QUALITY ASSESSMENT OF WORK RECOVERY ACTIVITIES: GUIDANCE FOR RECOVERING FROM WORK-RELATED DEMANDS

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A Thesis Submitted to the Faculty of the University of
Tennessee at Chattanooga in Partial
Fulfillment of the Requirements of the Degree
of Master of Science: Psychology

The University of Tennessee at Chattanooga
Chattanooga, Tennessee

May 2020

ABSTRACT

This study tested a revised work recovery process model and provides guidance for work recovery activities based on their recovery quality value. A diverse sample of 540 MTurk workers served as the participants for this in-depth, mixed method approach to evaluating workers' recovery activities (preferred and actual) as well as recovery needs. Using a modified model of the stress-recovery process, recovery quality was measured in terms of psychological detachment, mastery, and control, with relaxation serving as an outcome state associated with the proposed three core recovery mechanisms. A variety of analyses were used to support the idea that active recovery in peaceful, natural environments are more recovery-enhancing and to support the revised model. Results show how resources can effectively be replenished even when work-related demands are high (leading to better well-being and need for recovery outcomes). A comprehensive table of specific activities is provided as actionable guidance for optimal recovery.

DEDICATION

This thesis is dedicated to my family and boyfriend, Nate, for the unwavering support they have provided me throughout this project and graduate school. The long hikes and care packages helped to keep my stress levels manageable as I tackled this project and I am forever thankful for each of you.

This work is also dedicated to my past cross country and track coaches who have taught me to work hard, never give up, and push through undesirable circumstances. I attribute many of my life successes to these coaches who instilled a hard-working mindset in me and who have helped me achieve goals I did not know were possible. Along with this, I dedicate this work to those who share a passion for nature, running, and active activities in general with me. It is exciting to see statistical support for something I am so avid about and personally experience on a daily basis. I hope this research encourages people to live a more active lifestyle; I promise the positive effects go much further than a significant *p*-value.

ACKNOWLEDGEMENTS

I would first like to express my gratitude toward my thesis chair, Dr. Chris Cunningham, for his enthusiasm on this project and for always making it a priority amidst many other projects and deadlines. Thank you for offering your expertise and for pushing me to incorporate as much as possible to make the end product something to be proud of. I feel fortunate to say that I truly enjoyed working on this research in large part because of the guidance I was given to keep me motivated and curious. I would also like to thank Drs. Kristen Black and Brian O'Leary for supporting this research and offering their input to make this project the best it could be.

I would like to thank Dr. Joanne Romagni (Vice Chancellor for Research at UTC) and my GA supervisor, Dr. Lisa Piazza (Director of the Office for Undergraduate Research and Creative Endeavor at UTC), for financially supporting this project through a university grant. Additionally, I am appreciative of the research assistants in the Healthy and Optimal Work (H.O.W.) lab (Camille Wheatley, Ellie Risinger, Hayden Curtis, and Braden Sanford) who helped code the large amount of qualitative data that was gathered for this study.

Special thanks to my friends in the UTC I-O program for helping me practice what I study by forcing me out of my research zone at times to engage in some much-needed recovery activities. Finally, I want to thank those who contribute to recovery research and help to improve work and nonwork experiences. I hope organizations realize the powerful impact and implement suggestions from this field of research to improve the health and well-being of their workforce.

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LIST OF ABBREVIATIONS

CSES, Core Self-Evaluations Scale

NFRR, Need for Resource Recovery

PANAS-X, Positive and Negative Affect Schedule

PIA, Perceived Income Adequacy

PNWD, Perceived Nonwork Demands

PW, Psychological Well-Being

PWD, Perceived Work Demands

QWI, Quantitative Workload Inventory

REQ, Recovery Experiences Questionnaire

RR, Recovery Remorse

SR, State Relaxation

UTC, University of Tennessee at Chattanooga

WD, Work-Related Demands

LIST OF SYMBOLS

α, Cronbach's alpha

β, Standardized Beta

b, Unstandardized Beta

BootLLCI, Lower limit confidence interval from bootstrapping

BootMean coefficient, Coefficient from bootstrapping

BootULCI, Upper limit confidence interval from bootstrapping

df, Degrees of freedom

F, the ANOVA test statistic

M, Mean

Max, Maximum

Mdn, Median

Min, Minimum

MSE, Mean squared error

N, Total number of cases (i.e., overall sample size)

p, probability value

R, Correlation coefficient

r, Estimate of Pearson product-moment correlation coefficient

R^2 or R-sq, Proportion of variance accounted for

SD, Standard deviation

LIST OF SYMBOLS

se, Standard error

t, Ratio of departure of the estimated value to its standard error

CHAPTER I

INTRODUCTION

Work-related demands are the most common and chronic stressor to which workers are exposed. The stress reaction to common work-related stressors can lead to chronic and cumulative strains for workers. This stressor-strain process poses significant health risks, given that full-time workers are engaged in job duties for at least 34% of a standard day in America (8.06 hours; Bureau of Labor Statistics, 2018) and sometimes longer in other countries. Chronically high levels of work-related demands (e.g., work pressure, frequent new tasks, toxic work environment) not only negatively impact worker well-being; they can also reduce job performance, and increase worker intentions to leave an organization (Bakker, Demerouti, Oerlemans, & Sonnentag, 2013; Moloney, Boxall, Parsons, & Cheung, 2018; Sonnentag & Fritz, 2015).

Work-related demands can differ by industry or occupation but are generally managed by workers through application of prolonged physical and psychological efforts over the course of a work period. Consistent with Conservation of Resources theory (Hobfoll, 1989), job demands are met through the expenditure or depletion of available psychological, social, and energy-related personal resources (e.g., optimism, support, cognitive/physical energy). Such resources are leveraged by workers to successfully navigate psychologically, socially, physically, and emotionally challenging situations at work and in one's broader nonwork life.

Resources expended to meet work-related demands must be regularly replenished or recovered for workers to be able to respond effectively to future demands. The presence of lingering recovery needs when resources are not replenished can negatively affect work-related behaviors and worker well-being (Sonnentag, 2001; Sonnentag & Fritz, 2015). A typical full-time worker in America generally has fewer than five hours of somewhat flexible time outside of work on a typical workday between coming home from work and going to sleep (Bureau of Labor Statistics, 2018). During this available time, it is also important to recognize that demands outside of the workplace can hinder recovery processes and also contribute to job disengagement, poor general well-being, and decreased job performance (Fritz & Sonnentag, 2005).

The present study was designed to examine the activities and mechanisms through which workers tend to replenish or recover spent personal resources. These recovery activities are evaluated in terms of several qualities that have been theorized and shown to link with resource replenishment (i.e., extent to which the activity is associated with experiences of mastery, detachment, control, and relaxation). The data gathered for the present study begins to address the question of how workers can be optimally engaged in activities that replenish needed resources. Ensuring that individuals are adequately recovering from each work day will help them to thrive while on the job, which in turn, can help to promote better psychological well-being and enhance experiences in nonwork roles (Byron, 2005; Edwards & Rothbard, 2000). In other words, improving workers' abilities to identify and practice effective recovery can support and facilitate more optimal management of multiple life roles.

In the following sections of this introduction, theoretical foundations are described to serve as a framework for understanding work- and nonwork-related demands and resources

along with how recovery plays a role in the cyclical process. A conceptual model is then proposed to integrate the existing literature along with the hypotheses that this study was designed to test.

Theoretical and Conceptual Foundations

The overarching concept within this study is the idea that work-related demands are imposed on workers, workers expend resources to respond to these demands, resources are lost as a result, and these resources need to be replenished through various recovery processes. Multiple established theoretical perspectives help to explain this cycle, as detailed in the following subsections.

Conservation of Resources Theory

According to the Conservation of Resources theory (COR; Hobfoll, 1989), job demands are met through workers' expenditure or depletion of available psychological, social, and energy-related personal resources (e.g., optimism, support, cognitive/physical energy). This theory asserts that individuals want to retain, protect, and build psychological, social, and material resources. Resources can be understood in terms of their existence along at least two dimensions: their source and whether they are temporary or long-lasting (Hobfoll, 2002; Ten Brummelhuis & Bakker, 2012). The first dimension distinguishes between resources that emanate from, or are linked to, a context or the person. According to Ten Brummelhuis and Bakker (2012), *contextual resources* are those that are found outside of the self and are dependent on external factors as opposed to solely on the individual (e.g., social support, marriage, a home). *Personal resources* are determined only by the individual person (e.g., personal traits, cognitive energy, physical

energy). Contextual and personal resources are often used in conjunction for maximum benefits. This supports the notion of resource caravans, stating that resources are developed together and having resources makes it easier to gain further resources (Hobfoll, 2011). For example, contextual resources of supervisor support and supervisor feedback can be utilized to improve work ethic (i.e., a personal resource). This personal resource can aid an individual to receive promotions and advancement within their organization. As a result, other contextual resources can be gained from the increased salary (e.g., a better home, more stable family).

The second dimension for understanding resources involves considering the time frame in which the resources exist (Ten Brummelhuis & Bakker, 2012). *Volatile resources* are those that are used once (e.g., time and physical energy). Once time passes or physical energy is used, they cannot be brought back. Volatile resources also include temporal psychological states such as mood and attention. *Structural resources*, in contrast, are resources that are more stable and can be used more than once. Examples of structural resources include a house and a social network. Structural resources can be thought of as a reserved set of resources that can almost always be utilized when faced with stressful circumstances. Regardless of form, resources help people achieve work goals, reduce work-related demands, and stimulate personal growth, learning, and development (Bakker & Demerouti, 2007). Existing resources (e.g., objects, personal characteristics, conditions, and energies) are valued by an individual or serve as a means for attainment of something valued in the future (Hobfoll, 1989).

It is worth nothing that COR theory suggests that stress is not experienced in response to specific situations or experiences themselves, but rather by the actual or threatened loss of valuable resources (e.g., loss of money, status, or flexibility) when responding to a stressor. For example, when employees feel pressure at work, they may feel stressed due to lost flexibility

over their work and the risk that they will lose their social status as good employees if the work is not completed in a timely manner. A related and important component to COR theory is that those who have more resources are better able to respond adaptively and effectively to stimuli and challenges of life (Hahn, Binnewies, Sonnentag, & Mojza, 2011; Hobfoll, 1989). However, it is also important to note the opposite side of this, where lost resources lead to higher likelihood of losing more resources through the vicious resource loss cycle. For example, if recovery of resources does not happen, an individual can experience poor attention at work, which can lead to reduced effectiveness or performance at work as well as other negative work outcomes.

Effort-Recovery Model

Extending from COR theory, the Effort-Recovery model (ERM; Meijman & Mulder, 1998) describes how workers respond to work-related demands by using their personal resource supply, resulting in negative effects over time as further resources are depleted with few rest periods. The ERM focuses on four major factors associated with job-related demands that often deplete an individual's supply of resources through a downward cycle including work assignments, conditions, environment and facilities, and social relations (Meijman & Mulder, 1998). Recovery (e.g., rest periods, leisure time) must exist after effort is expended to replenish the depleted resources. The quality of a person's recovery from these demands is indicative of the extent to which spent resources are successfully replenished and the resource-loss cycle has ended (Hahn et al., 2011; Hobfoll, 1989).

Job Demands-Resource Model

The ERM and COR theory serve as foundational elements to the more recent and work-specific Job Demands-Resource model (JD-R) model, which positions stress as a phenomenon that develops when job demands outstrip available job resources (Bakker & Demerouti, 2007). According to the JD-R model, the presence of job resources can buffer the negative effects of job demands. Job resources such as high-quality relationships with supervisors can put the high demands of work overload in a different perspective, thus minimizing the strain experienced through appreciation and support. While COR theory perhaps most directly explains the downward "loss spiral" associated with resource depletion, the JD-R model illustrates how the presence of sufficient resources at work can result in increased motivation and work engagement, even when demands are high. The presence and absence of job resources and demands, and their ongoing relationship with one another, help to explain workers' physical and psychological realities at work. Recovery is a direct outcome in this framework showing that the resources used to meet job demands must be replenished.

Stressor-Detachment Model

In addition to accumulating resources at work to respond to job-related demands, psychological and physical detachment is also beneficial when responding to work-related demands as described through the Stressor-Detachment (S-D) model. Job stressors often lead to strain reactions as workers encounter negative psychological and physical situations at work. Stressors can be grouped into overarching categories such as physical stressors, task-related stressors, role stressors, social stressors, career-related stressors, traumatic events, and stressful change processes (Sonnentag & Fritz, 2015; Sonnentag, Kuttler, & Fritz, 2010). According to the

S-D model proposed by Sonnentag, Kuttler, and Fritz (2010), workers experience a variety of strain reactions including physiological (e.g., increased heart rate), psychological (e.g., increase in negative affect), and behavioral (e.g., arguments with co-workers) after responding to job stressors. It is important to note that these strain reactions can persist even after the stressor has been removed. Strain reactions can become chronic and have serious negative effects on physical and psychological health while simultaneously impeding on one's life outside of work. However, physical and psychological detachment from work can serve as a mechanism by which the negative impact of job stressors is reduced (Sonnentag & Fritz, 2015).

Work-Family Conflict Model

Further theoretical explanation of how resource drain and strain reactions from job stressors can impact one's life outside of work comes from the Work-Family Conflict (WF-C) model proposed by Greenhaus and Beutell (1985). The model asserts that an individual's experiences in one role (e.g., work) can directly influence their experiences in other roles (e.g., family or other nonwork roles). This *spillover* effect between work and nonwork roles can be either beneficial or harmful to one's well-being, life satisfaction, and resource recovery potential. Work-family conflict exists when an abundance of time, strain, and specific behaviors required by one role (e.g., being a parent) makes it difficult to devote time to another role (e.g., being an employee; Greenhaus & Beutell, 1985). Multiple roles may compete for an individual's time and expectations of behavior can be different for each role. The expectations may be incompatible with one another, making it difficult to adjust to these various expectations on a daily basis. This model helps to explain why recovery is not always possible outside of work, as when nonwork

demands require additional resource expenditure before any sort of resource replenishment can begin.

Recovery

The process by which expended or depleted resources are replenished is known as *resource recovery*. When focused on the recovery of work-related resources, this process is often referred to as *work recovery* and is focused on workers replenishing the resources they need to be ready to respond to the next set of work demands and maintain their general well-being (Bakker et al., 2013; Sonnentag & Fritz, 2015). The ERM asserts that work recovery is possible only when the effortful functional systems used during work are no longer being activated (Meijman & Mulder, 1998). More recent work suggests that this is not necessarily the case as Cranley, Cunningham, and Panda (2015) found early career physicians viewed some work-related activities to be resource replenishing (e.g., patient care, teaching, rounds). Additionally, Garrick et al. (2018) found that work-related activities during off-work time were associated with higher engagement levels, which ultimately fostered recovery through increased sleep quality. While a few studies show some positive recovery effects for engaging in work-related activities during off work time, the bulk of research in this area adheres to the ERM perspective.

Extensive theorizing and research into the recovery process has yielded a model that characterizes how individuals unwind and recuperate from work during leisure time through four general types of recovery experiences: psychological detachment, mastery, control, and relaxation (Sonnentag & Fritz, 2007).

