

WHEN JOB DEMANDS UNDERMINE RECOVERY EXPERIENCES: UNPACKING
THE RECOVERY PARADOX

by

Carol Wong
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Committee:

_____ Director

_____ Department Chairperson

_____ Program Director

_____ Dean, College of Humanities
and Social Sciences

Date: _____ Spring Semester 2022
George Mason University
Fairfax, VA

When Job Demands Undermine Recovery Experiences: Unpacking the Recovery
Paradox

A Dissertation submitted in partial fulfillment of the requirements for the degree of
Doctor of Philosophy at George Mason University

by

Carol Wong
Master of Arts
George Mason University, 2019
Bachelor of Science
University of California San Diego, 2016

Director: Lauren Kuykendall, Associate Professor
Department of Psychology

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George Mason University
Fairfax, VA

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DEDICATION

This is dedicated to my parents, who always believe in me.

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I would like to thank Dr. Lauren Kuykendall for her patient guidance during this entire process. This dissertation would not have been completed without her tremendous support. I would also like to thank Drs. Lois Tetrick, Seth Kaplan, and Suzanne C. de Janasz for their invaluable counsel and continuous support.

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ABSTRACT

WHEN JOB DEMANDS UNDERMINE RECOVERY EXPERIENCES: UNPACKING THE RECOVERY PARADOX

Carol Wong, Ph.D.

George Mason University, 2022

Dissertation Director: Dr. Lauren Kuykendall

Despite the greater need for recovery when faced with a high level of job demands, empirical evidence suggests that employees are less likely to recover under such circumstances—a phenomenon known as the “recovery paradox.” The present study aims to (1) clarify how different job demands impair recovery experiences and (2) identify boundary conditions in the recovery paradox. Employing an experienced sampling methodology (ESM), data was collected from 163 participants after work and before bedtime over the course of 5 consecutive workdays, resulting in 698 complete day-level responses. Multilevel path analysis was conducted to test the hypotheses. I found partial support for the negative relationships between job demands and recovery experiences as described in the recovery paradox model. There was also empirical support for the indirect effects of emotional demands, as well as overload demands, on psychological detachment via negative affect. However, the same effects did not extend to relaxation

and control experiences. There were no significant indirect effects of overload on recovery experiences via work-related technology usage. Lastly, moderating effects of work-home boundary segmentation preference, job resources, and personal resources were not found. Implications, limitations, and future research are discussed.

INTRODUCTION

According to the Stress in America results, 64% of Americans reported that work is a significant source of stress, making it one of the most commonly mentioned personal stressors (American Psychological Association, 2020). Employees often face excessive workload, increased job insecurity, as well as high cognitive and emotional demands (Maestas et al., 2017). Advances in technology have also made it possible for employees to stay connected to work 24/7, resulting in pressure to respond to work-related communications quickly even at home (Barber & Santuzzi, 2015). As employees face more job stressors and the boundaries between work and nonwork time have become blurrier, recovery during nonwork time—defined as the unwinding process during which employees replenish used resources and reduce strain due to job stressors (Craig & Cooper, 1992; Meijman & Mulder, 1998; Sonnentag et al., 2017)—is increasingly important for employees to maintain optimal job performance and well-being.

Despite the need and desire to recover well in face of job demands, empirical evidence suggests that it is less likely for employees to experience recovery under such circumstances (e.g., Bennett et al., 2018; Litwiller et al., 2017; Steed et al., 2021). Sonnentag (2018) described this phenomenon as the “recovery paradox.” Indeed, when employees face high levels of job stressors, they are less likely to engage in recovery-

enhancing activities—such that they tend to exercise less and have poorer quality of sleep (Litwiller et al., 2017)—even though they are in particular need for recovery to occur.

Empirical studies based on the stressor-detachment model (Sonnentag & Fritz, 2015) provide support that job stressors make recovery experiences, specifically psychological detachment (i.e., not thinking about work during after work hours), less likely to occur (e.g., Clauss et al., 202; Sonnentag & Fritz, 2015; Zhou et al., 2020). Although the need for recovery increases when exposed to job stressors (Meijman & Mulder, 1998), the likely response from employees is not taking a break to distance themselves from job stressors and to allow for recovery, but rather staying connected to work. Meta-analyses further document that different types of job stressors, to various extents, undermine other recovery experiences (Bennett et al., 2018; Steed et al., 2021).

While existing research has shown that exposure to job stressors undermine recovery despite people's need for a break, limited empirical work has examined the mediating mechanisms in the recovery paradox. Since different types of job demands demonstrate distinct patterns with recovery and well-being indicators (e.g., Bennett et al., 2018; Haun et al., 2018; Steed et al., 2021), understanding if and how different variables might explain the negative relationships between job demands and recovery can provide a more nuanced understanding of why the recovery paradox occurs. Indeed, Sonnentag (2018) has called for future empirical studies to examine the recovery paradox and compare different mediating processes that may explain the paradoxical phenomenon.

Further, recent meta-analyses on the relationships between job demands and recovery experiences (Bennett et al., 2018; Steed et al., 2021) showed that a low

percentage of variance is accounted for by statistical artifacts, indicating the potential of meaningful moderators (Hunter & Schmidt, 2004). Steed and colleagues (2021) argue that incorporating moderators to study recovery at both the within- and between-person levels represents an important opportunity to extend the current literature. As existing literature on recovery has primarily studied how work characteristics (i.e., job demands and resources) independently relate to recovery experiences, the buffering effects of resources, as proposed in the job-demands model (JD-R model; Demerouti et al., 2001), has received less attention in this context (for exceptions, see Clauss et al., 2020; Eichberger, et al., 2020; Schulz et al., 2019.). Responding to the call by Steed and colleagues (2021), integrating boundary theory (Ashforth et al., 2000; Clark, 2000) and the JD-R model (Demerouti et al., 2001) to investigate moderators can help identify for whom and in what situations employees may be able to recover despite high levels of job demands. Better understanding of both the mediating mechanisms and moderating factors in the recovery paradox might inform organizational practices, job design, and interventions to more effectively promote employee recovery.

In this dissertation, I draw from boundary theory (Ashforth et al., 2000; Clark, 2000) and the mood congruency hypothesis (Bower, 1981; Rusting & DeHart, 2000) to identify mediating mechanisms explaining how different job demands impair recovery experiences. I propose that work-related technology usage and negative affect mediate the relationships between job demands (i.e., emotional and overload demands) and recovery experiences. Further, integrating boundary theory (Ashforth et al., 2000; Clark, 2000) and the JD-R model (Demerouti et al., 2001), I also propose that work-home

segmentation preferences, job resources (i.e., instrumental and emotional support) and personal resources (i.e., emotional stability and occupational self-efficacy) buffer the negative effect of job demands on recovery experiences. This study contributes to the recovery literature by showing how two types of job demands undermine employees' recovery experiences through different mechanisms, despite that the need for recovery actually increases under such conditions. Further, identifying moderators helps clarify boundary conditions of the recovery paradox.

With these goals in mind, I first review the recovery literature and prior studies that have examined the relationships between job stressors and employee recovery. I then develop a moderated mediation model and conduct a study that employs experienced sampling methodology (ESM) to examine the recovery paradox.

LITERATURE REVIEW

Conceptualizing Recovery

Recovery, which can be viewed as the opposite to strain, generally refers to the unwinding process during which individuals replenish used resources and eliminate strain due to job demands (Craig & Cooper, 1992; Meijman & Mulder, 1998). Researchers have advocated for careful differentiation on the distinct conceptualizations of recovery (Sonnetag et al., 2017). As an outcome, recovery captures the extent to which people feel mentally recovered, physically refreshed, and well rested after recovery processes (Binnewies et al., 2009). As a process, recovery refers to activities and experiences that allow people's strain level to return to its pre-stressor level (Sonnetag et al., 2017). Examples of recovery-enhancing activities include sleep (e.g., Litwiller et al., 2017), physical exercise (e.g., van Hooff et al., 2019), social activities (e.g., ten Brummelhuis & Trougakos, 2014), or leisure (e.g., De Bloom et al., 2018).

While people may engage in different activities to recover from job stress, the underlying psychological processes vital for recovery is suggested to be more uniform. Recovery experience refers to the psychological experiences that underlie the recovery process. Sonnetag and Fritz (2007) identified four distinct recovery experiences: (a) psychological detachment, which involves leaving work behind and not thinking about work during nonwork time, (b) relaxation, which refers to experiencing a low activation level and increased positive affect, (c) mastery, which involves taking up challenges and learning opportunities in nonwork domains, and (d) control, which focuses on the

perception of having a choice in deciding how nonwork time is spent. Because the specific nonwork activities that can bring forth recovery can vary across individuals, focusing on recovery experiences, in lieu of the specific activities, can allow researchers to more accurately assess the restorative processes occurred during recovery (Sonnentag & Fritz, 2007; Sonnentag, 2018).

