance. *Journal of Management Information Systems, 27*(3), 303–334. https://doi.org/10.2753/MIS0742-1222270311

Valtorta, N., & Hanratty, B. (2012). Loneliness, isolation and the health of older adults: Do we need a new research agenda? *Journal of the Royal Society of Medicine, 105*(12), 518–522. https://doi.org/10.1258/jrsm.2012.120128

Vander Elst, T., Verhoogen, R., Sercu, M., Van Den Broeck, A., Baillien, E., & Godderis, L. (2017). Not extent of telecommuting, but job characteristics as proximal predictors of work-related well-being. *Journal of Occupational and Environmental Medicine, 59*, 180–186. https://doi.org/10.1097/JOM.0000000000001132

Vasconcelos, P., Furtado, E., & Pinheiro, P. R. (2015). An approach of multidisciplinary criteria for modelling alternatives of flexible working. *Computers in Human Behavior, 51*, 1054–1060. https://doi.org/10.1016/j.chb.2015.02.071

Vittersø, J., Akselsen, S., Evjemo, B., Julsrud, T. E., Yttri, B., & Bergvik, S. (2003). Impacts of home-based telework on quality of life for employees and their partners quantitative and qualitative results from a European survey. *Journal of Happiness Studies, 4*, 201–233. https://doi.org/10.1023/A:1024490621548

Wang, K., Shu, Q., & Tu, Q. (2008). Technostress under different organizational environments: An empirical investigation. *Computers in Human Behavior, 24*(6), 3002–3013. https://doi.org/10.1016/j.chb.2008.05.007

Webster, J. R., Beehr, T. A., & Love, K. (2011). Extending the challenge-hindrance model of occupational stress: The role of appraisal. *Journal of Vocational Behavior, 79*(2), 505–516. https://doi.org/10.1016/j.jvb.2011.02.001

Wei, S., Zhu, F., & Chen, X. (2020). Do stressors stifle or facilitate employees' innovative use of enterprise systems: The moderating role of IT mindfulness. *Information Technology and People, 34*(3), 1–22. https://doi.org/10.1108/ITP-09-2019-0499

Wheatley, D. (2012). Good to be home? Time-use and satisfaction levels among home-based teleworkers. *New Technology, Work and Employment, 27*(3), 224–241. https://doi.org/10.1111/j.1468-005X.2012.00289.x