Psychological detachment refers to the ability to mentally switch off and distance oneself from work-related demands (Sonnentag, Binnewies, & Mojza, 2010; Sonnentag & Fritz, 2015).

High work-related demands result in emotional exhaustion, psychosomatic complaints, and low work engagement, but psychological detachment can buffer the negative effects of high work-related demands (Sonnentag, Binnewies, et al., 2010). This is evident through the S-D model described above, which suggests that psychological detachment can be both a mediator and moderator in the stressor-strain process at work. In terms of mediation, job stressors can impair psychological detachment, resulting in high strain and poor individual well-being. However, psychological detachment can also serve as a moderator, reducing the negative impact of job stressors on well-being. Sonnentag and Fritz (2007) found that lack of psychological detachment most strongly impaired well-being out of the four recovery experiences, suggesting this may be the most crucial mechanism for recovery.

When psychological and physical detachment from work during off-job time is present, it helps to protect employee well-being and work engagement while simultaneously boosting one's mood (Sonnentag, 2003; Sonnentag & Bayer, 2005; Sonnentag, Binnewies, et al., 2010). When individuals feel as though they have successfully recovered from a day at work, they are often more engaged in their work the following day, allowing them to take initiative in their work, be proactive, and pursue their learning goals (Sonnentag, 2003). On the other hand, when psychological detachment is not present, burnout and lower life satisfaction are likely to occur (Sonnentag & Fritz, 2015).

Individuals with higher work-related demands need psychological detachment the most, but often experience it the least. This paradox was highlighted by Sonnentag and Bayer (2005) through their finding that as workload increased, psychological detachment in the evening decreased. This is likely due to fatigue after a long work period, then impairing a person's ability to self-regulate and "shut off" one's job-related thoughts (Sonnentag, Kuttler, et al., 2010) and/or

actively engage in some form of recovery. Thus, individuals who need optimal recovery the most are the ones who are likely to engage in suboptimal recovery due to the depleted self-regulatory capacity following work (Sonnentag & Jelden, 2009). Detachment refers not only to psychologically shutting off job-related thoughts, but also physically ending work as well. This includes disengagement from job-related duties in off-work time (e.g., not receiving work-related phone calls or emails; Sonnentag & Fritz, 2007).

Mastery experiences are conditions and experiences that enable an individual to handle various situations in the future. These experiences are a second important component to recovery, in large part because of their contribution to detachment through engaging in challenging opportunities. Mastery experiences distract individuals from job-related thoughts and feelings, because they require focusing on and overcoming challenging learning opportunities that are separate from one's primary work activities (Sonnentag & Fritz, 2007). Such experiences allow for new skills and abilities to develop, and this helps to build new personal resources for future use (Hobfoll & Lilly, 1993; Sonnentag & Fritz, 2007).

Mastery experiences are also helpful in building self-efficacy, or the belief in one's abilities to accomplish goals (Bandura, 1994, 1997). Self-efficacy can even be increased by remembering a time an individual was successful at mastering something in the past (Bandura, 1997; Hahn et al., 2011). Repeated successes (i.e., mastery experiences) build self-efficacy and are often associated with setting higher goals and demonstrating stronger commitment to those goals (Bandura, 1994). Examples of mastery experiences include taking a language class, climbing a mountain, learning a new hobby, and playing sports (Fritz & Sonnentag, 2006; Sonnentag & Fritz, 2007). It is important to note, that mastery (as with detachment) can only be experienced through the investment of effort, time, and often other resources. In other words,

these dimensions of recovery are obtainable only through additional resource drain, yet they are shown to generate positive returns. Mastery, in particular, has emerged as a key self-management resource, given its strong association with the use and flow of other resources (Hobfoll & Lilly, 1993). Thus, mastery is a key resource within the drain and gain (i.e., stress and recovery) cycle.

Control is the ability to choose between one or more options and this ability or quality of an experience has shown to be important to psychological functioning and a strong predictor of physical and mental well-being when present (Langer & Rodin, 1976; Skinner, 1996; Sonnentag & Fritz, 2007). Control over specific leisure activities, in particular, facilitates successful recovery due to increased feelings of self-efficacy and competence (Sonnentag & Fritz, 2007). Individual differences come into play when choosing activities to pursue, thus the quality of recovery gained from them is also likely to differ among individuals. Engaging in an activity one prefers allows the individual to have a sense of control and has shown to lead to resource replenishment (Dhar & Gorlin, 2013; Hunter & Wu, 2016). Control during off-work time is suggested to serve as an external (i.e., contextual) resource. However, when lack of control is evident, negative implications can result such as psychological distress, negative self-evaluations, anxiety, and depression, thus depleting one's amount of resources (Rosenfeld, 1989; Sonnentag & Fritz, 2007).

It is important to note that, in the present study, the data were collected on activities the individual actually pursues during a typical week or weekend day that are not work-related activities. For some, these may be the activities they prefer to engage in (i.e., likely associated with higher control). However, other individuals might not have control over the activities they actually engage in. For example, they may prefer to engage in physical activities but are unable to do so because of other demands experienced during off-work time (e.g., taking care of kids or

an elderly family member). In the present study, the discrepancy between preferred and actual recovery activities was identified and studied as a predictor of experienced recovery quality.

Relaxation is generally seen as a process that is experienced with chosen, or preferred, leisure activities; an implication is that some degree of control needs to be present for relaxation to occur (Sonnentag & Fritz, 2007). During relaxation, few social demands are placed on an individual, no challenge is present, and little physical or intellectual effort is exerted (Tinsley & Eldredge, 1995). It is important to note here that relaxation differs from psychological detachment, mastery, and control because of the fact that few demands or challenges are present when relaxation occurs. The other three recovery experiences (psychological detachment, mastery, and control) all require some degree of resource investment to experience these dimensions. Resources such as time or energy need to be invested to fully experience psychological detachment, mastery, and control, but relaxation does not typically require the investment of resources.

Relaxation is linked to positive affect and has shown to reverse the effects of negative emotions (Fredrickson, Mancuso, Branigan, & Tugade, 2000). This suggests that when an individual experiences negative affect from work stress, relaxation can serve as a means to reach a positive affective state and reverse the impact of negative emotions. Relaxation is clearly important to address in the work recovery process because of its potential to return an individual to their pre-stress state while simultaneously reducing the likelihood for illness or negative health implications to occur (Brosschot, Pieper, & Thayer, 2005).

Active versus Passive Recovery

Recovery experiences can be either active or passive in nature. Although contradictory and limited, research has shown that both active and passive activities can be beneficial towards recovery and recovery outcomes (Oerlemans, Bakker, & Demerouti, 2014; Rook & Zijlstra, 2006; Sonnentag, 2001; van Hooff, Geurts, Beckers, & Kompier, 2011). Active recovery generally refers to any activity that increases an individual's physiological arousal such as exercise or housework. Increasing physiological arousal subsequently increases endorphins, which are linked to increased well-being, better health and mood, and lower stress levels (Keating, 2016; van Hooff et al., 2011). Physical and social activities have also been shown to have a positive effect on individual well-being and are associated with higher daily recovery levels (Oerlemans et al., 2014; Sonnentag, 2001) All of these outcomes are associated with the recovery process, supporting the notion that active recovery may be more beneficial.

Passive forms of recovery have also been linked to resource replenishment, but to a weaker degree. Passive recovery encompasses activities that require minimal effort and personal resource investment, such as watching TV, napping, or reading. These activities typically include a strong relaxation component, evident in decreased heart rate, relaxed muscles, and slower breathing (Keating, 2016; Sonnentag & Jelden, 2009). Sonnentag (2001) found that low effort recovery activities (along with physical and social activities) had a positive effect on individual well-being through a diary study. However, low effort activities have also been linked to increased levels of fatigue, possibly due to the inability of such activities to facilitate psychological disengagement from work demands (Rook & Zijlstra, 2006). From a neutral standpoint, less effortful activities (i.e., passive) have been shown to have no relation to post-break resources and no effect on recovery levels (Hunter & Wu, 2016; Oerlemans et al., 2014).

Although the research within this specific area is limited, there is a stronger pattern of findings supporting active recovery as more effective at resource replenishment than passive recovery. Paradoxically, active recovery (such as sport) is perceived as more recovery enhancing than low-effort activities, but are also more difficult to pursue after work-related challenges and constraints reduce one's self-regulatory resources (Sonnentag & Jelden, 2009). This is an important paradox to acknowledge, because active forms of recovery (e.g., physical activity and sport) require individuals to invest personal resources (e.g., time, energies) before resource replenishment is possible. It is easier for resource-depleted workers to engage in passive forms of recovery as they are typically associated with relaxation and more readily available.

Supporting the notion that active forms of activities may be best for resource replenishment, the present study was designed to test an alternate framework in which psychological detachment, mastery, and control are the three core recovery experience qualities or mechanisms that ultimately lead to relaxation as an outcome (i.e., state relaxation). One reason for this alternate model is that, as mentioned earlier, the three core recovery mechanisms all require some degree of resource investment, aligning these three mechanisms with more active than passive forms of recovery. Additionally, it is not likely that the three core mechanisms or qualities can be equivalently present with relaxation at the same time. For example, mastery is associated with a feeling of competence, which can be achieved through an activity such as lifting weights. This effort-intensive activity (i.e., form of active recovery) is not typically also viewed as relaxing, but rather is associated with a subsequent state of relaxation after the activity is accomplished through the three core mechanisms.

Furthermore, recent recovery research has explored the idea that recovery experiences may co-occur through a routine sequence. Bennett, Gabriel, Calderwood, Dahling, and

Trougakos (2016) give the example that an individual may go for a run, cook a new meal, and watch TV after work to experience psychological detachment, mastery, and relaxation, respectively. These types of recovery profiles are likely to be different for each individual, but this perspective on recovery demonstrates how the four main recovery elements (i.e., psychological detachment, mastery, control, and relaxation) may not happen all at once or together, but instead function more as some sort of sequence. As noted earlier, relaxation makes one logical outcome to a recovery sequence.

The Present Study

The present study builds on the preceding theoretical background and was designed to test an integrated and somewhat modified model of the stress-recovery process. The importance of the REQ by Sonnentag and Fritz (2007) is acknowledged as a highly respected framework and has been instrumental in expanding the way we think about recovery. In the present study, the goal was to explore ways to leverage this framework to greater effect, by critically evaluating the structure of the main components and reflecting on the logical rationale behind them. Specifically, being tested was the idea that relaxation is more of an outcome state rather than mechanism or component to the recovery process.

Additionally, the present study was designed to take a more holistic, inductive, and mixed-method approach to identifying and assessing the quality of specific recovery activities. While past research encourages active forms of recovery, limited concrete or actionable guidance is available as to which specific activities are most optimal at providing opportunities for the optimal recovery experiences (Keating, 2016; Oerlemans & Bakker, 2014; Sonnentag, 2001; Sonnentag, Venz, & Casper, 2017). Previous research along these lines has coded activities

within broad categories (e.g., work-related, house-hold and child care, low effort, social, and physical activities) and has limited participants to selecting choices from drop-down menus of pre-selected activity options within these broad categories (Ragsdale, Hoover, & Wood, 2016; Sonnentag, 2001; Sonnentag et al., 2017). This type of research has provided some initial information about general categories of recovery activities but has not provided insight regarding specific recovery activities (e.g., reading, listening to music, running, hiking) within these broader categories that people actually pursue or the extent to which these activities are more or less optimal for resource replenishment.

In testing a revised recovery model, the present study was designed to ultimately test the impact of work-related demands on the outcomes of need for resource recovery and psychological well-being through the process of recovery. The model specifically pays close attention to the recovery process and how the quality of recovery impacts the outcomes of need for resource recovery and psychological well-being through a sequential mediator of state relaxation. An additional moderator of perceived nonwork demands is also tested within this model. These data advance the knowledge base and the literature by providing empirical advice for fostering recovery, ultimately providing guidance as to what specific recovery activities lead to resource replenishment. The modified model is represented in Figure 1 below.

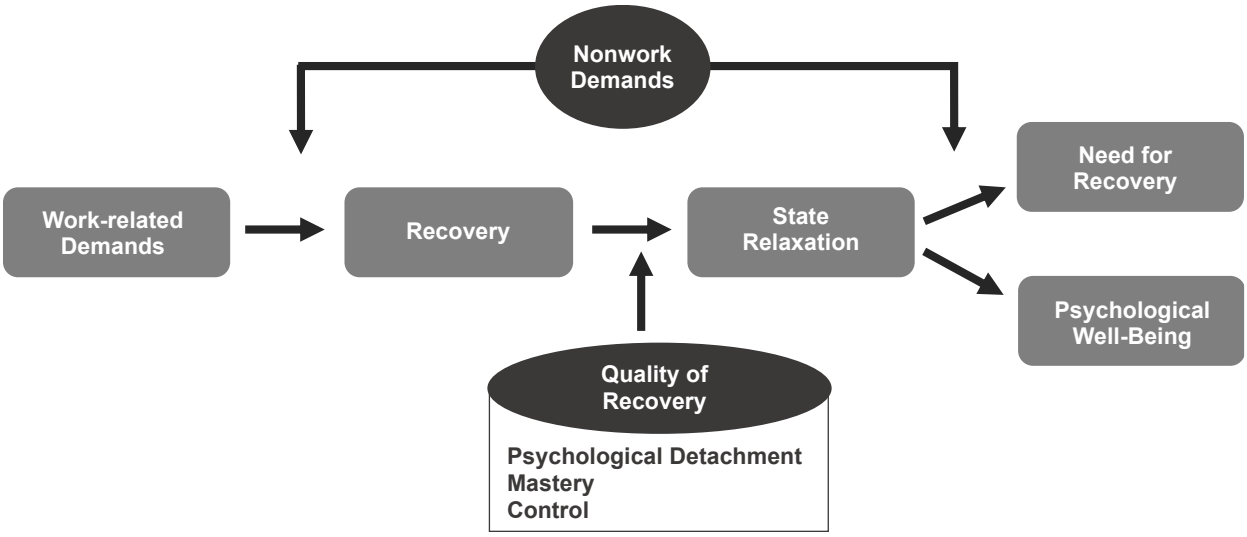

Figure 1 Conceptual model of predicted relationships between work-related demands and the outcomes of need for recovery and psychological well-being

As illustrated in Figure 1, this study was designed to test relationships that are generally supported by existing theory and research in this area, and to more fully examine two major areas of challenging the current recovery framework while testing its impact on the study outcomes to advance the literature as described above. The following subsections include support for each pathway and associated hypothesis represented in the model.

Work-Related Demands

Demands and resources are closely linked to one another and can impact psychological and physiological resource drain and gain processes employees experience at work. Work-related demands (e.g., work pressure, poor work environment, emotionally demanding interactions) require prolonged physical and psychological efforts when responding to physical, psychological, social, or organizational aspects of the job (Bakker & Demerouti, 2007). Work

assignments, conditions, environment and facilities, and social relations are factors identified as predictors of work-related demands within the ERM (Meijman & Mulder, 1998). *Work assignments* (e.g., creating an annual report) refer to any work activity tasked to an employee. The specifications of work activities are often vague or ambiguous, constituting a common stressor for workers to manage, thereby increasing the ultimately experienced demand associated with the original work assignment.