Theoretical Frameworks in the Recovery Research

Both the effort-recovery model (Meijman & Mulder, 1998) and the conservation of resources theory (Hobfoll, 1989) have been widely used as complementary frameworks, as they highlight the respective role of demands and resources in the recovery process. According to the effort-recovery model (Meijman & Mulder, 1998), when individuals expend effort to attend to job demands, this process brings about short-term load reactions (i.e., strain), such as stress hormones, fatigue, elevated heart rate and blood pressure. These reactions can build up with continuous exposure to demands, resulting in a felt need for recovery. That is, individuals develop a conscious state of fatigue and a desire to be temporarily relieved from the demands (Meijman & Mulder, 1998). This need for recovery is also linked to a wish for low baseline activity (Craig & Cooper, 1992) and the expectation that recovery is needed to handle future demands (Sonnentag & Zijlstra, 2006). Once job demands cease, recovery occurs which restores homeostasis, allowing individuals return to their pre-stressor state. When recovery is incomplete, strain reactions are prolonged such that people have to compensate and invest additional effort upon taking on subsequent job demands (Demerouti et al., 2009).

This leads to increasingly draining load reactions in an accumulative process, resulting in chronic negative outcomes (Geurts & Sonnentag, 2006; Igit et al., 2017).

The conservation of resources theory (Hobfoll, 1989) primarily focuses on resources and suggests that people seek to obtain and maintain important resources. Over time, threatened or lost resources can result in strain. The theory highlights that recovery allows individuals to replenish and recuperate depleted resources (Hobfoll, 1989). This process of creating resources is also reinforcing, such that those with resources are more capable of gaining additional resources (i.e., gain spirals), which further promotes both the recovery process and its outcomes (Hobfoll et al., 2018).

Extending these two frameworks, the job demands-resources model (JD-R model; Demerouti et al., 2001) examines demands and resources as parallel mechanisms that also have interactive effects. Job demands refer to aspects of the job that require physical or mental effort, whereas job resources refer to aspects of the job that facilitate managing job demands, goal accomplishment, and growth. In the health impairment process, job demands exhaust people's resources and can result in strain if left unmitigated. The motivation process suggests that job resources energize people and lead to high work engagement. The JD-R model further posits that the interaction between job demands and resources is important for the development of strain, as job resources may offset the impact of job demands (Bakker et al., 2005). In other words, when people have enough resources, they may be better at coping with job demands. Taken together, these theoretical frameworks portray a nuanced illustration of the recovery process.

The Recovery Paradox

As recovery is critical to employee well-being and job performance (Bennett et al., 2018; Steed et al., 2021; Wendsche & Lohmann-Haislah, 2017), considerable research has investigated predictors of recovery experiences. Meta-analyses suggest that job demands impede recovery, while resources promote recovery (Bennett et al., 2018; Steed et al., 2021; Wendsche & Lohmann-Haislah, 2017). Specifically, overload is negatively linked to all recovery experiences (with the exception of mastery; Steed et al., 2021). Challenging and hindering job demands both exhibit negative relationships with psychological detachment, relaxation, and control, but have nonsignificant relationships with mastery experiences (Bennett et al., 2018). Further, work and home contextual resources are positively related to all four recovery experiences (Bennett et al., 2018; Steed et al., 2021).

Here, I specifically focus on the underlying negative relationships between job demands and recovery in the recovery paradox. This empirically documented phenomenon, which has been conceptualized as both a within- and between-person phenomenon, illustrates how employees are less likely to recover when they face high levels of job stressors, despite the need for and benefits of recovery under such circumstances (Sonnentag, 2018). Although stressed workers develop a conscious state of desiring a break from continued exposure to job demands (Meijman & Mulder, 1998; Sonnentag & Zijlstra, 2006), such desire is overridden. Existing research on the recovery paradox has mostly looked at how different job demands relate to psychological detachment and recovery-enhancing activities, such as physical exercise and sleep.

The stressor-detachment model (Sonnentag & Fritz, 2015) suggests that not only do job stressors directly lead to strain, the prolonged activation even after the stressors are removed (i.e., lack of psychological detachment) is detrimental to well-being. In other words, the model highlights the partial mediating role of psychological detachment. In the context of the recovery paradox, the negative relationship between job stressors and detachment is of particular relevance.

Existing meta-analyses have provided evidence in support of the stressor-detachment model, indicating that job demands, regardless of the operationalizations, impede psychological detachment (Bennett et al., 2018; Steed et al., 2021; Wendsche & Lohmann-Haislah, 2017). Longitudinal studies, which provide greater clarity on the process described in the stressor-detachment model, suggest that quantitative job demands, in particular, undermine psychological detachment over time (Kinnunen & Feldt, 2013; Meier & Cho, 2019). A recent meta-analysis including diary and ESM studies found the same negative relationships between job demands and detachment at the within-person level as well (Steed et al., 2021). Overall, empirical evidence is in support of the negative links between job demands and psychological detachment.

Studies on the relationships between job demands and recovery-enhancing activities such as physical exercise and sleep also show similar impairment (e.g., Abdel Hadi et al., 2020; Litwiller et al., 2017). Although the number of studies is quite limited, some research has also investigated how job demands undermine recovery experiences other than detachment. For instance, job demands predicted a significant decrease in relaxation but not mastery or control experiences after work in their mediation model

(Kinnunen et al., 2011). Singh and colleagues (2016) also found that nurses who faced increased work intensity experienced less relaxation during nonwork time. Meta-analytic correlations at both the within- and between-person levels showed that overload, cognitive, and emotional job demands were negatively linked to relaxation and control experiences (Steed et al., 2021).

HYPOTHESIS DEVELOPMENT

Motivation for the Study

Although the recovery paradox—as evidenced by negative relationship between job stressors and recovery—has been supported by meta-analytic evidence (e.g., Bennett et al., 2018; Litwiller et al., 2017; Steed et al., 2021), less is known about the mediating mechanisms linking each subtype of job demands to different recovery experiences. Further, low percentages of variance being accounted for by statistical artifacts (e.g., sampling error) in existing meta-analyses on the relationships between job demands and recovery experience (Bennett et al., 2018; Steed et al., 2021) indicates the existence of potential moderators (Hunter & Schmidt, 2004). This represents an opportunity to add important nuance and investigate cross-level moderation that is not feasible in meta-analyses. Because not everyone experiences the recovery paradox to the same degree, examining the moderating effects of job resources and personal resources will help identify boundary conditions of the phenomenon. Understanding of both the mediating mechanisms and moderating factors in the recovery paradox might help inform organizational practices, job design, and interventions to more effectively supported stressed workers and promote recovery

To address these questions in the literature on the recovery paradox, I propose a moderated mediation model in an attempt to explain why, for some individuals, there is a

lower likelihood of beneficial recovery experiences in face of job demands. Because of the inconclusive evidence on the link between job demands and mastery experiences (Steed et al., 2021), I focus on psychological detachment, relaxation, and control in this study. Specifically, I examine the effect of overload and emotional demands on these three recovery experiences, proposing both mediators and moderators of their impact on recovery experiences. Overload and emotional demands are particularly relevant demands, as they have been linked to impaired recovery in a recent meta-analysis (Steed et al., 2021). Figure 1 illustrates the conceptual model for the study.

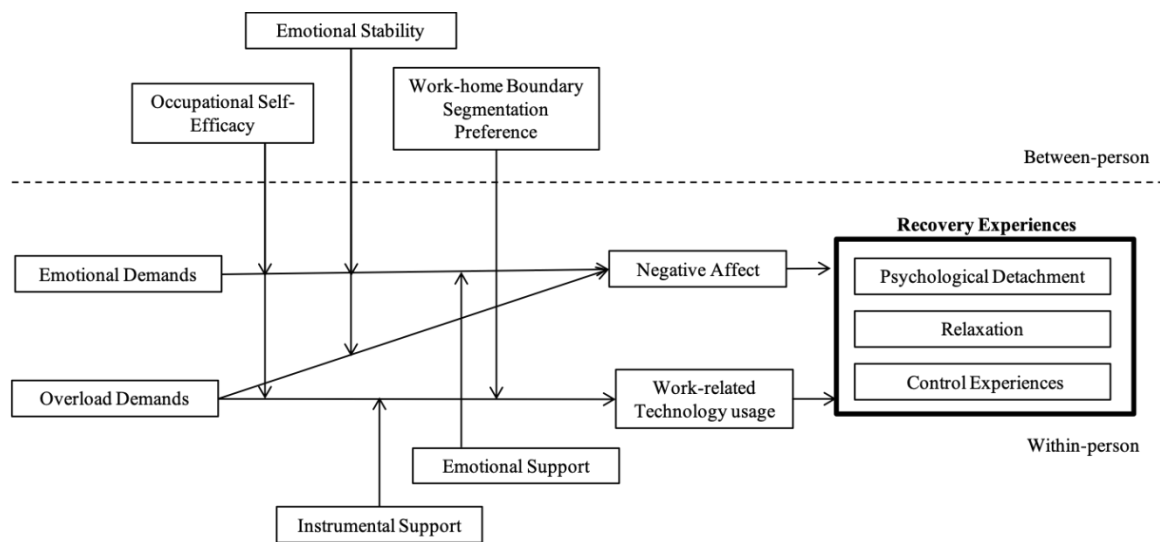


Figure 1. Conceptual Model

Mediating Mechanisms of the Recovery Paradox

Emotional demands refer to job aspects that invoke strong feelings in employees on a personal level because of the taxing and draining nature of work (ten Brummelhuis

& Bakker, 2012; de Jonge & Dormann, 2003). Examples of emotional demands at work include interaction with aggressive or abusive individuals, interpersonal conflicts, and being exposed to situations that involve human loss.