Work conditions, the second antecedent of job demands, are known as the agreements between the worker and employer regarding the work assignment. These take the form of expectations and behavior requirements associated with an assigned job (e.g., monetary compensation, production times, length of working days, and break schedules). These vary depending on the nature of the work assignment and can often be a source of stress if workers have unrealistic expectations or are not paid appropriately for the effort put forth. The third predictor of job demands, work *environment and facilities*, refer to the tools available to workers when attempting to meet job demands (e.g., how conducive the design of the workplace is, physical conditions of the work environment, presence of hazardous materials, and potential hostile work environments).

Finally, the fourth predictor of job demands, *social relations*, refer to the social interactions within the workplace that can either help or hinder job-related demands. When negative social interactions are present, higher levels of depersonalization and burnout are evident within workers (Defreese & Mihalik, 2016). Conversely, positive social interactions in the form of work-based social support (i.e., a resource) are associated with lower levels of burnout. Based on theory and research regarding job demands, the following direct relationships were hypothesized:

Hypothesis 1. Work-related demands are (a) positively associated with need for resource recovery, and (b) negatively associated with psychological well-being.

Hypothesis 2. Work-related demands are negatively associated with the average amount of (a) hours spent on recovery, (b) days per week engaged in the activity and (c) effort put forth during the activity.

Hypothesis 3. Work-related demands are negatively associated with quality of recovery as operationalized in terms of (a) psychological detachment, (b) mastery, and (c) control.

Nonwork Demands and Interrole Management

Resources span work-nonwork boundaries, and therefore can be depleted by both work and nonwork demands. In a related fashion, an individual's experiences in one role (e.g., work) can directly influence their experiences in other roles (e.g., family or other nonwork roles) as shown within the WF-C model (Greenhaus & Beutell, 1985). For example, a source of stress such as workplace ostracism (i.e., the perception that one is excluded by employees in their workplace; Ferris, Brown, Berry, & Lian, 2008) can lead workers to ultimately perceive lower levels of satisfaction in their family domains (Liu, Kwan, Lee, & Hui, 2013). Research along these lines suggests stressful events and demands at work follow the individual home and negatively impact perceptions of satisfaction for other nonwork roles.

Additional nonwork demands on weekends have also been shown to impair individual resource recovery processes (Fritz & Sonnentag, 2005). This is linked to lack of job disengagement and poor general well-being after the weekend, making it more difficult for workers to focus on work-related tasks in the following workweek, and thus resulting in

decreased job performance. An implication here is that when individuals devote too much time in one role, the other role suffers and negative effects for both the individual and their employing organization are evident.

Thankfully, the opposite is true as well. When individuals successfully recover from the stressors and demands experienced at work, they are better able to manage demands that are present in other nonwork roles (Demsky, Ellis, & Fritz, 2014; Fritz, Yankelevich, Zarubin, & Barger, 2010). This essentially refers to the idea that positive experiences in one role spill over into other roles for better management of multiple roles in which optimal work recovery can aid in achieving (i.e., interrole management). Given this existing theory and research, it was expected that:

Hypothesis 4. Nonwork demands moderate the relationship between work-related demands and recovery. Specifically, it was hypothesized:

H4a. The positive relationship between work-related demands and need for recovery (H1) is strengthened in the presence of high levels of nonwork demands.

H4b. The negative relationship between work-related demands and psychological well-being (H1) is exacerbated in the presence of high levels of nonwork demands.

An additional related research question (research question 1) related to this but not directly illustrated in the model was, “Do nonwork demands impact quality of recovery”?

Recovery Needs and Quality

When resources are drained and not replenished, employees develop a need for recovery. Need for recovery essentially refers to fatigue at work and is a major symptom of chronic job

stress, burnout, and adjustment disorders (van Veldhoven & Broersen, 2003). When need for recovery is high, negative outcomes such as production loss, sickness absence, and work disability may result (Geurts, Kompier, & Gründemann, 2000). Need for recovery is typically expected to be high during a person's last few hours at work and immediately after work (van Veldhoven & Broersen, 2003), however, a person's need for recovery can also accumulate and persist over time if a worker is chronically unable to replenish spent resources. Temporary feelings of overload, irritability, social withdrawal, lack of energy, and reduced performance are all major characteristics of need for recovery.

The constant presence of work- and nonwork-related demands means that workers need to regularly engage in recovery practices to recuperate and replenish resources, so that they can address these demands. Engaging in regular periods of recovery reduces workers' residual need for recovery (i.e., feelings of exhaustion, fatigue; Sonnentag & Fritz, 2007). The majority of literature around work recovery focuses on recovery that occurs during typical off-work times such as during vacations (Fritz & Sonnentag, 2006), evenings after a work day (Sonnentag, 2001), and weekends (Fritz & Sonnentag, 2005).

Some research has also focused on the idea that work recovery does not just have to happen outside of work. Microbreaks within the timeframe of a normal work day have shown to result in positive affective displays and increase performance within workers when taking time for relaxation, socialization, and cognitive activities while simultaneously reducing the likelihood of chronic resource drain (Cranley et al., 2015; Kim, Park, & Headrick, 2018; Trougakos, Beal, Green, & Weiss, 2008). Temporary breaks throughout the workday have been shown to replenish resources at work (Hunter & Wu, 2016), thus reducing the demands experienced during that work period. All forms of work breaks are a vital component to the

recovery process and aids in replenishing depleted resources from work-related demands (Trougakos & Hideg, 2009).

By engaging in activities that provide psychological detachment, mastery, control, and relaxation, individuals can replenish spent personal resources and sustain a strong sense of psychological well-being, competence, and self-worth; they experience a better mood, and become more engaged at work. Although the dominant model at present suggests that all four of these qualities are necessary components to recovery experiences themselves, this study tested whether the positive effects of recovery are primarily channeled through psychological detachment, mastery, and control experiences and that relaxation is actually better positioned among positive potential outcomes of recovery through the core recovery mechanisms.

The primary logic behind this adaptation of existing theory is that the three core recovery experience qualities or mechanisms require some degree of resource investment, which has shown to be associated with strong recovery. Relaxation itself does not require additional investment of resources, thus its passive nature is likely not a core component of the recovery process. As mentioned earlier in this introduction, the present study was in part designed to test whether relaxation is really an outcome of recovery instead of a fourth quality of the recovery experience. Figuring this out helps to address some of the contradictions that exist within literature regarding which types of recovery are more or less beneficial. Therefore, it was hypothesized that:

> *Hypothesis 5.* Quality of recovery moderates the relationship between work-related demands and recovery outcomes of need for resource recovery and psychological well-being, such that the relationships between work-related

demands and: (a) need for resource recovery and (b) psychological well-being are less negative when quality of recovery is high versus low.

Hypothesis 6. State relaxation further mediates the relationship between work-related demands and recovery outcomes, as a sequential mediator following recovery actions.

An additional related research question (research question 2), not directly illustrated in the conceptual model was, “Is there a difference in recovery quality experiences and outcomes for those who report having to engage in non-preferred vs. preferred recovery activities?”.

Active versus Passive Recovery

As stated earlier, some research suggests extra investment of resources aids in better resource replenishment as opposed to passive activities (Rook & Zijlstra, 2006; Sonnentag & Jelden, 2009). However, there are some contradictions in this area of research and uncertainties as to which activities are best for recovery. The following hypothesis is not directly illustrated in the conceptual model but, to begin teasing apart the contradictions found in literature, it was hypothesized that:

Hypothesis 7. Effort invested in recovery activities is positively associated with (a) quality of recovery, (b) state relaxation, and (c) psychological well-being, and negatively associated with (d) need for recovery.

Environmental Influence

Further investigation into specific types of recovery activities suggests that the environment in which recovery occurs can influence the effectiveness of recovery experiences.

Although recovery experiences will be different for each person, Kaplan (1995) suggests natural environments are particularly restorative based on their peaceful qualities (e.g., limited noise and crowds). Blue environments such as coasts, rivers, lakes, and the sea, along with green environments such as forests and hills have shown to be environments with the most recovery potential as opposed to urban environments (Barton & Pretty, 2010). This is likely because certain features of the environment can contribute to involuntary attention, or fascination, as described through Attention Restoration Theory (Berto, Baroni, Zainaghi, & Bettella, 2010; James, 1892, 1984; Kaplan, 1995). By engaging in involuntary attention, the resources required for voluntary, or directed, attention can be restored for later use.

Given these findings, a final research question (research question 3), not directly illustrated in the conceptual model but to be explored was, "Is the presence of nature during recovery activities associated with (a) the quality of recovery, (b) state relaxation, (c) need for recovery, and (d) psychological well-being"?

CHAPTER II

METHODOLOGY

Participants

Data were initially gathered from 671 participants, recruited through the Amazon Mechanical Turk (MTurk) crowdsourcing platform. MTurk has become an increasingly popular platform to recruit working adult participants through crowdsourcing where researchers (or "requesters") post "Human Intelligence Tasks" (HITs) for paid workers to complete (Buhrmester, Talaifar, & Gosling, 2018; Casler, Bickel, & Hackett, 2013). Research shows the quality of data from MTurk is just as adequate, and may even be more dependable than data gathered through traditional forms of recruitment such as social media postings and college student participant pools, while also providing a more demographically diverse sample (Buhrmester, Kwang, & Gosling, 2011; Casler et al., 2013).

Of the overall sample of respondents, 125 did not pass MTurk's completion requirements and were excluded from analyses due to incomplete surveys or failed attention checks (detailed later in this section). The remaining 546 participants had at least portions of valuable data to use for analyses, although an additional 6 of these participants were excluded from analyses during the data coding phase for providing nonsensical answers. All told, 464 participants fully passed MTurk's requirements for completion (i.e., provided a unique survey code at the beginning and end of the survey to be considered for payment), but another 6 of these were excluded from analyses for providing nonsensical answers upon closer examination. Demographic data

represents these 458 paid workers, but the final analyzable data set also included data from the partially completed surveys where participation and validation criteria were met (N = 540).

In regard to demographics, the sample consisted of 43% males, 56% females, and less than 1% who responded "other" (non-binary and preferred not to disclose). The age range of this sample was 20 to 74, with an average age of 41.06 (SD = 11.13). Most participants were white (81.0%), with the remaining identified as Black or African American (7.0%), Asian (6.8%), Multi-Race (2.6%), American Indian or Alaska Native (1.3%), and Other (1.3%). Most participants were not Hispanic or Latino (95.2%). Over half of the participants were married (56.2%) followed by single (27.4%), divorced (12.0%), widowed (0.9%), and other (3.5%). The average number of dependents (both children and adults) was 1.44 (SD = 1.52).

In terms of education level, 39.6% had a Bachelor's degree, Master's degree holders and those with some college but no degree each accounted for 17.1%, 11.6% had an Associate's degree, 6.8% had a high school diploma, 5.0% had some graduate school but no degree, 2.2% had a Doctoral degree, and less than 1% indicated they had some high school but no degree. The average hours worked per week was 42.95 (SD = 7.04). The industries worked in by respondents were widespread across 29 categories, but over half were accounted for by the following: Health Care and Social Assistance (11.2%), Finance and Insurance (8.3%), Information Services and Data (7.5%), Retail (7.2%), Arts, Education, and Recreation (6.8%), Other Manufacturing (5.7%), and Scientific or Technical Sciences (5.3%). Industry roles were also fairly widespread, but included Trained Professional (24.9%), Middle Management (18.8%), Administrative Staff (14.0%), Support Staff (12.5%), Junior Management (10.1%), Skilled Laborer (6.1%), Upper Management (5.5%), Self-employed/Partner (3.7%), Consultant (1.8%), Researcher (1.3%), Student (0.20%), and Other (1.1%).

Most participants (69%) reported working a standard 9:00 AM – 5:00 PM shift whereas 31% indicated they work nontraditional hours and/or nights. The average number of years the participants have worked at their current organization was 7.97 years (*SD* = 7.04). There was a fairly equal number of participants providing care for a child(s) or other family member(s) very frequently or frequently (49%) compared to occasionally or rarely (51%). On average, participants reported living with 1.83 other people (*SD* = 1.35). Over half of the participants lived in suburban (55.1%) areas, followed by urban (25.6%) and rural (19.3%) areas.

Procedure and Measures

The procedure for this study was approved by the university's Institutional Review Board (IRB) and the IRB approval letter can be found in Appendix A. Participants were recruited through MTurk and paid $1.00 to complete a brief, internet-based survey and self-reflection activity which took, on average, 24.08 (*SD* = 15.11) minutes to complete. Qualifications for participation in the HIT to receive compensation were: being 18 years of age or older, being located in the U.S., working full-time (i.e., at least 35 hours a week; Bureau of Labor Statistics, 2018), and having a HIT approval rate within the MTurk system of at least 95. It is important to note here that, although the filtering criteria within the MTurk system was set to restrict to U.S. locations, the system recorded 3% of the sample being from one of 11 countries outside of the U.S. As this was a small proportion of the data and as this study was not designed to examine cross-cultural differences in recovery quality and other study variables, data from these participants were still included as long as other core inclusion criteria were met. Within the 97% U.S. citizen participants, 46 of the 50 states were represented, with most respondents coming

from California (9%), Florida (6%), Texas (5%), New York (5%), Michigan (5%), Ohio (4%), or Georgia (4%).

Additional safeguards for data quality (over and above the safeguards that MTurk provides automatically) were implemented into the QuestionPro survey before publishing to protect the HIT from potential robots. Specifically, a Completely Automated Public Turing test to tell Computers and Humans Apart (CAPTCHA) was embedded near the beginning of the survey to assist with determining whether each respondent was a human (versus an automated responding system of some sort). Attention check question logic was also set up such that the survey would automatically terminate should any two of six attention check items scattered throughout the survey be triggered. Also, Anti-Ballot Box Stuffing was enabled within the survey system to prevent respondents from completing and submitting multiple surveys. To further ensure data quality, all MTurk worker ID's were manually validated to ensure surveys were not received from the same person twice. Finally, three qualitative items (in addition to the six attention check items) were required in the survey to detect nonsensical answers that could potentially be identified as computer versus human generated. After screening out all respondents who did not pass basic MTurk requirements and/or who provided nonsensical responses or tripped one or more attention check items in the survey, the final analyzable sample included 540 participants. 458 of these individuals were paid $1.00 for fully completing this HIT in the MTurk system (the other 82 dropped out of the survey before finishing so they were not eligible for payment per requirements through the MTurk system).

A brief overview of the survey measures is outlined as follows, with more details provided later this section. The bulk of the survey had participants respond to various questions about qualities, frequencies, time frames, and motives of their listed recovery activities. In the

rest of the survey, outcome variables were assessed (e.g., psychological well-being and need for resource recovery) along with various other measures including work and nonwork demands, personality variables, and demographics. These latter measures came after the listed activities portion, so as not to prime or otherwise influence the listing of activities. For example, if the psychological well-being scale was presented first and a participant realized their well-being is low, they could possibly list different activities or avoid the question altogether because of the potentially different mindset.