Emotional demands are often considered to be the most relevant for occupations involving traditional “emotion work”, such as health care workers (Riedl & Thomas, 2019), teachers and school principals (Maxwell & Riley, 2017), as well as frontline service workers (Castanheira, & Chambel, 2013). However, studies with heterogeneous occupations have provided evidence on the relevance of emotional demands in most workplaces, as they also arise through routine, interpersonal interactions with supervisors, colleagues, and/or customers (e.g., Kampa et al., 2017; Tucker et al., 2020). In the context of recovery, Steed and colleagues (2021) found a significant negative relationship between emotional demands and recovery experiences ($\rho = -.26$) in their meta-analysis, suggesting that emotional demands do impede recovery experiences, particularly psychological detachment ($\rho = -.28$) and relaxation ($\rho = -.17$).

As suggested by the effort-recovery model (Meijman & Mulder, 1998), when individuals expend effort on job demands, this process creates short-term physiological and psychological strain reactions. These reactions can manifest in numerous ways, including the experience of negative affect (Ng et al., 2019). As emotional demands, by definition, are aspects of the job that are emotionally taxing (de Jonge & Dormann, 2003; ten Brummelhuis & Bakker, 2012), I expect negative affect to be a relevant manifestation of strain in this context. Negative affect captures the extent to which workers experience multiple negative emotions, including anger, worry, and sadness (Watson & Clark, 1984).

Drawing from the mood congruency hypothesis (Bower, 1981; Rusting & DeHart, 2000), I hypothesize that negative affect mediates the relationships between emotional demands and recovery experiences, such that it overrides people's need for recovery resulting from job demands and impair recovery. The mood congruency hypothesis (Bower, 1981; Rusting & DeHart, 2000) argues that people's affective states evoke mood-congruent information in memory. That is, when individuals are in positive affective states, pleasant thoughts more easily come to mind. In contrast, during negative affective states, people find it easier to retrieve negative cognitions and thoughts.

As emotional demands evoke negative affect (Ng et al., 2019), it becomes easier for them to access negative cognition (Bower, 1981; Rusting & DeHart, 2000), which further reinforces the initial negative mood. Negative affect also signals to people that the situation at hand is problematic, which stimulates ruminative cognitions in an effort to identify a solution (Sonnentag & Lischetzke, 2018). Therefore, although employees feel a sense of urgency to take a break after facing emotional job demands (Meijman & Mulder, 1998; Sonnentag & Zijlstra, 2006), negative affect may prolong strain reactions and intrude on nonwork time, making recovery experiences less likely to occur. For instance, despite the desire for disengagement from work after an encounter with a difficult customer, employees may continue to think about the unpleasant encounter and other similar negative occurrences with customers—made more accessible in their memory due to the initial negative affect—even after they have left the workplace. In turn, emotional job demands that employees face keep employees connected to work, even when they are no longer performing work tasks. Indeed, negative affect experienced at work is shown to

spillover and is positively linked to negative affect at home (Ilies et al., 2007). As a result, recovery during nonwork time may be impaired.

In the face of emotional demands, employees tend to be less successful in regulating their emotional reactions (Sonnentag, 2018). As a result, negative affect is likely to persist and make it harder for employees to direct their cognitions away from work, resulting in poorer psychological detachment. Negative affect such as frustration and distress are associated with increased arousal (Russell, 1980) and can trigger a ‘fight or flight’ response (Nicholson & Griffin, 2015), which might hinder people’s ability to manage their experience of negative affect and relax. When employees wish to recharge and relax in the face of job demands (Sonnentag & Zijlstra, 2006), negative affect may override such desire and make relaxation more difficult. Indeed, frustration caused by negative work events has been linked to lower relaxation after work (Parker et al., 2020). Negative affect also stimulates negative work reflection (Volmer et al., 2012) —people may perceive themselves having less control over how their over nonwork time is spent, as reflecting about work has taken up their time at home.

Hypothesis 1: Emotional demands are negatively linked to (a) psychological detachment, (b) relaxation, and (c) control experiences.

Hypothesis 2: Negative affect partially mediates the relationship between emotional demands and (a) psychological detachment, (b) relaxation, and (c) control experiences.

Overload occurs when employees have more work to do than their capacity (ten Brummelhuis & Bakker, 2012). Examples of overload demands include having to

perform many tasks at a high pace or to meet a deadline under short notice. Overload is one of the most common job demands for today's workforce (Bakker et al., 2005). Commonly conceptualized as a hindrance stressor, overload has been linked to increased withdrawal and poorer well-being (Bowling et al., 2015). It is also the type of job demands which shows the strongest negative relationship with recovery experiences ($\rho = -.27$) based on results from a recent meta-analysis (Steed et al., 2021).

Leveraging boundary theory, I propose that work-related technology usage after work mediates the relationship between overload and recovery. Boundary theory (Ashforth et al., 2000; Clark, 2000) highlights the ways in which individuals create physical, temporal, and psychological boundaries among the different roles they occupy, including work and family roles. These boundaries vary in strength, which determines if individuals integrate or separate their roles. For example, some workplaces expect employees to address work-related issues beyond formal work hours, which results in home boundaries being more permeable for work. Boundary theory posits that both personal and situational factors determine the permeability of the boundaries through which work intrude the home domain (Ashforth et al., 2000; Clark, 2000).

Here, the level of overload demands may serve as a situational factor that pressures employees to weaken their home boundary and attend to job tasks at home, which is made possible by ICT. The experience of overload implies that people perceive work demands exceed their capacity to cope. Thus, overload constitutes a likely reason for people to stay connected and work beyond hours—which overrides their desire for recovery—as a coping mechanism. Indeed, employees have been shown to turn to their

computers and mobile devices during nonwork time to manage job demands (Gadeyne et al., 2018). When employees have to meet deadlines under short notice, they may also experience uncertainty about whether work can be done in time (Hui & Lee, 2000). Instead of fulfilling their desire of taking a break after feeling overloaded at work, they may check their mobile devices at a higher rate, respond to work communications, or continue to work on unfinished job tasks during nonwork time.

Although employees develop a need for recovery when exposed to continuous overload demands (Meijman & Mulder, 1998; Sonnentag & Zijlstra, 2006), they may perceive a greater need to bring job tasks into nonwork time instead of resting as desired. This behavior comes at a potential increasingly blurry boundaries between work and nonwork domains (Demerouti et al., 2014). The constant technological connectivity and attending to job tasks at home may also undermine recovery in substantial ways. Indeed, empirical studies have shown that employees' urge to respond quickly to work-related messages (i.e., workplace telepressure) impair their recovery experiences after work (Barber & Santuzzi, 2015). Using ICT for work purposes at home has been linked to lower levels of psychological detachment (Derks et al., 2014; Park et al., 2011; Van Laethem et al., 2018). Taken together, staying connected to work during nonwork time, which is enabled by ICT, impairs recovery processes.

While most existing research on the relationship between work-related technology usage after hours and recovery has focused on psychological detachment, I expect this relationship also applies to other recovery experiences. That is, in choosing to work beyond formal work hours to cope with overload, despite the need for recovery,

employees' relaxation and control experiences would also be impaired. Specifically, actively addressing work-related issues using technology at home due to overload requires sustained attentional focus (Kao et al., 2020), which would likely hinder employees' ability to relax during nonwork time. As employees have to spend more of their time at home using ICT for work, they may perceive themselves less in control of what they are capable of doing during their nonwork time. In sum, I hypothesize that work-related technology usage during nonwork time will serve as a behavioral pathway that links high levels of overload demands with people's impaired recovery experience.

Hypothesis 3: Overload demands are negatively linked to (a) psychological detachment, (b) relaxation, and (c) control experiences.

Hypothesis 4: Work-related technology usage partially mediates the relationship between overload demands and (a) psychological detachment, (b) relaxation, and (c) control experiences.

In addition to coping behaviors of using technology for work purposes at home, when employees feel overloaded, I expect they will also experience negative affect.