Careless Responses

Once participants opted to consider participating in this study in exchange for the $1.00 associated with this HIT and indicated their consent to continue, they were told at the beginning of the survey that there are attention check items embedded throughout the HIT. They were informed that successful completion of the survey would require them not to trip any of the attention check questions. They were also informed that if they provide nonsensical answers to any of the questions, they would not be paid for the HIT and their data would be discarded. The expectations for payment were clearly identified on both platforms (MTurk and QuestionPro) multiple times before the start of the survey to ensure participants were aware of the requirements and termination details.

Careless response patterns were monitored throughout the survey and participants were terminated if they responded incorrectly to any two of these six items interspersed throughout the survey. The attention-check questions were used to detect insufficient effort responding (IER), which refers to a respondent being unmotivated to understand the instructions, correctly interpret the items, and provide accurate responses (Huang, Bowling, Liu, & Li, 2015; Huang, Curran,

Keeney, Poposki, & DeShon, 2012). This was also used to screen out any potential robots who might be programmed to quickly speed through the survey selecting answers at random. The attention check items mimicked those discussed by Huang et al. (2015) through the infrequency approach using counterfactual statements, deviation from "common sense" and improbable events.

Five of the attention check items from Huang et al. (2015) were utilized for this study. The items were embedded among other scale items and were assessed on the same response scale that was used for the surrounding items. Examples of these items include, "I eat cement occasionally," "I work fourteen months in a year," and, "I can run 2 miles in 2 minutes". Dichotomization was used to assess if the items were tripped; *slightly disagree, somewhat disagree, strongly disagree, not at all accurate, and slightly inaccurate* were coded as attentive responding (i.e., non-IER) whereas agreement in any way through *slightly agree, somewhat agree, strongly agree, slightly accurate, and completely accurate* were coded as non-attentive (i.e., IER). Neutral responses reflected random error. An additional question, "I have paid no attention to this survey so far" was added to capture participants' self-report IER. This was also rated on the same scale as the surrounding items and higher scores suggested IER behavior.

After participants were informed of the careless response details and indicated their agreement with the consequences if IER behavior was displayed, the main data gathering activity/survey for this study began. The survey included the following components, presented to participants in the order of the subsections listed here. All measures, including instructions and response options are visible in the complete survey found in Appendix B.

Quality of Recovery Activities

Participants were introduced to the main part of the survey by reading an applicable definition of resources and an explanation of how some activities (e.g., work) drain their resource supply. Participants were then asked to identify the three restorative or resource replenishing activities, other than sleeping, in which they most frequently engage (e.g., running, reading, eating). They were asked to think broadly about activities they engage in at work and outside of work. Participants then provided additional information about the qualities of these activities.

The Recovery Experiences Questionnaire (REQ; Sonnentag & Fritz, 2007) was adapted to measure the extent to which participants' recovery activities provided the three core recovery experience elements (i.e., how well the person is able to psychologically detach from their work, feel a sense of mastery, and a sense of control when engaging in the activity). The relaxation dimension of the REQ was also assessed for each listed recovery activity. Participants were asked to respond to the adapted REQ items with respect to each of their typical recovery activities listed. The adaptation of the REQ for the present purposes is minimal and involved adjusting the focus of the items from recovery in general to each specific recovery activity. For example, one original REQ item is, "I don't think about work at all" and the adapted item is, "I don't think about work at all when I engage in this activity". For the original measure, observed internal consistency reliability statistics were high for each dimension: psychological detachment (.84), mastery (.79), control (.85), and relaxation (.85). Similar reliabilities were evident in the present study, even with the item adaptations, given the minimal impact of the adaptations. The reliabilities for the present study are as follows: psychological detachment (.86), mastery (.84),

control (.85), and relaxation (.83). Participants responded to all REQ items using a five-point Likert scale ranging from 1 (*disagree strongly*) to 5 (*agree strongly*).

Separate overall psychological detachment, mastery, control, and relaxation scores were computed using the average of these construct scores collapsed across all three activities. One overall recovery quality composite score was generated for each participant, which included the computed average score of each of the four REQ dimensions. Because quality of recovery was operationalized as including the three core recovery mechanisms (psychological detachment, mastery, and control), another REQ overall composite score was generated for each participant, this time including the averages from just these three dimensions. These composite scores were aggregated across individuals for the analyses to easily compare the main recovery scores (both with and without relaxation included) with hypothesized outcomes. The reliabilities of these overall REQ scales (along with all other scale reliabilities) can be found along the diagonal of the correlation matrix in Table 2.

State Relaxation

To test the idea that relaxation is actually an outcome component of a recovery experience as opposed to a quality or mechanism of the recovery experience itself, state relaxation was assessed using a modified approach and extension of the Smith Relaxation States Inventory (SRSI; Smith, 2001; Smith, 2007a, 2007b). The SRSI was constructed by asking thousands of people to describe words and experiences related to relaxation. Smith identified twelve types of relaxation states of which he categorized into four main groups: *Basic Relaxation*, *Core Mindfulness*, *Positive Energy*, and *Transcendence*.

Since its construction, the SRSI has developed into a series with numerous adaptations and revisions. The version that the present study most closely associates with is the Smith Relaxation States Inventory 3 (SRSI3) and utilizes the *Basic Relaxation* subscale. The SRSI3 asks participants to report how they feel right now with a subsequent statement of, "right now I feel…". Each item is rated on a five-point scale from 1 (*not at all*) to 5 (*maximum*). The *Basic Relaxation* subscale consists of five relaxation states: sleepiness, disengagement, physical relaxation, rested/refreshed, and mental relaxation. The items on the sleepiness, disengagement, and rested/refreshed dimensions were generally outside the realm of what was needed for the present study. For example, the rested/refreshed dimension item was, "I sense the deep mystery of things beyond my understanding". This was difficult to adapt to the context of a post-recovery activity and seemed to measure beyond what the focal point of the present study was intended to measure. Additionally, the disengagement items on the original scale would likely overlap with psychological detachment scores in the REQ.

To capture a brief and simple understanding of a participant's physical and mental state after engaging in their recovery activities, only the physical relaxation (three items) and mental relaxation (three items) state subscales were used along with two additional items asking participants how relaxed and refreshed (relaxed-refreshed) they feel after engaging in each activity. For the present study, Cronbach's alpha was .86 for the physical relaxation subscale and .91 for the mental relaxation subscales. These subscales along with the two additional items (i.e., rested-relaxed) were formed together to create the State Relaxation Scale in order to address the needs of this study. Cronbach's alpha for the rested-relaxed subscale was .83. With all three subscales together (physical and mental relaxation along with rested-refreshed), overall reliability for state relaxation in the present study was .94.

Higher scores on the State Relaxation Scale addresses a relaxation state experienced immediately after engaging in an activity. Because the original instructions were assessing a current state of relaxation, instructions were adapted to read, “please respond to the following statements, thinking about how you feel immediately after engaging in this activity”. This ensured the items were measuring how one feels immediately after engaging in the activity as opposed to how they felt in the moment when they took the survey. The response scale remained the same as was used in the SRSI3 (though the highest anchor “maximum” was replaced with “completely”). The State Relaxation Scale was given to participants after each listed activity to gain a better understanding of what specific activities and recovery experience qualities are associated with a state of relaxation.

Actual and Preferred Typical Recovery Activities

To better understand the listed activities, participants were asked to: (a) report the hours spent on each activity each week, (b) report the number of days per week they engage in each activity, (c) report the time(s) of day in which they engage in each activity, (d) report how much energy and effort they put into each activity, (e) indicate the extent to which the participant is in a natural environment versus a built environment when engaging in each activity, (f) indicate how peaceful the environment is when they engage in each activity, (g) respond to an open-ended prompt regarding why they engage in the activities they have identified, and (h) indicate the last time they engaged in the activity. All of these except the open-ended prompt and time of day were averaged for each person based on the three activities they list. Thus, each person was given multiple separate scores based on the average amount of hours spent on each activity each week, the average number of days per week they engage in the activity, etc.

Participants were also asked to respond to additional questions aimed at identifying preferred versus actual recovery activities. They were asked to indicate the extent to which they felt their choice of recovery activities was limited and were asked to identify the top three factors that limit their recovery activity choices (e.g., taking care of children or other barriers that hinder their activity choices). Participants were also asked if they prefer to engage in other recovery activities. If they indicated that they did wish to engage in other activities, they responded to an open-ended prompt discussing what the activities were and why they wished to engage in them. It is important to note here that participants were told they are not required to list additional activities if they already engage in the activities they prefer. This was to ensure a discrepancy was not forced between actual versus preferred activities.

Recovery Remorse

Participants were next asked to indicate the extent to which they feel remorse for engaging in their recovery activities. Recovery remorse was measured using the Relaxation Remorse scale, which essentially refers to feeling guilty for taking breaks and resting (Jennings, 2017). The items were adapted so that participants were rating the guilt they feel for engaging in the three activities they listed earlier in the survey. For example, an original item was, “Relaxing makes me feel guilty because there is always something else I could be doing for work” but was adapted to, “Engaging in these activities makes me feel guilty because there is always something else I could be doing for work”. The response scale remained the same on a Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). The scale is comprised of six items and, in its original form, has a Cronbach’s alpha of .94. Even with the adaptations, the reliability in the present study remained the same at .94. It is important to note here that recovery remorse was used

solely for exploratory analyses and helped to explain some of the hypothesis testing relationships as mentioned in the discussion section of this paper.

Psychological Well-being

Data were gathered on psychological well-being to determine if the quality of participants' typical recovery experiences was related to general psychological well-being. The Flourishing Scale was used to assess psychological well-being within eight items (Diener et al., 2010). This scale was selected because of its breadth and generalizability compared to other, more widely used measures (e.g., Grossi et al., 2006). The items on the Flourishing Scale measure the respondents' self-perceived success in important areas such as relationships, self-esteem, purpose, and optimism. Responses were made on a seven-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

The scale provides a single psychological well-being score; higher scores represented a person with many psychological resources and strengths (i.e., good relationships, high self-esteem, a sense of purpose, and high levels of optimism). The original Flourishing Scale had a previous Cronbach's alpha of .87 and also had high reliabilities and high convergence with similar psychological well-being scales (e.g., Satisfaction with Life Scale; Diener, Emmons, Larsen, & Griffin, 1985; Watson, Clark, & Tellegen, 1988) measuring competence, supportive relationships, autonomy, growth, mastery, relationships, self-esteem, and purpose and meaning. Cronbach's alpha for the present study was .93.

Work-Related Demands

To assess participants' more objective workload in terms of pace and volume, the Quantitative Workload Inventory was administered (QWI; Spector & Jex, 1998). The QWI is a five-item frequency scale to which participants indicate how frequently certain indications of quantitative workload occur in their work. Responses were made on the following scale: 1=*less than once per month or never* to 5=*several times per day*. Previous Cronbach's alpha for the QWI was .82, and for the current study it was .87. The five-item Perceived Work Demands Scale (PWD) was also used to assess participants' more subjective perception of work-related demands. Previous Cronbach's alpha for the PWD was .89, and reliability increased to .93 is this study. Responses to this measure were made on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores on both the QWI and PWD scales indicate higher work-related demands.

Because these work-related demands measures showed a high degree of intercorrelation (r = .69) and because it captured a broader objective and subjective perception of work-related demands, these two widely used scales were combined together. These scales were standardized to calculate one overall *z*-score to be used for all analyses. For exploratory independent samples *t*-test analysis purposes mentioned in the discussion section of this paper, these *z*-scores were also split into negative and positive *z*-scores to explore work-related demands in terms of low versus high categorical variables.

Perceived Nonwork Demands

Data was also gathered on perceptions associated with participant's perceived nonwork demands through the Perceived Family Demands Scales (PFD; Boyar, Carr, Mosley, & Carson,

2007). The PFD scale has a Cronbach's alpha of .77 and was originally intended to assess an individual's perceived family demand. For the present study, the items were adapted to assess broader nonwork demands by changing the context of "family" to "nonwork" within each item. For example, the original item, "my family requires all of my attention" was adapted to, "my nonwork roles require all of my attention". This was the most inclusive label given that the sampling was done on a broad age range with varying life stages. Broader life demands were expected to be present more so than family-specific demands. With the adaptations, Cronbach's alpha increased to .86 for this study. Responses on this measure were made on the same five-point Likert scale as the original scale used, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores indicate higher perceived nonwork demands.

Need for Resource Recovery

To address the paradox found in the literature stating that individuals who need to recover the most are less likely to engage in high quality work recovery, this study evaluated the worker's need for resource recovery. Need for resource recovery was measured using the Need for Resource Recovery Scale consisting of 12 items measuring lack of attention/cognitive resources and need for detachment (NFRR; Cunningham, 2008). Responses were on a five-point perceived accuracy scale ranging from 1 (*not at all accurate*) to 5 (*completely accurate*) and higher scores meant individuals had a higher need for resource recovery. Item number six (i.e., "Despite my work efforts so far today, I am thinking as clearly as I was when I started working today") was written in opposite form to the other items, so this variable did not conform to the others and decreased the overall reliability of the scale. Distributional properties were improved for the overall scale when excluding item six, so this item was removed from the overall NFRR

scale score. This reduced the NFRR scale to 11 items instead of the original 12. Internal consistency for the 12-item scale in previous studies have been adequate, ranging from .72-.90 (Johnson, 2019). For this study, Cronbach's alpha was .93 with item six excluded. The framing of the NFRR scale items asked participants how accurate each of the statements were at describing how they feel after a typical workday. This allowed easy relation of typical recovery activities with typical need for resource recovery.

Core Self-Evaluations

For exploratory and covariate analysis purposes on personality variables, core self-evaluations were assessed with the 12-item Core Self-Evaluations Scale (CSES; Judge, Erez, Bono, & Thoresen, 2003). This scale assesses four core traits: self-esteem, generalized self-efficacy, neuroticism, and locus of control. The CSES correlates significantly with job satisfaction, job performance, and life satisfaction, proving to offer relevant and valuable information for the present study. The twelve items are rated on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Previous Cronbach's alpha for the CSES is .92, and in the present study, it was .91.

Positive and Negative Affect

Positive and negative affect were assessed for exploratory and covariate analysis purposes with the 20-item Positive Affect and Negative Affect Scale (PANAS; Watson et al., 1988). This scale is comprised of 20 one-word items (10 for positive and 10 for negative) to assess an individual's mood pattern over the past few weeks. Positive affect is comprised of words like "determined" and "enthusiastic" whereas negative affect is comprised of words like

"ashamed" and "irritable". Items were rated on a five-point scale ranging from 1 (*very slightly or not at all*) to 5 (*very much*). Previous Cronbach's alpha ranged between .86 and .90 for positive affect and between .84 and .87 for negative affect. In the present study, Cronbach's alpha was .94 for positive affect and .92 for negative affect.

Perceived Income Adequacy

The Perceived Income Adequacy Scale (PIA; Cheung, 2014; Sears, 2008) was included solely for future exploratory analysis purposes and is only briefly mentioned in the discussion section of this paper. This scale consists of ten items regarding perceived ability to afford current and future needs as well as current and future wants. The scale was assessed from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores on this scale indicate that the individual perceives their income level is adequate to meet their wants and needs. Cronbach's alpha for this study was .93.