Based on the effort-recovery model (Meijman & Mulder, 1998), the process of investing effort in managing job demands induces strain for individuals. As overload occurs when employees perceive having more work to do than they are capable of, the uncertainty about whether all the work can be completed in time (Hui & Lee, 2000) is likely to induce frustration, anxiety, and other negative emotions. Indeed, a prior meta-analysis has found a strong effect for the relationship between overload and negative affect, as well as that between excessive work demand and negative affect (Ng et al., 2019).

Hypothesis 5: Negative affect partially mediates the relationship between overload demands and (a) psychological detachment, (b) relaxation, and (c) control experiences.

Moderators in the Recovery Paradox

According to boundary theory, people vary in terms of how they prefer to manage their work-home boundaries (Ashforth et al., 2000; Clark, 2000). Work-home boundary segmentation preference refers to the degree to which one prefers more or less impermeable boundaries to separate work and home roles (Kreiner, 2006), which impacts their boundary management strategies. Here, I expect that individual preference offsets the impact of environment on employees' work-related technology usage at home. Employees high on segmentation preference prefer the work-home boundaries to be strict and impermeable, whereas those low on segmentation preference are more likely to develop flexible boundaries between domains (Allen et al., 2014). Despite the situational factor of overload, employees who prefer segmented work-home boundaries may still choose to limit work-related technology usage at home due to their desire of prioritizing their need for recovery and preventing work from invading their home domain. Instead, they may rely on other coping strategies such as seeking help from others to manage overload. On the other hand, those low on segmentation preferences might want to take advantage of the flexible boundaries between work and home to cope with overload. Indeed, prior research has found that those who prefer more permeable work-home boundaries see work-related technology usage at home as an adaptive strategy that helps them juggle competing demands from different domains (Gadeyne et al., 2018).

Hypothesis 6: Work-home boundary segmentation preference moderates the relationships between overload demands and work-related technology usage, such that the relationships are weaker when work-home boundary segmentation preference is high.

According to the buffering hypothesis proposed by the JD-R model, the negative link between job demands and employees' strain reaction may be contingent on the level of job resources, suggesting a buffering effect (Bakker et al., 2005). This assumption expands the demand-control model (DCM; Karasek, 1979) and proposes that different job resources may play the role of buffer against different job demands. It is also consistent with the basic principles of the conservation of resources theory (Hobfoll, 1989), which states that those with more resources are less vulnerable to resource loss and more capable of achieving further resource gains. Conversely, those with fewer resources are more vulnerable to resource loss and less capable of resource gain.

In addition to job resources, resources also exist within individuals. Personal resources represent stable personality traits that enable people to cope with stressors and utilize resources to impact upon their environment more successfully (ten Brummelhuis & Bakker, 2012). Personal resources allow people to capitalize on available resources and face set-backs at work in a positive manner. Along with job resources, personal resources have also been recognized as crucial determinants of well-being (Xanthopoulou et al., 2013) and are expected to play a similar role as job resources, acting as buffer against the undesirable effect of job demands. Identifying optimal demand-resource combinations can help understand how specific demands threaten and how specific

resources protect employees from developing strain (De Jonge & Dormann, 2003). Indeed, Bakker and Demerouti (2017) called for empirical work to study the buffering effects of different combinations of demands and resources. Here, I expect matching job resources and personal resources will be relevant in alleviating the impact of emotional demands and overload demands in the recovery paradox.

Job Resources

Social support refers to interpersonal resources that can include emotional expression of concern, behavioral assistance, and instrumental support (House et al., 1988). Social support at work is often cited as a vital job resource that mitigates the negative effects of job stressors (Bakker & Demerouti, 2017). It can also spill over and influence employees' experiences outside of work (Jolly et al., 2021).

According to the JD-R model, the costs associated with high job demands are lower for those with sufficient job resources (Bakker et al., 2005). When the available resources are based on qualitatively similar dimensions to the demand, they are better able to mitigate the negative effects of those demands (De Jonge & Dormann, 2003). Because social support can vary in terms of its content and differentially relate to other variables (French et al., 2018; Mathieu et al., 2019), it is important to ensure that the social support construct under investigation matches with demands with respect to their types (Jolly et al., 2021). Specifically, I hypothesize that emotional support serves as a buffer against emotional demands on negative affect, whereas instrumental support offsets the effects of overload demands on work-related ICT usage after hours.

Emotional support involves the provision of psychological resources such as understanding, care, and respect, which makes employees feel valued and cared for (House et al., 1988; French et al., 2018). In face of emotional and overload demands, emotional support may help employees reframe and reappraise the situation at hand. For instance, conversation with supervisors after a stressful encounter with customers can put the emotionally taxing job demands in another perspective (Bakker et al., 2005), which may offset the effect of emotional demands on negative affect. When supervisors show care and empathy towards employees, it also alleviates strain reactions (Jolly et al., 2021), such as negative affect, that employees experience due to emotional demands.

Instrumental support from supervisors can help employees directly address job tasks and may therefore alleviate the impact of overload (Tadic et al., 2015). Here, instrumental support provides employees with external resources that can boost their perceived coping abilities, such that they may feel less of a need to turn to their mobile devices and continue working at home. According to boundary theory (Clark, 2000), domain boundaries are socially constructed, such that members in different domains, or “border keepers”, play an important role in hindering or promoting employees’ ability to manage work-home boundaries. Often, supervisors act as border keepers in determining the permeability of work-home boundaries. Accordingly, when supervisors provide instrumental support that directly addresses overload and promotes adaptive coping, employees may feel more comfortable in setting expectations and limiting work-related technology usage during nonwork time.

Hypothesis 7: Emotional support moderates the relationships between emotional demands and negative affect, such that the relationships are weaker when emotional support is high.

Hypothesis 8: Instrumental support moderates the relationships between overload demands and work-related technology usage, such that the relationships are weaker when instrumental support is high.

Personal Resources

I also expect two personal resource constructs, specifically occupational self-efficacy and emotional stability, to be of relevance and offset the effects of emotional demands and overload demands. Emotional stability captures people's capacity to regulate emotions, control impulses, and cope with challenging situations (Costa & McCrae, 1992). As empirical evidence suggests that emotional stability moderates the relationship between job stressors and strain (e.g., Rubino et al., 2012), I expect emotional stability to serve as a key personal resource for employees to protect and procure additional resources, which might help mitigate the impact of emotional and overload demands on negative affect.

Emotional stability is linked to the use of productive coping strategies, such as emotion-approach coping (Connor-Smith & Flachsbart, 2007). Those high in emotional stability tend to engage in active attempt to resolve stressors through logical planning and generating possible solutions. Thus, they are less likely to ruminate over negative experiences (Muris et al., 2005) and are less affected negatively by job stressors (Kammeyer-Mueller et al., 2009). Because emotional stability is associated with

resilience and mindfulness (Oshio et al., 2018), it provides additional resources to help people cope with negative emotions. In face of overload and emotional demands, those who are high in emotional stability may be better at utilizing available resources to regulate their emotions and recover from negative affect quicker.

Hypothesis 9: Emotional stability moderates the relationship between emotional demands and negative affect, such that the relationships are weaker when emotional stability is high.

Hypothesis 10: Emotional stability moderates the relationship between overload demands and negative affect, such that the relationships are weaker when emotional stability is high.

Occupational self-efficacy, which is a domain specific conceptualization of self-efficacy, reflects people's belief in their abilities to execute occupational tasks successfully (Schyns & Von Collani, 2002; Rigotti et al., 2008). As a form of personal resource, occupational self-efficacy may be an important moderator such that employees may experience less negative affect and feel less of a need to use technology for work during nonwork time in response to overload.

Although overload is commonly conceptualized as a hindrance stressor, the effect of overload may be contingent on how it is perceived (Sonnentag & Fritz, 2015).

Individuals with high levels of occupational self-efficacy are more likely to use functional strategies to attend to job stressors (Jex & Bliese, 1999). Because of the confidence they have in their own abilities to handle job tasks successfully, those with high levels of occupational self-efficacy may view job demands as challenges instead of

hindrances (Clauss et al., 2020). Such appraisal may then mitigate the negative impact of overload demands. That is, individuals might feel more adequate in managing many tasks or having to meet deadlines under pressure. Thus, they might be less likely to experience negative affect and to see the need to continue working using ICT after work hours.

Occupational self-efficacy is also positively associated with positive emotions, which can lessen the impact of job stressors on negative arousal (Tugade & Fredrickson, 2004).

Alternatively, employees with low levels of occupational self-efficacy may feel even more overwhelmed in face of overload demands (Brown et al., 2005; Ladebo & Awotunde, 2007). They may not perceive themselves having the abilities to take on such stressors successfully. As a result, they are more likely to perceive overload demands as a threatening situation, which further exacerbates the negative affect that they experience such that they may engaged in more work-related rumination and turn to their mobile devices at a higher rate during nonwork time.

Hypothesis 11: Occupational self-efficacy moderates the relationships between emotional demands and negative affect, such that the relationships are weaker when occupational self-efficacy is high.

Hypothesis 12: Occupational self-efficacy moderates the relationships between overload demands and work-related technology usage, such that the relationships are weaker when occupational self-efficacy is high.

METHOD

Participants and Procedures

Participants were recruited via Prolific, a web-based platform that offers access to participants who produce high quality data (Peer et al., 2017). To participate in the study, participants must be located in the U.S., over the age of 18 years old, and have a good participation record on Prolific (i.e., 98% or higher approval rate). Participants also needed to be working full-time (i.e., being employed at a job outside of Prolific for more than 32 hours per week), maintain a fixed traditional work schedule, and have indicated that their employment status had not changed due to the COVID-19 pandemic.

The initial sample included 315 participants who enrolled in the study and filled out the initial survey. I removed some participants after the initial survey for the following reasons: 1) 38 participants failed at least one attention check questions in the initial survey (e.g., “Select ‘slightly agree’ for this question”), 2) 11 participants completed only parts of the initial survey, 3) 17 participants reported having day(s) off during the workweek that they were scheduled to participate in the ESM portion, and 4) four participants completed their initial survey in an unreasonably short amount of time (i.e., <20 s), which raised concerns about careless responding.

After the initial survey, 245 participants were invited to respond to two daily surveys for 5 consecutive workdays (i.e., Monday to Friday) the following week.

Specifically, the end-of-workday survey was emailed at 3pm and was available until 7pm. The evening survey was sent at 9pm, and participants were instructed to complete this survey before bedtime. All surveys were sent according to participants' local time zone (i.e., Eastern, Central, Mountain, and Pacific Time). On average, participants completed the end-of-workday survey at 4:06pm and the evening survey at 9:52pm.

Of the 245 participants invited to return, 48 participants did not respond to any daily surveys after their initial survey participation, and 34 participants partially completed a set of daily surveys (e.g., only responded to the end-of-workday surveys but not the evening surveys), resulting in a final sample of 163 participants who completed both surveys for at least three days. The response rate was 51.7% out of the 315 respondents to the initial surveys. Multiple independent t-tests revealed that the final sample was not significantly different from other participants in terms of their age ($t = 1.83$, n.s.), job tenure ($t = -.36$, n.s.), or weekly work hours ($t = -1.41$, n.s.). Chi-square tests also showed no differences between them regarding their sex ($\chi^2 = 4.94$, n.s.) and marital statuses ($\chi^2 = 4.50$, n.s.). The final sample provided 698 day-level responses out of 815 possible data points, resulting in a compliance rate of 85.6%.

In the final sample, 54% of the participants were male, and majority of them were single (53.4%). The mean age of the participants was 32.41 years old ($SD = 7.35$), and their mean organizational tenure was 4.16 years ($SD = 3.70$). Participants worked an average of 41.47 hours per week ($SD = 3.57$) and came from a variety of industries.

Measures

Between-person Measures

Work-home boundary segmentation preference. In the initial survey, work-home segmentation preference was measured using Kreiner's (2006) four-item scale. Higher scores indicated a stronger preference for segmentation, whereas lower scores indicated a stronger preference for integration. A sample item was "I prefer to keep work life at work." Responses were given on a seven-point scale ranging from 1 ("strongly disagree") to 7 ("strongly agree"). The Cronbach's alpha was .89.

Emotional Stability. Trait emotional stability was measured in the initial survey using the 10-item neuroticism scale from the International Personality Item Pool (IPIP; Goldberg et al., 2006). Participants were asked to indicate to extent to which each item characterizes them, using a five-point response scale from 1 ("very inaccurate") to 5 ("very accurate"). Eight of the ten items were reverse coded, such that higher scores indicated higher emotional stability. An example item was "I get upset easily", which was reverse scored. The Cronbach's alpha was .93.

Occupational Self-Efficacy. The six-item version of the Occupational Self-Efficacy Scale (Rigotti et al., 2008) was used in the initial survey to capture the extent to which participants felt confident in performing their occupational roles and organizational requirements. An example item was "Whatever comes my way in my job, I can usually handle it." Participants responded using a six-point scale ranging from 1 ("not at all true") to 6 ("completely true"). The Cronbach's alpha was .90.

Control Variable. Marital status was included as a between-person control variable, as it may influence recovery during nonwork time (Sonnentag et al., 2017).

Within-person Daily Measures

Emotional Demands. In the end-of-workday surveys, emotional job demands were assessed using the six-item scale developed by Bakker and colleagues (2003). A sample item was “Was your work today emotionally demanding?” Previous daily diary studies (e.g., Quinones & Griffiths, 2017) have used this measure to capture employees’ daily emotional demands at work. Participants responded on a five-point scale from 1 (“not at all”) to 5 (“a great deal”). The between-person Cronbach’s alpha was .96, while the within-person Cronbach’s alpha was .85.

Overload Demands. In the end-of-workday surveys, participants reported their overload demands at work using the eight-item scale developed by Janssen and colleagues (2001). The scale has been adapted and used in prior ESM studies (e.g., Ilies et al., 2007; Smith & Barber, 2015). Sample items included “Today, I had too much work to do” and “I worked under time pressure today.” Participants responded using a five-point scale from 1 (“strong disagree”) to 5 (“strongly agree”). The between-person Cronbach’s alpha was .96, while the within-person Cronbach’s alpha was .87.

Emotional and Instrumental Support. Employees’ perception of supervisory support was measured in the end-of-workday surveys. Emotional support from supervisor was measured using items adapted by Bacharach and colleagues (2010). An example item included “Today, my supervisor provided me with encouragement.” The between-person Cronbach’s alpha was .95, while the within-person Cronbach’s alpha was .71.

Instrumental support was assessed using adapted by Tucker and colleagues (2020), and an example item included “Today, I felt that I could rely on my supervisor to help me out with work problems.” The between-person Cronbach’s alpha was .96, while the within-person Cronbach’s alpha was .71.

Negative Affect. Daily negative affect was measured using the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) in the end-of-workday surveys. Following prior studies that examined affect in the recovery context (e.g., Haun et al., 2018; Sonnentag & Binnewies, 2013), six items (“distressed”, “upset”, “nervous”, “jittery”, “afraid”, and “irritable”) were used. Participants were asked to report the extent to which they have experienced each of the negative emotions listed at work using a five-point scale ranging from 1 (“not at all”) to 5 (“a great deal”). The between-person Cronbach’s alpha was .87, while the within-person Cronbach’s alpha was .79.

Work-related Technology Usage. In the evening surveys, participants reported their work-related technology usage *after work hours* using the scale developed by Park and colleagues (2011). Participants indicated the extent to which they have used an array of ICT (i.e., email, computers, cell phones, instant messaging) for work purposes during nonwork hours. A five-point frequency scale from 1 (“not at all”) to 5 (“very often”) was used. Because this scale is a formative measure, participants' total score was aggregated to indicate their work-related technology usage after work hours.

Recovery Experiences. Similar to previous studies with ESM design on recovery, items from Sonnentag and Fritz’s (2007) Recovery Experiences Questionnaire were adapted to capture participants’ daily recovery experiences after work hours in the

evening surveys. Each recovery experience was measured using four items, and each item began with “during the time after work today.” An example item for psychological detachment was “I did not think about work at all.” The between-person Cronbach’s alpha for psychological detachment was .93, while its within-person Cronbach’s alpha was .79. An example item for relaxation was “I used the time after work today to relax.” The between-person Cronbach’s alpha for relaxation was .98, while its within-person Cronbach’s alpha was .91. An example item for control experiences was “I decided my own schedule for the time after work today.” Participants responded using a 5-point scale from 1 (“I do not agree at all”) to 5 (“I fully agree”). The between-person Cronbach’s alpha for control experiences was .96, while its within-person Cronbach’s alpha was .83.

Control Variable. Number of hours worked was included as a within-person control variable, as I expect that it would exhibit a negative relationship with recovery experiences (e.g., Harma, 2006). Number of daily work hours was measured with one item asking participants to indicate how many hours they worked that day.

Analytic Approach

Because the data had a nested structure (i.e., daily responses within individuals), multilevel path analysis using Mplus 8.6 (Muthén & Muthén, 1998-2016) was conducted to test the hypotheses. Results of null models showed that the intraclass correlation coefficients (ICC[1]) ranged from 0.41 - 0.82 (see Table 1), indicating that between-person fluctuations explained a significant amount of the variance in the variables. Thus, the multilevel-modeling approach was appropriate for the hypothesis testing.