Demographic Information

Lastly, demographics and additional information were gathered for each participant including age, sex, ethnicity, race, education level, tenure with their current organization, number of hours worked on an average week, what industry they work in, their role in the industry, job title, shift work schedule, number of dependents, relationship status, frequency of providing care for a child or other family members, number of adults and children living in the household, and whether they live in an urban, suburban, or rural setting,

Attached to the end of the demographics section, a five-point scale ranging from 1 (*none at all*) to 5 (*a great deal*) was provided to assess the physical limitations a participant feels they

have that impact their ability to participate in physical activities. This information was used as a covariate in the analyses to control for ability to engage in certain types of recovery activities. It was important to be aware if someone had a physical limitation that would prevent or hinder them from engaging in some activities, so it did not skew the results or result in incorrect patterns among the activities. Lastly, on the same five-point scale, participants responded to a question asking if they have had a major life event within the last week and, if so, how much of an impact the event had on their typical work or nonwork routine by using the same response scale.

CHAPTER III

RESULTS

Analytical Strategy

The following analyses were conducted with quantitative data collected from the final analyzable data set (N = 540). Descriptive statistics were calculated using SPSS (v26; Table 1). Intercorrelations between all study variables are summarized in Table 2. The hypotheses were tested using correlation and regression-based techniques, and the PROCESS V3.4 syntax by Hayes and Little (2018) within the SPSS program. Regression-based analyses are summarized in Tables 3-5 and Table 14. The results of the PROCESS analyses are summarized in Tables 6-13 and Tables 16-18. Results were identified as statistically significant at $p < .05$ and/or when the 95% confidence interval (CI) around an estimate excluded 0.

Covariates included in all hypothesis testing analyses included age, sex, education, physical limitations, and perceived nonwork demands. Personality covariates (i.e., core self-evaluations, positive and negative affect) were also considered for all analyses, but these personality variables showed a moderate amount of collinearity in many of the regression-based models, which obscured the effects of the variables of interest. The magnitude and direction of the effects were generally in the same direction with and without these covariates but, for simplicity and to avoid reporting results on overlapping constructs, these personality variables were excluded from final analyses and results reported in this manuscript.

Table 1 Descriptive Statistics for All Study Variables

Variables	*N*	*M*	*Mdn*	*SD*	*Min*	*Max*
Age	457	41.06	39.00	11.13	20	74
Female	455	0.56	1.00	0.50	0	1
Education	457	4.77	5.00	1.55	1	8
Tenure	456	7.97	6.00	6.60	<1	35
Work hours	455	42.95	40.00	7.04	12	75
Number of dependents	457	1.44	1.00	1.52	0	12
Frequency of providing care	457	2.58	3.00	1.29	1	4
Household number	455	1.83	2.00	1.35	0	6
Physical limitation	457	1.85	2.00	0.97	1	5
Recovery Remorse (RR)	497	2.81	2.50	1.48	1	7
Quantitative workload (QWI)	466	3.37	3.40	1.03	1	5
Perceived work demands (PWD)	465	3.97	4.00	0.85	1	5
Work-related demands (WD; z-score)	466	0.00	0.04	0.92	-2.79	1.58
Perceived nonwork demands (PNWD)	465	3.16	3.25	0.95	1	5
Psychological well-being (PW)	483	5.65	5.88	1.00	1	7
Need for resource recovery (NFRR)	464	2.50	2.45	0.97	1	5
Core self-evaluations (CSES)	461	3.62	3.67	0.76	1.33	5
PANAS Negative	460	1.65	1.40	0.69	1.00	4.8
PANAS Positive	460	3.37	3.40	0.89	1	5
Quality of recovery (4 dimensions)	494	4.05	4.02	0.46	2.48	5
Quality of recovery (3 dimensions)	494	4.01	4.00	0.50	2.42	5
Psychological detachment (PD)	486	4.31	4.33	0.54	2.42	5
Mastery (M)	429	3.52	3.58	0.74	1	5
Control (C)	425	4.09	4.08	0.56	1.92	5
Relaxation (R)	466	4.17	4.17	0.54	2.25	5
State relaxation (SR)	455	3.28	3.33	0.77	1.04	5
Presence of nature	499	2.24	2.33	0.90	1	5
Peaceful environment	499	3.65	3.67	0.90	1.33	5
Last time engaged in activity	499	2.04	2.00	0.72	1.00	5.67
Average hours	487	8.56	7.33	5.91	1.00	47.33
Average days	490	4.78	4.83	1.50	1	7
Effort during activities	499	2.95	3.00	0.78	1	5
Feel limited in recovery activity choice	497	2.01	2.00	0.88	1	5

Note: Female (0=Male, 1=Female). Last time engaged in activity (1=today, 7=longer than 2 months).

Table 2 Correlation Matrix for All Study Variables

	1.		2.		3.		4.		5.		6.		7.	
1. Age														
2. Female	.09													
3. Education	-.10	*	-.05											
4. Tenure	.44	**	.00		-.09									
5. Work hours	-.06		-.11	*	.00		.07							
6. Number of dependents	-.02		-.10	*	.07		.09		-.01					
7. Frequency of providing care	.08		.04		.01		-.09		.06		-.52	**		
8. Household number	-.11	*	-.11	*	-.02		.05		-.02		.66	**	-.52	**
9. Physical limitation	-.01		.03		-.05		-.07		-.12	**	.01		-.06	
10. RR	-.11	*	.06		.08		-.04		.14	**	.08		-.12	**
11. QWI	-.05		.05		.01		-.03		.31	**	-.01		-.10	*
12. PWD	.04		.08		.03		.05		.31	**	.05		-.09	*
13. WRD	-.01		.07		.03		.01		.34	**	.03		-.10	*
14. PNWD	-.11	*	.00		.05		-.05		-.02		.14	**	-.23	**
15. PW	.13	**	.04		-.06		.14	**	.08		.098*	*	-.07	
16. NFRR	-.14	**	.01		.18	**	-.15	**	.17	**	-.12	**	.04	
17. CSES	.14	**	-.06		-.12	*	.23	**	.07		.08		-.08	
18. PANAS Negative	-.22	**	.12	**	.09		-.20	**	-.11	*	-.07		-.01	
19. PANAS Positive	.17	**	-.03		-.16	**	.18	**	.08		.08		-.06	
20. Quality of recovery (4 dimensions)	-.02		.08		-.06		.01		.00		-.06		.01	
21. Quality of recovery (3 dimensions)	-.03		.04		-.03		-.01		.00		-.05		.03	
22. PD	-.02		.03		-.07		.01		-.03		-.03		.00	
23. M	-.07		-.04		.07		-.04		.01		-.02		-.01	
24. C	-.01		.12	*	-.05		-.03		-.01		-.09		.04	
25. R	.02		.17	**	-.11	*	.05		.00		-.06		-.03	
26. SR	-.03		.02		-.11	*	.00		-.01		-.03		-.02	
27. Presence of nature	.09	*	-.01		-.09		.12	*	.09		.00		.00	
28. Peaceful environment	.00		.02		-.12	*	.03		-.02		-.04		.00	
29. Last time engaged in activity	-.01		-.10	*	.06		.06		.03		-.05		.04	
30.. Average hours	-.03		.09		-.01		-.12	*	-.09		-.06		.02	
31. Average days	.07		.10	*	-.05		.00		-.10	*	-.03		.03	
32. Effort during activities	.03		.03		.04		.06		-.04		-.06		.01	
33. Feel limited in recovery choice	-.10	*	-.06		.05		-.09	*	.00		.07		-.16	**

Note: * Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

Table 2, cont'd

	8.		9.		10.		11.		12.		13.		14.	
8. Household number														
9. Physical limitation	.03													
10. RR	.10	*	.10	*	*.94*									
11. QWI	.01		.13	**	.13	**	*.87*							
12. PWD	.03		.03		.08		.69	**	*.93*					
13. WRD	.02		.09		.11	*	.92	**	.92	**				
14. PNWD	.11	*	.09		.23	**	.12	**	.11	*	.13	**	*.86*	
15. PW	.06		-.23	**	-.22	**	.07		.28	**	.19	**	.05	
16. NFRR	-.11	*	.19	**	.36	**	.35	**	.25	**	.33	**	.16	**
17. CSES	.08		-.29	**	-.27	**	-.07		.12	**	.03		-.08	
18. PANAS Negative	-.04		.23	**	.30	**	.08		-.09		-.01		.10	*
19. PANAS Positive	.08		-.15	**	-.13	**	.10	*	.22	**	.17	**	.03	
20. Quality of recovery (4 dimensions)	-.05		-.03		-.22	**	.14	**	.20	**	.19	**	.01	
21. Quality of recovery (3 dimensions)	-.05		-.03		-.22	**	.11	*	.18	**	.16	**	.01	
22. PD	-.02		-.03		-.28	**	.04		.12	**	.09		-.02	
23. M	-.06		.04		-.04		.13	**	.09		.12	*	.08	
24. C	-.09		-.12	*	-.23	**	.10	*	.19	**	.16	**	-.04	
25. R	-.01		-.02		-.15	**	.16	**	.21	**	.20	**	.03	
26. SR	-.04		-.06		-.13	**	.17	**	.17	**	.18	**	-.01	
27. Presence of nature	-.04		-.06		.02		.00		.00		.00		-.04	
28. Peaceful environment	-.02		-.11	*	-.22	**	.06		.10	*	.09		-.06	
29. Last time engaged in activity	.00		-.03		-.01		-.06		-.02		-.04		-.02	
30.. Average hours	-.07		.07		-.03		.08		.02		.05		.04	
31. Average days	-.08		.04		-.03		-.02		.00		-.01		.02	
32. Effort during activities	-.07		-.03		-.05		.05		.08		.07		.16	**
33. Feel limited in recovery choice	.09		.20	**	.37	**	.07		.00		.04		.15	**

Note: * Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

Table 2, cont'd

	15.		16.		17.		18.		19.		20.		21.	
15. PW	*.93*													
16. NFRR	-.31	**	*.93*											
17. CSES	.75	**	-.47	**	*.91*									
18. PANAS Negative	-.53	**	.39	**	-.64	**	*.92*							
19. PANAS Positive	.58	**	-.29	**	.55	**	-.36	**	*.94*					
20. Quality of recovery (4 dimensions)	.38	**	-.12	**	.28	**	-.22	**	.33	**	*.92*			
21. Quality of recovery (3 dimensions)	.35	**	-.11	*	.28	**	-.21	**	.32	**	.96	**	*.90*	
22. PD	.31	**	-.11	*	.26	**	-.22	**	.21	**	.75	**	.73	**
23. M	.22	**	-.03		.12	*	-.06		.26	**	.71	**	.79	**
24. C	.39	**	-.18	**	.34	**	-.28	**	.33	**	.81	**	.81	**
25. R	.32	**	-.09		.23	**	-.18	**	.26	**	.76	**	.55	**
26. SR	.34	**	-.14	**	.30	**	-.24	**	.42	**	.56	**	.52	**
27. Presence of nature	.08		-.03		.14	**	-.09		.14	**	.07		.08	
28. Peaceful environment	.27	**	-.15	**	.27	**	-.22	**	.30	**	.41	**	.37	**
29. Last time engaged in activity	-.09	*	.11	*	.00		.01		-.10	*	.08		.09	*
30.. Average hours	.01		-.01		-.03		.10	*	.07		.07		.05	
31. Average days	.05		-.08		-.02		.03		.08		-.06		-.08	
32. Effort during activities	.16	**	-.09		.16	**	-.06		.27	**	.25	**	.28	**
33. Feel limited in recovery choice	-.28	**	.30	**	-.28	**	.28	**	-.13	**	-.18	**	-.17	**

Note: * Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

Table 2, cont'd

	22.		23.		24.		25.		26.		27.		28.	
22. PD	*.85*													
23. M	.24	**	*.84*											
24. C	.50	**	.43	**	*.85*									
25. R	.56	**	.24	**	.57	**	*.83*							
26. SR	.44	**	.39	**	.46	**	.48	**	*.94*					
27. Presence of nature	-.03		.19	**	.09		.05		.21	**				
28. Peaceful environment	.34	**	.20	**	.38	**	.38	**	.53	**	.27	**		
29. Last time engaged in activity	.10	*	.08		-.01		.05		.03		.14	**	.00	
30.. Average hours	.02		.04		.09		.10	*	.06		-.06		.08	
31. Average days	-.08		-.07		.06		.02		-.04		-.14	**	.01	
32. Effort during activities	.13	**	.33	**	.24	**	.05		.23	**	.19	**	.26	**
33. Feel limited in recovery choice	-.15	**	-.06		-.25	**	-.13	**	-.13	**	.04		-.16	**

Note: * Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

Table 2, cont'd

	29.		30.		31.		32.		33.
29. Last time engaged in activity									
30.. Average hours	-.28	**							
31. Average days	-.68	**	.44	**					
32. Effort during activities	.04		.00		-.06				
33. Feel limited in recovery choice	.06		-.07		-.05		-.05		

Note: * Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

Hypothesis Tests

Hypothesis 1 was that work-related demands are (a) positively associated with need for recovery, and (b) negatively associated with psychological well-being. Results from hierarchical linear regression analyses provided mixed support for this hypothesis. Hypothesis 1a was supported; work demands were significantly and positively associated with need for resource recovery (β = .29). Hypothesis 1b was not supported; high work demands were actually significantly and *positively* associated with psychological well-being (as opposed to the expected negative association; β = .22). Complete results from this regression analysis are summarized below in Table 3.

Table 3 Work-Related Demands Predicting NFRR and PW

	Need for Resource Recovery			Psychological Well-being		
	β			β		
Predictors	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3
Age	-.12 *	-.11 *	-.11 *	.12 *	.12 **	.12 **
Female	.02	.02	.00	.04	.04	.02
Education	.17 **	.17 **	.16 **	-.06	-.06	-.07
Physical Limitation	.20 **	.19 **	.17 **	-.24 **	-.25 **	-.26 **
PNWD		.12 *	.08		.09 *	.07
Work-Related Demands			.29 **			.22 **
ΔR^2	.08	.01	.08	.08	.01	.05
ΔF	10.34 **	6.57 **	45.20 **	9.12 **	4.13 *	23.14 **
Adjusted R^2	.08	.09	.17	.07	.07	.11
F	10.34 **	9.69 **	16.40 **	9.12 **	8.17 **	11.00 **

Note. N = 455, * p < .05. ** p < .01. NFRR = need for resource recovery. PNWD = perceived nonwork demands.

Hypothesis 2 was that work-related demands are negatively associated with the average amount of (a) hours spent on recovery, (b) days per week engaged in the activity, and (c) effort put forth during recovery activities. Results from hierarchical linear regression analyses did not support this hypothesis; high work-related demands did not have significant associations with average hours spent (β = .04), days per week engaged (β = -.02), or effort put forth during recovery activities (β = .05). Complete results from this regression analysis are summarized below in Table 4.