Table 1*Variance Decomposition for Within-Person Level Variables*

Variable	Within-person variance (σ^2)	Between-person variance (τ_{00})	ICC(1)
Emotional Demands	0.51	0.69	0.58
Overload Demands	0.52	0.47	0.47
Emotional Support	0.34	0.65	0.65
Instrumental Support	0.35	1.60	0.82
Negative Affect	0.20	0.21	0.51
Work-Related Technology Usage	6.47	8.06	0.55
Psychological Detachment	0.52	0.49	0.49
Relaxation	0.68	0.68	0.50
Control Experiences	0.47	0.33	0.41

Multilevel confirmatory factor analysis (MCFA) using maximum likelihood estimation with robust standard errors (MLR) was done to determine if the Level 1 and Level 2 constructs exhibited appropriate fit. Work-related technology usage, which is a formative construct, and single-item control variables were excluded. All items were loaded onto their corresponding latent constructs, but the MCFA model did not converge. Given that the sample size ratio was not sufficient to create estimates at Level 2 (i.e., 1:5; Bentler & Chou, 1987), this result was not surprising. Thus, an item parceling technique was used to estimate the MCFA model. Specifically, three parcels were generated for each construct, such that the item with the highest factor loading was assigned to the first parcel, the second highest to the second parcel, and so forth (Landis et al., 2000; Matsunaga, 2008). Results showed that the eleven-factor MCFA model fit the data well ($\chi^2 [248] = 695.28, p < .001$, comparative fit index [CFI] = .954, Tucker Lewis Index

[TLI] = .943 root mean square error of approximation [RMSEA] = .047, standard root mean square residual [SRMR] = .045 at the within-person level and .042 at the between-person level), suggesting that the measures captured the respective constructs as intended.

For the analyses, Level-1 exogenous variables were all group-mean centered to ensure within-person relationships in the model were not confounded by individual differences, and Level-2 moderators (i.e., work-home boundary segmentation preference, emotional stability, and occupational self-efficacy) were grand-mean centered (Hofmann et al., 2000; Ilies et al., 2007). To test Hypotheses 1 and 3, I regressed each recovery experience on both emotional and overload demands in the direct effects model. Hypotheses regarding mediation were tested in the mediation model, and the remaining hypotheses were examined in the moderated mediation model (Preacher et al., 2007). I specified random effects of emotional demands on negative affect, overload demands on negative affect, and overload demands on work-related technology usage at the within-person level. I also accounted for the direct fixed effect of emotional and overload demands on the recovery experiences (i.e., psychological detachment, relaxation, and control experiences). For the within-person level moderation effects, I created an interaction term (i.e., the multiplication of the centered variables) for emotional demands and emotional support, as well as overload demands \times instrumental support. I then specified their fixed effects on negative affect and work-related technology usage respectively. Last, I specified the Level-2 moderators on the slopes of emotional demands and negative affect, overload demands and negative affect, and overload demands and work-related technology usage. To examine the mediation hypotheses, I used a Monte

Carlo approach with 20,000 simulated bias-corrected parameter estimates to create the 95% confidence intervals (CIs) around the observed values for the indirect effect (Preacher et al., 2010; Selig & Preacher, 2008). Following guidelines recommended by Becker and colleagues (2016), I ran analyses with and without the control variable and retained the control variable only if it has a substantive effect on the results.

RESULTS

Means, standard deviations, and within- and between correlations are in Table 2. Unstandardized coefficient estimates for the direct effects model, the mediation model, and the moderated mediation model are presented in Tables 3, 4 and 5 respectively.

As expected, the within-person bivariate correlations between emotional demands and psychological detachment ($r = -.28, p < 0.01$), relaxation ($r = -.19, p < 0.01$), as well as control experiences were significant ($r = -.17, p < 0.01$). However, in the main effects model, emotional demands were not significantly related to recovery experiences (psychological detachment: $\gamma = 0.06$, n.s.; relaxation: $\gamma = -0.09$, n.s.; control experiences: $\gamma = -0.07$, n.s.). Therefore, Hypotheses 1a through 1c were partially supported. For Hypothesis 2a, the indirect effect of emotional demands on psychological detachment via negative affect was -0.062 (95% CI = $[-0.11, -0.026]$). Since the CI did not include zero, Hypothesis 2a was supported. Since the indirect effects of emotional demands on relaxation (95% CI = $[-0.045, 0.028]$) and on control experiences (95% CI = $[-0.047, 0.0018]$) via negative affect were not significant, hypotheses 2b and 2c were not supported.

In line with my expectations, the bivariate correlations between overload demands and psychological detachment ($r = -.38, p < 0.01$), relaxation ($r = -.20, p < 0.01$), as well as control experiences ($r = -.24, p < 0.01$) were significant at the within-person level. In

the main effects model, overload demands were also significantly linked to psychological detachment ($\gamma = -0.12, p < .05$), which is in support of Hypothesis 2a. Yet, they were not significantly related to relaxation ($\gamma = -0.06, n.s.$) and control experiences ($\gamma = -0.05, n.s.$) in the main effects model. Thus, Hypotheses 3b and 3c were partially supported. As overload demands were not related to work-related technology usage in the mediation model, the indirect effects of overload demands on recovery experiences via work-related technology usage and via negative affect were also not significant. Therefore, Hypotheses 4a through 4c were not supported. For Hypothesis 5a, the indirect effect of overload demands on psychological detachment via negative affect was -0.045 (95% CI = $[-0.089, -0.008]$). Since the CI did not include zero, Hypothesis 5a was supported. However, the indirect effects of overload demands on relaxation and on control experiences via negative affect were not significant. Thus, Hypotheses 5b and 5c were not supported.

Hypothesis 6 predicted that work-home boundary segmentation preference would moderate the relationships between overload demands and work-related technology usage. As seen in Table 3, the interaction effect was not significant ($\gamma = 0.10, n.s.$). Thus, Hypothesis 6 was not supported.

After controlling for the main effect of emotional support on negative affect ($\gamma = -0.08, n.s.$), the emotional demands \times emotional support interaction on negative affect was not significant ($\gamma = 0.02, n.s.$). The overload demands \times instrumental support interaction on work-related technology usage was not significant ($\gamma = -0.45, n.s.$) after accounting for the main effect ($\gamma = -0.20, n.s.$). Therefore, Hypotheses 7 and 8 were not supported.

The interaction effects between emotional stability and emotional demands ($\gamma = -0.04$, n.s.), as well as between emotional stability and overload demands ($\gamma = -0.07$, n.s.), on negative affect were not significant. Therefore, Hypotheses 9 and 10 were not supported. The interaction effect between occupational self-efficacy and emotional demands on negative affect was not significant ($\gamma = -0.006$, n.s.). My results also suggested that occupational self-efficacy did not moderate the relationship between overload and work-related technology usage ($\gamma = -0.03$, n.s.). Thus, Hypotheses 11 and 12 were not supported.

Table 2*Means, Standard Deviations, and Correlations Among Study Variables.*

	M	Within- person SD	Between- person SD	1	2	3	4	5	6	7
Level 1										
1. Emotional demands	2.15	1.08	0.88	—	.47**	-.15**	-.16**	.49**	0.05	-.28**
2. Overload demands	2.38	0.99	0.76	.53**	—	-.11**	-.13**	.40**	.09*	-.38**
3. Emotional support	3.70	0.99	0.85	-.21**	-0.2	—	.88**	-.21**	0.02	0.02
4. Instrumental Support	3.56	1.05	0.91	-.21**	-.15*	.94**	—	-.19**	0.01	0.03
5. Negative Affect	1.51	0.59	0.44	.49**	.38**	-.25**	-.22**	—	0.05	-.31**
6. Work-related Technology Usage	7.16	3.80	3.09	0.1	0.1	0.0	0.0	0.0	—	-.41**
7. Psychological Detachment	3.90	1.01	0.79	-.38**	-.52**	0.0	0.1	-.35**	-.43**	—
8. Relaxation	4.04	0.99	0.67	-.28**	-.31**	0.1	0.1	-.23**	-.24**	.59**
9. Control Experiences	4.16	0.84	0.59	-.23**	-.40**	0.1	0.1	-.22**	-.21**	.59**
Level 2										
10. Work-home Boundary Segmentation Preference	6.23		0.92	0.1	-0.1	-.16*	-0.1	0.0	-.29**	.36**
11. Emotional Stability	3.36		0.92	-.27**	-0.1	.32**	.28**	-.48**	0.0	.18*
12. OSE	4.85		0.79	-0.1	-.18*	.24**	.20**	-.30**	0.1	0.1

(cont.)

Table 2 (continued)

	8	9	10	11
Level 1				
1. Emotional demands	-.19**	-.17**		
2. Overload demands	-.20**	-.24**		
3. Emotional support	0.07	0.07		
4. Instrumental Support	0.06	0.07		
5. Negative Affect	-.16**	-.17**		
6. Work-related Technology Usage	-.22**	-.23**		
7. Psychological Detachment	.51**	.53**		
8. Relaxation	—	.71**		
9. Control Experiences	.78**	—		
Level 2				
10. Work-home Boundary Segmentation Preference	.25**	.25**	—	
11. Emotional Stability	0.1	0.1	-.18*	—
12. OSE	0.2	0.1	-0.1	.43**

Note. Correlations above the diagonal represent within-person correlations (N = 756 - 698). Correlations between the diagonal represent between-person correlations (N = 163). Level 1 variables were aggregated to estimate between-person correlations.

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

Table 3*Unstandardized Coefficients of the Direct Effects Model*

Variable	<u>Psychological Detachment</u>		<u>Relaxation</u>		<u>Control Experiences.</u>	
	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.
Intercept	3.92**	.06	4.06**	.05	4.17	.05
Emotional demands	-.06	.05	-.09	.06	-.07	.05
Overload demands	-.12*	.04	-.06	.06	-.05	.05

Note. N at the within-person level = 756 – 698. N at the between-person level = 163. Same patterns were found with control variables included in the model. Including control variables did not have substantive effect on the results, thus the model without control variables are reported per recommendations of Becker and colleagues (2016).

* $p < .05$.

Table 4*Unstandardized Coefficients of the Mediation Model*

Variable	<u>Negative Affect</u>		<u>Work-related Technology Usage</u>		<u>Psychological Detachment</u>		<u>Relaxation</u>		<u>Control Experiences.</u>	
	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.
Intercept	1.50**	.03	7.12**	.24	3.92**	.06	4.06**	.05	4.17	.03
Level 1										
Emotional demands (A)	.22**	.02			-.04	.04	-.06	.06	-.02	.05
Overload demands (B)	.16**	.03	.20	.19	-.06	.05	-.04	.06	-.03	.05
Negative Affect					-.29**	.08	-.04	.09	-.11	.07
Work-related technology Usage					-.11**	.02	-.09**	.02	-.08**	.02

Note. N at the within-person level = 756 – 698. N at the between-person level = 163. Including control variables did not have substantive effect on the results, thus the model without control variables are reported per recommendations of Becker and colleagues (2016).

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

Table 5*Unstandardized Coefficients of the Moderated Mediation Model*

Variable	<u>Negative Affect</u>		<u>Work-related Technology Usage</u>		<u>Psychological Detachment</u>		<u>Relaxation</u>		<u>Control Experiences.</u>	
	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.
Intercept	1.50**	.03	7.08**	.23	3.96**	.06	4.09**	.06	4.20	.06
Level 1										
Emotional demands (A)	.21**	.05			-.03	.04	-.07	.07	-.03	.05
Overload demands (B)	.15	.18	.16	.20	-.06	.05	-.05	.06	-.03	.05
Emotional support (C)	-.08	.25								
Instrumental Support (D)			-.20	.24						
Negative Affect					-.29**	.08	-.04	.09	-.10	.07
Work-related technology Usage					-.11**	.02	-.10**	.03	-.08**	.02
A × C	.02	.06								
B × D			-.45	.34						
Level 2										
Work-home Boundary Seg. Pref. (E)			-.83**	.35						
Emotional Stability (F)	-.21**	.04								
OSE (G)	-.06	.06								
Cross-level moderation										
A × F	-.04	.17								
A × G	-.006	.46								
B × E			.10	.24						
B × F	-.07	.10								

Variable	<u>Negative Affect</u>	<u>Work-related Technology Usage</u>	<u>Psychological Detachment</u>	<u>Relaxation</u>	<u>Control Experiences.</u>
B × G		-.03	.17		

Note. N at the within-person level = 756 – 698. N at the between-person level = 163. OSE = Occupational Self-Efficacy. Same patterns were found with control variables included in the model. Including control variables did not have substantive effect on the results, thus the model without control variables are reported per recommendations of Becker and colleagues (2016).

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

DISCUSSION

The two goals of the current study were to (1) empirically examine the mediating mechanisms in the recovery paradox and (2) identify if and how work-home boundary segmentation preference, job resources, and personal resources might buffer the effects of job demands. However, my dissertation data only provided partial support for the recovery paradox—although the within- and between-person bivariate correlations between job demands and recovery experiences were significant as expected, with the exception of overload demands and psychological detachment, I did not find significant main effects of job demands predicting a decrease in recovery experiences.

The data also suggests that negative affect mediates the relationship between job demands and psychological detachment, which is in line with the stressor-detachment model (Sonnentag & Fritz, 2015). There was no empirical support on the mediating role of negative affect for relaxation and control experiences. Although work-related technology usage was negatively associated with all three recovery experiences, I did not find evidence in support of its proposed mediating role in the recovery paradox model.

Lastly, although I hypothesized that certain resources might buffer the effect of job demands, I did not find evidence of the hypothesized moderating effect of instrumental and emotional support, work-home boundary segmentation preference, emotional stability, or occupational self-efficacy in the recovery paradox.

In this section, I first propose a number of reasons that might explain the lack of significant main effects of job demands on recovery at the within-person level observed in the current study. I then discuss the implications on the mediating mechanisms of the recovery paradox. Lastly, I suggest an alternative moderator that might buffer the effects of job demands in the recovery paradox context.

The Recovery Paradox at the Within-Person Level

My study findings only partially supported the general premise of job demands undermining recovery experiences, as described in the recovery paradox, at the within-person level. Despite the nonsignificant main effects, the within- and between-person correlations in the current study were significant, which are in line with results from the most recent meta-analysis on recovery. Specifically, the within- and between-person meta-analytic correlations between overload demands and recovery experiences (i.e., psychological detachment, relaxation, and control experiences) were significant (Steed et al., 2021). The within- and between-person meta-analytic correlations between emotional demands and psychological detachment were significant as well. Although there were no within-person studies on the effects of emotional demands on relaxation and control, the between-person meta-analytic correlations were significant (Steed et al., 2021). However, it is important to note that within-person studies on the relations between job demands and recovery experiences is quite limited, so the results should be interpreted with caution.

There may be a number of reasons why I did not find evidence of significant within-person main effects of job demands on recovery experiences, in my study: (1) the

potential issue of multicollinearity, (2) the possibility of nonlinear relationships between job demands and recovery experiences at the within-person level, (3) smaller effects of job demands on recovery at the within-person level than the between-person level, and (4) additional confounding variables that might have concealed the main effects.

First, one explanation for the non-significant main effects of job demands on recovery despite the significant bivariate correlations might be due to multicollinearity. Although multilevel CFA results showed satisfactory fit, indicating that all constructs in the model were distinct from one another, overload and emotional demands shared a significant correlation of .53 at the within-person level. Since the correlation effect size was large, it might have created computational and interpretation issues for the direct effects model (Nimon & Oswald, 2013). Another ESM study (Haun et al., 2018) which included multiple types of job demands as predictors to detachment also had similar results. In that study, the authors measured daily quantitative and emotional demands, and found that neither variable predicted detachment after work, despite the significant within- and between-person correlations between job demands and detachment (Haun et al., 2018). To further probe the possibility that multicollinearity is contributing to the non-significant main effects, I re-ran the direct effect models with one job demand at a time. With only one job demand in the model, all main effects became significant or marginally significant. To clarify questions related to multicollinearity, future daily diary/ESM studies examining how different types of job demands impair recovery might benefit from adopting job demands frameworks in which the job demand variables are less strongly correlated (e.g., the challenge-hindrance framework; LePine et al., 2005).

Second, the non-significant main effects could indicate that the relationships between job demands and recovery experiences at the within-person level may be nonlinear. A daily diary study over 10 workdays found both negative linear and quadratic effects of workload on detachment (Germeys & De Dieter, 2017). Specifically, for low and moderate levels of workload, changes in the negative effect on psychological detachment were consistent. As the level of workload increased from moderate to high, it resulted in an accelerating decline in the ability to detach from work. However, I did not find support for significant quadratic effects here. Compared to their study, my sample size is smaller and thus might lack the power needed for testing nonlinear effects. More studies, particularly with larger sample sizes, are needed to answer the question if the negative job demand-recovery experience relationships might be curvilinear, at least with regard to certain kinds of recovery experiences.

It is also possible that not all job demands undermine recovery experiences at the within-person level significantly. As a general framework, the recovery paradox (Sonnentag, 2018) does not specify (1) if the strength of the job demand-recovery experiences relationships varies by levels and (2) if different types of job demands impair recovery experiences in the same way. Although both the within- and between-person meta-analytic correlations between job demands (i.e., overload and emotional demands) and recovery experiences (i.e., psychological detachment, relaxation, and control experiences) were significant, the within-person correlations were somewhat smaller than those at the between-person level in most cases (Steed et al., 2021), making it more difficult to detect significant effects in daily diary/ESM studies.