Table 4 Work-Related Demands Predicting Average Hours, Days, and Effort

	Average Hours			Average Days			Average Effort		
	β			β			β		
Predictors	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3
Age	-.04	-.04	-.04	.06	.06	.06	.05	.06	.06
Female	.08 **	.08 **	.08	.11 *	.11 *	.11 *	.03	.03	.02
Education	-.03	-.03	-.03	-.04	-.04	-.04	.04	.03	.03
Physical Limitation	.06	.06	.05	.04	.04	.04	-.02	-.03	-.04
PNWD		.04	.03		.02	.02		.17 **	.16 **
Work-Related Demands			.04			-.02			.05
ΔR^2	.01	.00	.00	.02	.00	.00	.01	.03	.00
ΔF	1.38	0.59	0.63	2.10	0.16	0.23	0.51	11.97 **	1.28
Adjusted R^2	.00	.00	.00	.01	.01	.01	.00	.02	.02
F	1.38	1.22	1.12	2.10	1.71	1.46	0.51	2.81 *	2.56 *

Note. N = 440, * p < .05. ** p < .01. PNWD = perceived nonwork demands.

Hypothesis 3 was that work-related demands are negatively associated with quality of recovery as operationalized in terms of (a) psychological detachment, (b) mastery, and (c) control. Results from hierarchical linear regression analyses did not support this hypothesis; high work demands were *positively* (not negatively) associated with psychological detachment, mastery, and control. These positive associations were significant for mastery (β = .13) and

control (β = .17) and approached significance for psychological detachment (β = .08). Complete results (including results from the REQ relaxation dimension as well as state relaxation) from this regression analysis are summarized below in Table 5.

Table 5 Work-Related Demands Predicting Psychological Detachment, Mastery, Control, Relaxation, and State Relaxation

	Psychological Detachment			Mastery			Control			Relaxation			State Relaxation		
	β			β			β			β			β		
Predictors	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3
Age	-.05	-.05	-.06	-.04	-.04	-.04	-.01	-.02	-.02	.01	.01	.00	-.07	-.07	-.08
Female	.06	.06	.06	-.07	-.07	-.07	.11 *	.11 *	.11 *	.14 **	.14 **	.14 **	.07	.07	.06
Education	-.11 *	-.11 *	-.11 *	.06	.06	.05	-.06	-.05	-.06	-.13 *	-.13 *	-.14 *	-.15 **	-.15 **	-.16 **
Physical Limitation	.00	.01	.00	.06	.05	.05	-.10	-.09	-.10	-.01	-.01	-.02	-.04	-.04	-.05
PNWD		-.03	-.04		.09	.07		-.04	-.06		.02	-.01		.00	-.04
Work-Related Demands			.08			.13 *			.17 **			.19 **			.23 **
ΔR^2	.02	.00	.01	.02	.01	.02	.02	.00	.03	.04	.00	.04	.03	.00	.05
ΔF	1.40	0.22	2.35	1.27	2.72	5.99 *	2.00	0.52	9.75 **	3.28 *	0.09	12.67 **	2.67 *	0.01	18.58 **
Adjusted R^2	.01	.00	.01	.00	.01	.02	.01	.01	.04	.03	.02	.06	.02	.02	.07
F	1.40	1.16	1.37	1.27	1.56	2.32 *	2.00	1.70	3.08 **	3.28 *	2.63 *	4.38 **	2.67 *	2.13	4.96 **

Note. N = 336, * p < .05. ** p < .01. PNWD = perceived nonwork demands.

Hypothesis 4 was that perceived nonwork demands moderates the relationship between work-related demands and recovery outcomes of need for resource recovery and psychological well-being, such that (a) the positive relationship between work-related demands and need for recovery is strengthened in the presence of high levels of perceived nonwork demands and that (b) the negative relationship between work-related demands and psychological well-being is exacerbated in the presence of high levels of nonwork demands. This was tested with PROCESS model 1 (Hayes & Little, 2018). This hypothesis was not supported; perceived nonwork demands did not moderate the relationships between work-related demands and need for resource recovery (Table 6) or psychological well-being (Table 7). However, there was a significant main effect of work-related demands on need for resource recovery.

Table 6 Work-Related Demands Predicting NFRR with PNWD

Variable	coefficient	BootMean coefficient	BootSE	BootLLCI	BootULCI
Constant	1.83	1.84	0.28	1.2925	2.3834
Work-Related Demands	0.33	0.33	0.15	0.0356	0.6140
PNWD	0.08	0.08	0.05	-0.0076	0.1752
Work-Related Demands X PNWD	-0.01	-0.01	0.05	-0.1009	0.0873
Age	-0.01	-0.01	0.00	-0.0167	-0.0019
Female	0.00	0.00	0.08	-0.1615	0.1669
Education	0.10	0.10	0.03	0.0476	0.1532
Physical Limitation	0.16	0.17	0.05	0.0772	0.2560

Model Summary

R-sq	*MSE*	*F*	*df*1	*df*2	*p*
0.18	0.78	0.04	1.00	447.00	0.8455

Note. N = 455. NFRR = need for resource recovery. PNWD = perceived nonwork demands.

Table 7 Work-Related Demands Predicting PW with PNWD

Variable	coefficient	BootMean coefficient	BootSE	BootLLCI	BootULCI
Constant	5.65	5.65	0.32	5.0130	6.2548
Work-Related Demands	0.32	0.32	0.25	-0.1397	0.8131
PNWD	0.08	0.07	0.05	-0.0279	0.1788
Work-Related Demands X PNWD	-0.03	-0.03	0.07	-0.1729	0.1108
Age	0.01	0.01	0.00	0.0027	0.0197
Female	0.05	0.05	0.09	-0.1258	0.2244
Education	-0.05	-0.04	0.03	-0.1002	0.0103
Physical Limitation	-0.27	-0.27	0.05	-0.3706	-0.1749

Model Summary

R-sq	*MSE*	*F*	*df*1	*df*2	*p*
0.13	0.92	0.31	1.00	447.00	0.5764

Note. N = 455. PW = psychological well-being. PNWD = perceived nonwork demands.

Hypothesis 5 was that quality of recovery (psychological detachment, mastery, control, and relaxation) moderates the relationship between work-related demands and recovery outcomes of need for resource recovery and psychological well-being such that the relationships between work-related demands and (a) need for recovery and (b) psychological well-being are less negative when quality of recovery is high versus low. This relationship was tested using PROCESS model 1 (Hayes & Little, 2018). Results showed this hypothesis was not supported; quality of recovery does not moderate the relationships between work-related demands and need for resource recovery (Table 8) or psychological well-being (Table 9). There are significant main effects of recovery quality on need for resource recovery (b = -.40) and psychological well-being (b = .75), but there was no significant interaction in either model. This suggests that quality of recovery is itself negatively associated with need for resource recovery and positively associated with psychological well-being, but that quality of recovery does not condition the effect of work-related demands on need for resource recovery or psychological well-being.

Table 8 Work-Related Demands Predicting NFRR with Quality of Recovery

Variable	**coefficient**	**BootMean coefficient**	**BootSE**	**BootLLCI**	**BootULCI**
Constant	3.79	3.78	0.45	2.8915	4.6460
Work-Related Demands	0.94	0.94	0.39	0.1697	1.6871
Quality of Recovery (4 dimensions)	-0.40	-0.39	0.09	-0.5716	-0.2141
Work-Related Demands X Quality of Recovery (4 dim)	-0.14	-0.14	0.10	-0.3333	0.0517
Age	-0.01	-0.01	0.00	-0.0181	-0.0032
Female	0.03	0.03	0.08	-0.1322	0.1878
Education	0.09	0.09	0.03	0.0377	0.1420
Physical Limitation	0.17	0.17	0.04	0.0886	0.2571

Model Summary

R-sq	*MSE*	*F*	*df*1	*df*2	*p*
0.21	0.75	2.47	1.00	443.00	0.1171

Note. N = 451. NFRR = need for resource recovery.

Table 9 Work-Related Demands Predicting PW with Quality of Recovery

Variable	coefficient	BootMean coefficient	BootSE	BootLLCI	BootULCI
Constant	2.73	2.73	0.43	1.8697	3.5708
Work-Related Demands	-0.10	-0.10	0.48	-1.0276	0.8290
Quality of Recovery (4 dimensions)	0.75	0.75	0.09	0.5723	0.9302
Work-Related Demands X Quality of Recovery (4 dim)	0.07	0.07	0.12	-0.1613	0.2953
Age	0.01	0.01	0.00	0.0038	0.0196
Female	-0.00	-0.00	0.09	-0.1696	0.1645
Education	-0.02	-0.02	0.03	-0.0775	0.0291
Physical Limitation	-0.26	-0.26	0.05	-0.3544	-0.1698

Model Summary

R-sq	*MSE*	*F*	*df*1	*df*2	*p*
0.24	0.81	0.47	1.00	443.00	0.4947

Note. $N = 451$. PW = psychological well-being.

Hypothesis 6 was that state relaxation further mediates the relationship between work-related demands and recovery outcomes, as a sequential mediator following recovery actions. PROCESS model 6 was used to test this hypothesis. Results of this multiple mediator model supported this hypothesis; state relaxation serves as a sequential mediator following recovery actions. This indirect effect model was first tested with the quality of recovery mediator including all four dimensions (psychological detachment, mastery, control, and relaxation). This causal chain with pathways identified is depicted in Figure 2 for need for resource recovery (indirect effects are presented below in Table 10) and Figure 3 for psychological well-being (indirect effects are presented below in Table 11).

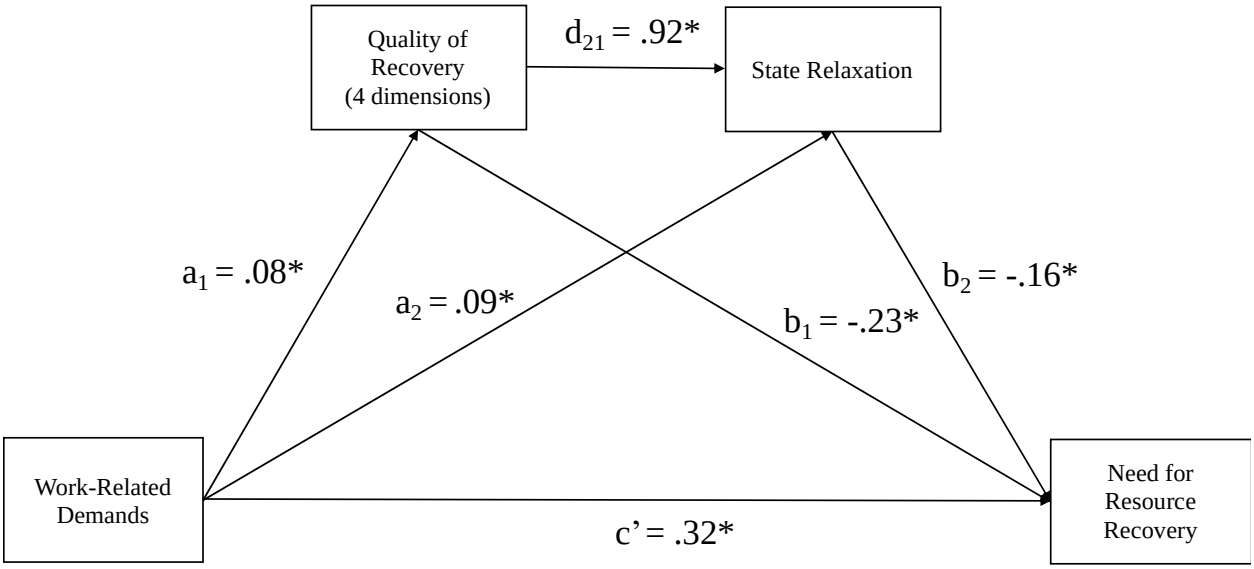

Figure 2 Mediating effects of recovery quality (4 dimensions) and state relaxation on the relationship between work-related demands and need for resource recovery

Table 10 Indirect Effects of Work-Related Demands on Need for Resource Recovery

Variable	**Effect**	**BootSE**	**BootLLCI**	**BootULCI**
Total	-0.05	0.02	-0.0786	-0.0183
WD → REQ (4) → NFRR	-0.02	0.01	-0.0436	-0.0013
WD → SR → NFRR	-0.01	0.01	-0.0326	-0.0011
WD → REQ (4) → SR → NFRR	-0.01	0.01	-0.0272	-0.0014

Total effect of WD on NFRR				
Effect	*se*	*t*	*LLCI*	*ULCI*
0.32	0.05	6.62	0.2226	0.4108
Direct effect of WD on NFRR				
Effect	*se*	*t*	*LLCI*	*ULCI*
0.36	0.05	7.59	0.2687	0.4565

Note. N = 413. NFRR = need for resource recovery. WD = work-related demands. REQ = recovery experiences questionnaire. SR = state relaxation.

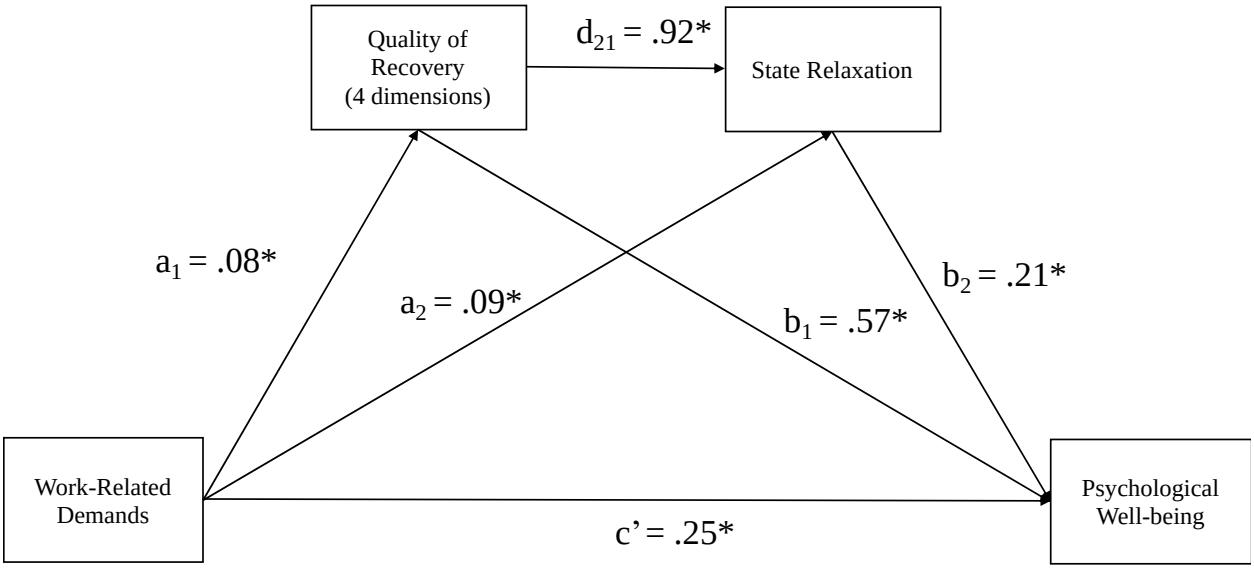

Figure 3 Mediating effects of recovery quality (4 dimensions) and state relaxation on the relationship between work-related demands and psychological well-being

Table 11 Indirect Effects of Work-Related Demands on Psychological Well-being

Variable	**Effect**	**BootSE**	**BootLLCI**	**BootULCI**
Total	0.08	0.03	0.0363	0.1362
WD → REQ (4) → PW	0.05	0.02	0.0163	0.0854
WD → SR → PW	0.02	0.01	0.0012	0.0457
WD → REQ (4) → SR → PW	0.02	0.01	0.0022	0.0364

Total effect of WD on PW				
Effect	*se*	*t*	*LLCI*	*ULCI*
0.24	0.05	4.52	0.1331	0.3376
Direct effect of WD on PW				
Effect	*se*	*t*	*LLCI*	*ULCI*
0.15	0.05	3.12	0.0566	0.2502

Note. N = 413. PW = psychological well-being. WD = work-related demands. REQ = recovery experiences questionnaire. SR = state relaxation.

This same multiple mediator model was tested again, this time dropping the relaxation dimension of the REQ as part of quality of recovery and using the revised operationalization of recovery quality (psychological detachment, mastery, and control). This proposed causal chain with pathways identified is depicted in Figure 4 for need for resource recovery (indirect effects are presented below in Table 12) and Figure 5 for psychological well-being (indirect effects are presented below in Table 13). This second model eliminated concerns of "stacking the deck" with two similar relaxation components included in the same model. Results of this model were still significant, state relaxation served as a sequential mediator following recovery actions through the three dimensions alone (psychological detachment, mastery, and control).

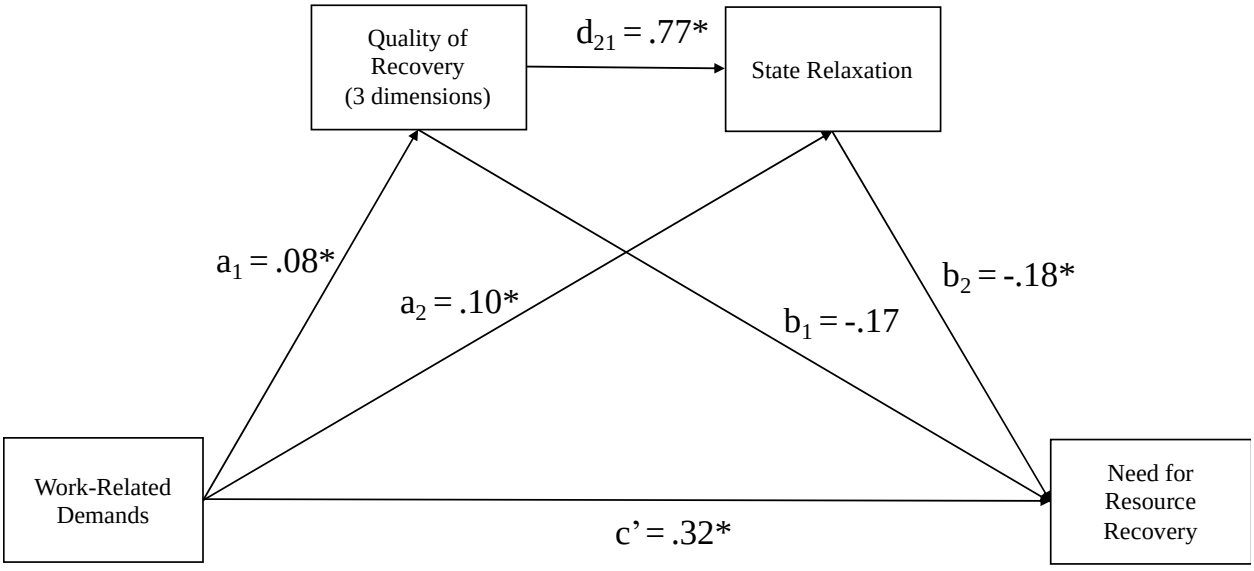

Figure 4 Mediating effects of recovery quality (3 dimensions) and state relaxation on the relationship between work-related demands and need for resource recovery

Table 12 Indirect Effects of Work-Related Demands on Need for Resource Recovery

Variable	**Effect**	**BootSE**	**BootLLCI**	**BootULCI**
Total	-0.04	0.01	-0.0745	-0.0166
WD → REQ (3) → NFRR	-0.01	0.01	-0.0331	0.0013
WD → SR → NFRR	-0.02	0.01	-0.0394	-0.0036
WD → REQ (3) → SR → NFRR	-0.01	0.01	-0.0239	-0.0018

Total effect of WD on NFRR				
Effect	*se*	*t*	*LLCI*	*ULCI*
0.32	0.05	6.62	0.2226	0.4108
Direct effect of WD on NFRR				
Effect	*se*	*t*	*LLCI*	*ULCI*
0.36	0.05	7.53	0.2658	0.4537

Note. N = 413. NFRR = need for resource recovery. WD = work-related demands. REQ = recovery experiences questionnaire. SR = state relaxation.

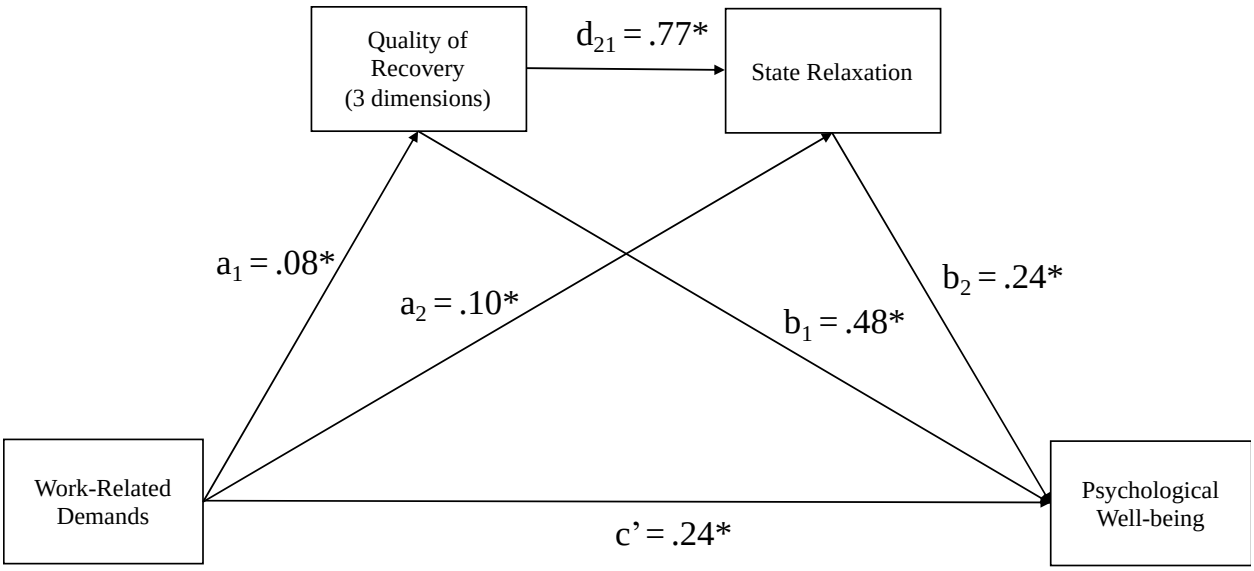

Figure 5 Mediating effects of recovery quality (3 dimensions) and state relaxation on the relationship between work-related demands and psychological well-being

Table 13 Indirect Effects of Work-Related Demands on Psychological Well-being

Variable	**Effect**	**BootSE**	**BootLLCI**	**BootULCI**
Total	0.08	0.02	0.0317	0.1279
WD → REQ (3) → PW	0.04	0.02	0.0102	0.0710
WD → SR → PW	0.03	0.01	0.0042	0.0545
WD → REQ (3) → SR → PW	0.01	0.01	0.0023	0.0313

Total effect of WD on PW				
Effect	*se*	*t*	*LLCI*	*ULCI*
0.24	0.05	4.52	0.1331	0.3376
Direct effect of WD on PW				
Effect	*se*	*t*	*LLCI*	*ULCI*
0.16	0.05	3.23	0.0622	0.2561

Note. N = 413. PW = psychological well-being. WD = work-related demands. REQ = recovery experiences questionnaire. SR = state relaxation.

Hypothesis 7 was that effort invested in recovery activities is positively associated with (a) quality of recovery, (b) state relaxation, and (c) psychological well-being, and negatively associated with (d) need for recovery. Using multiple linear regression analysis, hypothesis 7 was supported; increased effort during recovery activities did have significant associations with all four dimensions of the hypothesis in the appropriate directions. For hypothesis 7a, all four dimensions of recovery quality were used and found to be positively and significantly associated with effort put forth during recovery activities (β = .27). Hypothesis 7a was also tested using just the three dimensions of recovery quality (psychological detachment, mastery, and control); this analysis yielded similarly sized effects (β = .31) and was still significant. Specifically, psychological detachment (β = .17), mastery (β = .30), and control (β = .27) were all positively and significantly associated with effort put forth in recovery activities. Relaxation, however, was

not (β = .06). State relaxation was positively and significantly associated with effort put forth (β = .22), supporting hypothesis 7b.

In addition, effort put forth during recovery activities was positively associated with psychological well-being (β = .15) and negatively associated with need for resource recovery (β = -.14), supporting hypothesis 7c and 7d. The results of these regression-based models are presented below in Table 14.

Table 14 Effort During Activities Predicting Quality of Recovery, State Relaxation, PW, and NFRR

	Quality of Recovery (4 dimensions)			State Relaxation			Psychological Well-being			Need for Resource Recovery		
		β			β			β			β	
Predictors	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3
Age	-.04	-.04	-.06	-.05	-.05	-.06	.12 *	.13 **	.12 *	-.12 *	-.11 *	-.10 *
Female	.06	.06	.05	.02	.02	.01	.02	.01	.01	.03	.03	.04
Education	-.09	-.09	-.11 *	-.12 *	-.12 *	-.14 **	-.07	-.07	-.08	.17 **	.16 **	.17 **
Physical Limitation	-.02	-.02	-.02	-.07	-.07	-.07	-.25	-.25	-.25	.21 **	.20 **	.20 **
PNWD		.02	-.02		.00	-.04		.08	.05		.12 *	.14 **
Effort during activities			.27 **			.22 **			.15 **			-.14 **
ΔR^2	.01	.00	.07	.02	.00	.05	.08	.01	.02	.09	.01	.02
ΔF	1.30	0.20	32.25 **	2.21	0.01	20.62 **	8.96 **	2.48	10.42 **	9.85 **	6.01 *	8.84 **
Adjusted R^2	.00	.00	.07	.01	.01	.06	.07	.08	.10	.08	.09	.11
F	1.30	1.08	6.34 **	2.21	1.77	4.98 **	8.96 **	7.69 **	8.30 **	9.85 **	9.18 **	9.27 **

Note. N = 413, * p < .05. ** p < .01. PNWD = perceived nonwork demands.

Qualitative Analyses

To prepare for analyzing the qualitative data, several variables were qualitatively coded by multiple trained research assistants. These variables included the reported recovery activities, types of activities (based on Sonnentag, 2001's categories of physical, social, low-effort, household and child care, and/or work-related), overarching themes of recovery activities (i.e., brief descriptions or relevant words relating to the activity such as home improvement or personal care), reasons why participants engage in each activity they list, factors that participants felt limited their recovery choices, and any preferred activities that participants wished they

could engage in. Each of these variables were qualitatively coded independently by two research assistants. A final consensus round was conducted by the primary researcher on each of these variables. Analyses of the coded qualitative data revealed 152 unique recovery activities. The top ten most frequently reported activities (making up 50% of the total frequency report) were reading (11%), walking (7%), eating (7%), watching television (6%), exercise (5%), being with family (4%), baking or cooking (3%), video games (3%), meditation (2%), and listening to music (2%).

Applying Sonnentag's (2001) classifications of activities to the identified 152 unique reported recovery activities from the present sample of participants yielded the following breakdown: low effort (50%), physical (21%), social (20%), household and childcare (8%), and work-related (1%). Table 15 shows the listed activities and their reported frequencies, coded type(s) based on the classifications mentioned above, and dominant themes that provide words or descriptions mentioned above based on the context and answers provided by the participants. Quality dimensions are also included for each activity that break down the average psychological detachment, mastery, control, and relaxation experienced during the activity, along with the average post recovery state relaxation experienced. Finally, an overall quality score was calculated in the last column based on a sum of the average psychological detachment, mastery, control, and relaxation averages.

Activities in this table are presented in rank-order based on the overall quality score, such that the recovery activities deemed highest quality (i.e., higher psychological detachment, mastery, control, and relaxation) are at the top of the table and lower quality activities (i.e., lower psychological detachment, mastery, control, and relaxation) are presented at the bottom. This provides guidance for which recovery activities are deemed highest quality, while also getting an

idea for how much psychological detachment, mastery, control, relaxation, and state relaxation each recovery activity will likely provide individuals who are looking for effective recovery strategies. It is important to note here that criteria for activities to be included in this table were having at least five instances in the gathered data. In addition, a few of the unique activities were coded into slightly broader activities from the original coding to keep some of the activities in the list that were only reported a few times. For example, unique activities such as knitting, crocheting, and cross-stitching were combined into the activity labeled “needlework”. This final table (Table 15 presented below) consists of 53 unique activities, which has a total *N* of 1,484 reported activities.

Table 15 Reported Recovery Activity Qualities

Activities	*N*	Activity Type(s)	Dominant Themes	Quality Dimensions	Overall Quality
Fishing	8	1, 2, 3	relaxation, rest, restoration, fishing, family, quality time, children	P: 4.88 M: 3.72 C: 4.47 R: 4.81 SR: 3.85	4.47
Crafting	11	3	crafts, create, art, hobbies, projects	P: 4.63 M: 3.67 C: 4.72 R: 4.77 SR: 3.79	4.45
Playing the guitar	6	3	music, play, instrument, guitar	P: 4.29 M: 4.45 C: 4.42 R: 4.38 SR: 3.28	4.38
Gardening	14	1, 4	nature, planting, growth, flowers, hobbies	P: 4.56 M: 3.93 C: 4.67 R: 4.35 SR: 3.51	4.38
Riding a motorcycle or atv	5	1	drive, transportation, travel, hobbies, recreational	P: 4.75 M: 3.75 C: 4.70 R: 4.20 SR: 3.23	4.35
Vacation/travel	13	2, 3	vacation, break, work break, travel	P: 4.53 M: 4.14 C: 4.21 R: 4.49 SR: 3.68	4.34
Reading	179	3	books, reading, stories	P: 4.47 M: 4.26 C: 4.18 R: 4.45 SR: 3.33	4.34
Writing	15	3	writing, create, stories, ideas	P: 4.33 M: 4.30 C: 4.43 R: 4.29 SR: 2.99	4.34

Note. Activity types: 1 = physical, 2 = social, 3 = low effort, 4 = household & childcare, 5 = work-related. Quality dimensions: P = psychological detachment, M = mastery, C = control, R = relaxation, SR = state relaxation. Overall quality = average of P, M, C, and R.