It may also be the case that not all job demands undermine recovery experiences at the within-person level significantly. Here, the main effects of emotional demands on all three recovery experiences were not significant. Similar non-significant results between emotional demands and detachment were found in another ESM study (Haun et al., 2018). Yet, daily diary/ESM studies using other emotional demands operationalizations did find significant results. For instance, an ESM study which sampled frontline service workers found that day-specific customer mistreatment predicted a decrease in after-work detachment (Yang et al., 2020). Daily incivility within the workplace was also negatively linked to psychological detachment but not relaxation (Nicholson & Griffin, 2015). In another diary study, daily threat emotions associated with work decreased psychological detachment and relaxation after work, whereas challenge emotions boosted mastery experiences (Michel et al., 2016). These results seem to suggest that a more generalized operationalization of emotional job demands might not have a significant effect on recovery. Due to the lack of specifications in the recovery paradox framework, more studies employing daily diary/ESM design are needed in order to fine-tune the recovery paradox propositions at the within-person level and understand if different conceptualizations of job demands all impair recovery experiences.

The last potential explanation of the non-significant main effects could be due to confounding variables that were not controlled for. As suggested by Steed and colleagues (2021) in their meta-analysis, the low percentage of variance accounted for by statistical artifacts revealed the potential of moderators in the relationships between job demands and recovery experiences. For example, it is possible that the strength of the within-

person relationships between job demands and recovery varies by job types. Although both job demands were expected to be relevant for the general employee population, the hypothesis of overload demands undermining recovery may be less (or not) relevant for frontline service and blue-collar workers. Because data collection occurred during the pandemic, negative social interactions at work (i.e., examples of emotional demands) may be experienced differently for employees at different jobs (e.g., healthcare vs. knowledge work) because of pandemic-related restrictions, such as in-person social distancing or teleworking. Not accounting for job types may have confounded the results.

The non-significant results might also be partly due to participants' different commitments outside of their full-time job. Although we have controlled for participants' marital status and day-level work hours, other variables such as involvement in a second job might also shape how job demands (from their primary job) influence after-work recovery. In the diary study by Taylor and colleagues (2020), they found that working students experience both detachment from work while at school and detachment from school while at work due to their multiple roles. Although their study focused on how the two types of detachment differentially impacted well-being, they did speculate stressors in school and work domains may also influence how much detachment working students were able to experience. Since participants in the current study were recruited via Prolific, the amount of time they spent on this second job may have influenced if and how demands from their primary job impair their recovery.

Childcare responsibilities after work may have also confounded the results. Employees might have been busy with caring for their children, which left little time for

other activities (such as using ICT for work purposes) and fewer opportunities to have recovery experiences. As the relationship between childcare activities and recovery experiences is assumed to be highly person-dependent (Ginoux et al., 2021), it might be beneficial to control for childcare responsibilities in the analysis. Unfortunately, I did not collect information on the number of children participants have or the amount of time spent on childcare and other household activities after work. This further suggests that accounting for commitments outside of work may be critical in better understanding the recovery paradox in future research studies.

Mediating Mechanisms of the Recovery Paradox

One objective of the current study was to respond to Sonnentag's call (2018) and compare different mediating processes that may explain how job demands impair recovery. Although I found evidence on the indirect effect of emotional demands and psychological detachment via end-of-workday negative affect, the same mechanism did not extend to relaxation and control experience. This highlights how the same mediating mechanism may not apply to all recovery experiences, even though the recovery experiences are highly correlated (Bennett et al., 2018). Although the four recovery experiences evaluate distinct aspects of the recovery process (Steed et al., 2021), authors (including myself) tend to expect the same relationships to apply to them in similar ways. The current study seems to suggest that relaxation and control experiences (compared to detachment) are less impacted by negative affect resulted from emotional demands. It is important for future studies to examine multiple recovery experiences such that we can

develop a more nuanced understanding, both conceptually and empirically, on if and how the recovery paradox applies to different types of recovery experiences.

Although I did not find significant indirect effects between overload and recovery experiences, work-related technology usage was negatively related to psychological detachment, relaxation, and control experiences. Again, since the recovery paradox framework does not specify if job demands undermine recovery in the same fashion, it also means that the same mediating mechanism may not to all job demands. In this case, it is plausible that work-related technology usage is a relevant mediating mechanism in the recovery paradox, but not for overload demands as hypothesized. Instead, certain dimensions of ICT demands may be of greater relevance.

ICT demand refer to a multidimensional construct that captures the various domains of technology-related work demands that result in strain (Cho et al., 2020; Day et al., 2012). Specifically, extended availability and monitoring are two dimensions that may be relevant in the context of recovery. The increased availability afforded by ICT forms additional expectations for employees to be constantly accessible outside of work hours, which is different from actual workload during the workday. That is, employees can have a slow work day (i.e., low level of overload demands) but still feel the need to stay accessible via ICT at home. The expectation of extended availability further blurs the lines between work and nonwork (Day et al., 2012), which may create pressure for employees. Indeed, the extended availability demands have been linked to increased work-family conflict in previous diary studies (Cho et al., 2020; Kao et al., 2020). Further, when organization use ICT as a way to monitor job performance (e.g., tracking

email response time and number of active online hours), employees may perceive this practice negatively and experience additional stress (Day et al., 2019), which may lead to pressure to stay available and respond quickly to work communication even at home in order to keep up. Thus, instead of overload demands, work-related technology usage may serve as the mediating mechanism in explaining how ICT demands undermine recovery.

Moderators of the Recovery Paradox

I hypothesized that job resources, specifically emotional and instrumental support from supervisors, would buffer against the effects of job demands in the recovery paradox. Yet, these hypotheses were not supported. In the broader work-nonwork literature, there is an increased emphasis on the role of specific types of support for employees' nonwork experiences. While I have differentiated emotional and instrumental support, it is possible that supervisory support specific to recovery may be more important. It is possible for supervisors to care about employee well-being (i.e., emotional support) and to give advice when needed (i.e., instrumental support), yet the same supervisors can still hold expectations for workers to continue to work after formal work hours. Indeed, two studies have examined how supervisor support for recovery shapes workers' recovery experiences (Bennett et al., 2016; Zhu, 2021). This serves as an important area for future research to investigate whether those with more supervisor support for recovery might be less susceptible to the recovery paradox.

Study Limitations

As with any study, several limitations in the current study need to be acknowledged. First, as mentioned previously, participants in this study came from a

variety of industries. Although this is not uncommon in studies on employee recovery (e.g., Barber & Santuzzi, 2015; Clauss et al., 2020; Zhou et al., 2020), it may have confounded the results observed in the current study. Future research should restrict inclusion criteria to specify industries or job types to account for the different types of work environment and job tasks, as they can potentially influence employees' recovery experiences after work. This can help clarify if the recovery paradox generalizes to the general employee population.

Second, some of the focal variables exhibited considerable skewness. In particular, negative affect had a skewness of 2.05 at the within-person level and 1.50 at the between-person level. Work-related technology usage after work hours also had a skewness of 1.23 at the within-person level and 1.50 at the between-person level. To determine if this is something unique to the current sample, I have surveyed literature that have studied the same constructs with similar operationalizations (e.g., Gerpott et al., 2022; Ilies et al., 2007; Smith & Barber, 2015). I found that the means and standard deviations in the current study are comparable to those from other studies, some of which have also utilized online participant samples. However, published studies tend not to report indicators of skewness, so it is unclear if other studies also faced similar problems regarding skewness. However, it is important to note that Prolific is commonly used in other organizational research and has shown to produce high-quality data that is comparable to other web-based recruitment platforms (Peer et al., 2017). Regardless, it will be valuable to replicate the current study with employees recruited from one organization or via other platforms with more specific inclusion criteria.

Lastly, the current study adopted a quantitative approach to capture the within-person process of how job demands undermine recovery experiences while accounting for between-person differences. However, it would have been valuable to include additional measures and/or qualitative data to better understand employees' commitments during nonwork time (e.g., participation in a second job, childcare responsibilities). This may help control for between-person differences in non-work domains and contextualize their daily recovery experiences, resulting in a more nuanced understanding of the recovery paradox. Another direction would be to incorporate the person-centric approach to understand the paradox. For instance, Chawla and colleagues (2020) found that on days when employees experience higher role ambiguity, they are more likely to exhibit a recovery experience profile that stays connected to work (i.e., lack of psychological detachment). Because membership in recovery experience profile is dynamic and varies from day to day, studying how combinations of different job demands and resources can influence profile membership may be particularly insightful to understand in what conditions the recovery paradox might break down.

Conclusion

Study findings from my dissertation seem to suggest that while the basic premise described in the recovery paradox framework may still hold true at the within-person level, more fine-tuning is needed to further clarify whether and how different types of job demands all undermine recovery experiences in the same way at the within-person level. I thus hope that my dissertation encourages future daily diary/ESM studies to further

investigate different combinations of job demands, mediating mechanisms, and recovery experiences to gain more insight into how the recovery paradox unfolds.

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BIOGRAPHY

Carol Wong received her Bachelor of Science from University of California, San Diego in 2014. She received her Master of Arts in Industrial-Organizational Psychology from George Mason University in 2019.