Table 15, cont'd

Activities	*N*	Activity Type(s)	Dominant Themes	Quality Dimensions	Overall Quality
Painting	8	3	crafts, create, art, hobbies, projects, painting	P: 4.44 M: 4.28 C: 4.31 R: 4.25 SR: 3.55	4.32
Doing surveys	6	3, 5	work, money, internet	P: 4.20 M: 4.05 C: 4.45 R: 4.50 SR: 3.38	4.30
Hobbies	6	3	hobbies	P: 4.75 M: 3.67 C: 4.58 R: 4.08 SR: 3.30	4.27
Meditation	41	3	meditating, spiritual, mindfulness	P: 4.57 M: 3.57 C: 4.26 R: 4.63 SR: 4.16	4.26
Sexual activities	16	1, 2	intimacy, social, quality time, significant other	P: 4.77 M: 3.71 C: 3.98 R: 4.31 SR: 3.90	4.19
Being in nature	8	3	nature, relaxation	P: 4.38 M: 3.56 C: 4.31 R: 4.50 SR: 3.99	4.19
Video games	43	2, 3	video games, electronics, games, competition, challenge, social	P: 4.61 M: 3.55 C: 4.20 R: 4.38 SR: 3.25	4.19
Social media	14	2, 3	social, friends, smart phone, internet, connecting	P: 4.39 M: 3.85 C: 4.15 R: 4.34 SR: 3.08	4.18

Note. Activity types: 1 = physical, 2 = social, 3 = low effort, 4 = household & childcare, 5 = work-related. Quality dimensions: P = psychological detachment, M = mastery, C = control, R = relaxation, SR = state relaxation. Overall quality = average of P, M, C, and R.

Table 15, cont'd

Activities	*N*	Activity Type(s)	Dominant Themes	Quality Dimensions	Overall Quality
Singing	7	3	music, sing	P: 4.39 M: 4.11 C: 4.13 R: 4.07 SR: 3.31	4.17
Smoking or consuming tobacco or cannabis	10	3	smoking, tobacco	P: 4.44 M: 3.50 C: 4.23 R: 4.50 SR: 3.54	4.17
Driving	10	3	drive, transportation, travel	P: 4.50 M: 3.11 C: 4.56 R: 4.50 SR: 3.52	4.17
Baking or cooking	47	3, 4	cooking, food, nourishment, personal care	P: 4.32 M: 4.10 C: 4.26 R: 3.93 SR: 2.76	4.15
Taking a break (restroom, lunch, etc.)	10	3	break, work break, detachment, personal care, bodily functions	P: 4.31 M: 2.68 C: 4.19 R: 4.40 SR: 3.36	4.12
Surfing the internet	6	3	internet	P: 4.00 M: 3.85 C: 4.25 R: 4.33 SR: 3.02	4.11
Relaxing	21	3	relaxation, rest, restoration	P: 4.29 M: 3.49 C: 4.09 R: 4.55 SR: 3.70	4.11
Games (board, phone, computer)	29	2, 3	games, challenge, competition, hobbies, electronics, smart phone	P: 4.52 M: 3.53 C: 3.88 R: 4.43 SR: 2.74	4.09

Note. Activity types: 1 = physical, 2 = social, 3 = low effort, 4 = household & childcare, 5 = work-related. Quality dimensions: P = psychological detachment, M = mastery, C = control, R = relaxation, SR = state relaxation. Overall quality = average of P, M, C, and R.

Table 15, cont'd

Activities	*N*	Activity Type(s)	Dominant Themes	Quality Dimensions	Overall Quality
Practicing religion	9	3	spiritual, getting out, routine	P: 4.75 M: 4.25 C: 3.47 R: 3.89 SR: 4.04	4.09
Watching TV, movies, or videos	146	3	watch, tv, shows, entertainment, relaxation, movies, internet, videos	P: 4.46 M: 3.14 C: 4.17 R: 4.49 SR: 3.38	4.07
Yoga	25	1	yoga, exercise, stretching, fitness, health, relaxation	P: 4.46 M: 3.61 C: 3.81 R: 4.33 SR: 4.19	4.05
Listening to music	40	3	music, listen	P: 4.30 M: 3.43 C: 4.05 R: 4.30 SR: 3.07	4.02
Listening to audiobooks or podcasts	7	3, 5	books, listen, stories	P: 4.29 M: 3.86 C: 3.85 R: 4.07 SR: 2.65	4.02
Playing sports	15	1, 2	sport, exercise, fitness, health, team, competition, play	P: 4.09 M: 3.80 C: 4.03 R: 4.11 SR: 3.40	4.01
Swimming	19	1	swim, exercise, fitness, health, sport, water, pool	P: 4.29 M: 3.52 C: 4.07 R: 4.10 SR: 3.45	4.00
Needlework	10	3	crafts, create, art, hobbies, projects	P: 4.25 M: 3.44 C: 4.01 R: 4.28 SR: 3.03	4.00

Note. Activity types: 1 = physical, 2 = social, 3 = low effort, 4 = household & childcare, 5 = work-related. Quality dimensions: P = psychological detachment, M = mastery, C = control, R = relaxation, SR = state relaxation. Overall quality = average of P, M, C, and R.

Table 15, cont'd

Activities	*N*	Activity Type(s)	Dominant Themes	Quality Dimensions	Overall Quality
Being with/ talking to family or friends	101	2, 3, 4	social, family, connecting, quality time, talk	P: 4.17 M: 3.71 C: 3.89 R: 4.19 SR: 3.04	3.99
Hiking	22	1	hiking, walking, exercise, fitness, health, nature	P: 4.20 M: 3.76 C: 4.12 R: 3.68 SR: 3.24	3.94
Playing with pets	9	2, 3	animals, pets, quality time, play	P: 4.88 M: 2.14 C: 4.19 R: 4.47 SR: 3.28	3.92
Going out to lunch or dinner	8	2, 3	eating, food, nourishment, personal care, energy, getting out, colleagues, work break, break	P: 4.28 M: 3.21 C: 4.13 R: 3.96 SR: 3.11	3.92
Exercise	82	1	exercise, fitness, health	P: 4.37 M: 3.60 C: 4.18 R: 3.44 SR: 3.13	3.90
Shopping	16	3	shop, money, internet	P: 4.61 M: 2.73 C: 4.13 R: 4.13 SR: 2.93	3.90
Sleeping	22	3	sleep, rest, energy, restoration	P: 4.52 M: 2.75 C: 3.91 R: 4.33 SR: 4.33	3.88
Walking	110	1	walking, exercise, fitness, health	P: 4.07 M: 3.32 C: 4.09 R: 3.98 SR: 3.17	3.87

Note. Activity types: 1 = physical, 2 = social, 3 = low effort, 4 = household & childcare, 5 = work-related. Quality dimensions: P = psychological detachment, M = mastery, C = control, R = relaxation, SR = state relaxation. Overall quality = average of P, M, C, and R.

Table 15, cont'd

Activities	*N*	Activity Type(s)	Dominant Themes	Quality Dimensions	Overall Quality
Lifting weights	14	1	strength, exercise, fitness, health, weights, gym	P: 4.52 M: 3.70 C: 4.27 R: 2.94 SR: 3.13	3.86
Socializing	11	2, 3	social, friends, connecting, quality time	P: 3.90 M: 3.43 C: 3.95 R: 4.08 SR: 2.70	3.84
Biking	13	1	cycling, exercise, fitness, health, transportation, working out	P: 4.23 M: 3.44 C: 4.04 R: 3.44 SR: 3.03	3.79
Running/jogging	48	1	jogging, running, health, exercise, fitness	P: 4.27 M: 3.83 C: 4.10 R: 3.86 SR: 3.71	3.75
Bathing	27	3	shower, personal care, refresh, pampering, clean, water, bathing	P: 4.35 M: 2.34 C: 3.89 R: 4.42 SR: 4.22	3.75
Watching sports	6	3	watch, sport, entertainment, competition, team	P: 4.50 M: 2.45 C: 3.75 R: 4.25 SR: 2.77	3.74
Walking pets	14	1, 4	walking, exercise, fitness, health, animals, pets	P: 4.17 M: 2.77 C: 3.85 R: 3.94 SR: 3.15	3.68
Cleaning, housework, or yardwork	14	1, 4	housework, clean, organization	P: 4.27 M: 2.92 C: 4.45 R: 3.06 SR: 2.88	3.68

Note. Activity types: 1 = physical, 2 = social, 3 = low effort, 4 = household & childcare, 5 = work-related. Quality dimensions: P = psychological detachment, M = mastery, C = control, R = relaxation, SR = state relaxation. Overall quality = average of P, M, C, and R.

Table 15, cont'd

Activities	*N*	Activity Type(s)	Dominant Themes	Quality Dimensions	Overall Quality
Drinking alcoholic beverages	9	2, 3	alcohol, drink	P: 3.64 M: 2.72 C: 4.00 R: 4.25 SR: 3.06	3.65
Being with pets	10	2, 3, 4	animals, pets, quality time	P: 4.09 M: 2.47 C: 3.57 R: 4.13 SR: 2.78	3.56
Self-care/ pampering	11	3	massage, relaxation, intimacy, pampering, personal care, body image	P: 3.54 M: 2.65 C: 3.58 R: 4.25 SR: 3.32	3.51
Eating	107	2, 3	eating, food, nourishment, personal care, energy	P: 3.77 M: 2.48 C: 3.77 R: 3.96 SR: 2.87	3.50
Drinking non-alcoholic beverages (water, coffee, tea, soda)	26	2, 3	coffee, caffeine, drink, energy	P: 3.03 M: 2.47 C: 3.50 R: 3.76 SR: 2.49	3.19

Note. Activity types: 1 = physical, 2 = social, 3 = low effort, 4 = household & childcare, 5 = work-related. Quality dimensions: P = psychological detachment, M = mastery, C = control, R = relaxation, SR = state relaxation. Overall quality = average of P, M, C, and R.

Participants were also asked the reasoning for why they engage in each of their common recovery activities. Coding of responses revealed 87 unique reasons shared by participants for engaging in their typical recovery activities. The ten most frequent reasons (making up 53% of the total frequency report) were: enjoyment (11%), relaxation (10%), detachment (7%), fitness (4%), to relieve stress (4%), health reasons (4%), to learn new things (4%), for bonding (3%), out of necessity (3%), and for social time (3%).

Although participants generally did not feel limited by their recovery choices as described in further detail in the discussion section, the top ten most frequent factors that limit participants' recovery choices are as follows (making up 73% of the total factors): work (17%), time (12%), taking care of family or family obligations (11%), money (8%), children (8%), household chores (7%), fatigue or low energy (4%), weather (2%), social obligations (2%), and personal schedule (2%).

Of those who preferred other activities, 76 unique activities emerged. The top ten most frequent preferred activities (making up 50% of the total listed preferred activities) are as follows: exercise (19%), travel (8%), taking classes (4%), yoga (4%), being in nature (3%), hiking (3%), socializing (3%), baking or cooking (2%), getting out of the house (2%), going out to lunch or dinner (2%)

CHAPTER IV

DISCUSSION AND CONCLUSION

Recap of Study Purpose

The purpose of the present study was to examine the ways in which workers recover their resources through the process of work recovery. Specifically, how work-related demands impact a workers' need for resource recovery and psychological well-being after taking into account the quality of workers' recovery activities. The quality of work recovery activities was examined and found that effortful activities that have nature present (as discussed further later in this section through research question 3) are more optimal than activities that require little effort or do not have nature present during the activity. Additionally, statistical support is evident for the alternate, revised work recovery process model mentioned throughout that shows how the relaxation component of the recovery process may be better positioned as an outcome state following the quality of recovery actions as opposed to a fourth component of the work recovery process.

One piece of statistical support for this is shown through the indirect effects in hypothesis 6, indicating that the overall model remains significant when the REQ relaxation dimension is dropped. Statistical support for the revised model highlighting that active activities are more beneficial to recovery is also evident through hypothesis 7, showing that as more effort is put forth during recovery activities, state relaxation *after* the activity significantly increases (as opposed to the REQ relaxation dimension *during* activities). As discussed above, several of the

findings emerged with clear statistical support, but the nuances to the hypotheses are discussed in this section along with the research question results.

Explanation of Findings and Probing Hypotheses

The mixed findings pertaining to hypothesis 1 (i.e., support for 1a, but not for 1b) are interesting and rather explainable, upon further consideration. Hypothesis 1a is clearly supported in the present data and consistent with past literature; those who have high work demands have a higher need for resource recovery. For hypothesis 1b, it is interesting to see the statistically significant and positive (not negative) association between work demands and psychological well-being. At first glance, this does not align with the current literature suggesting that high work demands contribute to poorer well-being. Interpreting these findings requires careful attention to the questions that were actually asked of participants, as well as the nature of the present sample. This examination yields insights that are not typically available in previous studies that have tested this type of relationship. Specifically, the majority of participants (74%) reported regularly engaging in their preferred recovery activities; only 26% indicated they would rather engage in other recovery activities.

An implication here is that most of the present participants are already engaging in what they perceive to be effective recovery practices (i.e., recovery that contributes to improved well-being). Taking this one step further, people are most likely to engage in recovery when such recovery is needed. This is the case when work demands are high. Finishing this logic chain, it is possible to see how higher work demands may be associated with more positive well-being when participants are also regularly engaging in more effective (i.e., more preferred) recovery practices.

To test this interpretation further (through independent *t*-test analyses for research question 2), participants' ratings of recovery experience quality were compared for those who reported already engaging in their preferred recovery activities versus those who wish they could engage in other activities. Results showed that, on average, those who indicated they preferred other recovery activities than the ones in which they regularly engage reported significantly lower typical recovery quality (M = 3.94, SD = 0.44) compared to those who reported regularly engaging in their preferred recovery activities (M = 4.09, SD = 0.46), $t(489) = -3.08$, $p = <.001$. Calculations of effect size indicated this was a moderate effect, $r = .14$.

This pattern of effect also held true for each dimension of perceived recovery quality as well, such that those who preferred other recovery activities reported lower psychological detachment, mastery, control, and relaxation from their typical recovery activities. These effects were statistically significant for mastery and control. Specifically, experienced mastery during typical recovery activities for those who already engage in their preferred recovery activities was significantly higher (M = 3.57, SD = .74) compared to those who reported that wish they could engage in other recovery activities (M = 3.36, SD = .73), $t(424) = -2.74$, $p = .01$. Experienced control during typical recovery activities for those who already engage in their preferred recovery activities was significantly higher (M = 4.13, SD = .56) compared to those who reported that they wish they could engage in other recovery activities (M = 3.98, SD = .53), $t(420) = -2.41$, $p = .02$. Further, those who preferred other recovery activities also reported significantly lower state relaxation from their typical recovery activities (M = 3.01, SD = .76) compared to those who already engage in their preferred activities (M = 3.36, SD = .75), $t(450) = -4.36$, $p = <.001$.

In addition, this effect carried over to the study outcomes as well; those who indicated they wish to engage in other activities reported significantly lower psychological well-being and significantly higher need for resource recovery. Those who reported already engaging in their preferred recovery activities reported significantly higher psychological well-being (M = 5.75, SD = .99) compared to those who wish to engage in other activities (M = 5.40, SD = 1.01), t(480) = -3.43, p = <.001. Need for resource recovery was significantly lower for those that reported already engaging in their preferred recovery activities (M = 4.43, SD = .98) compared to those who wish to engage in other activities (M = 2.70, SD = .90), t(461) = 2.61, p = .01.

Related to hypothesis 1, the more days that passed from the last time participants engaged in resource-replenishing recovery activities also had a significant effect on need for resource recovery and psychological well-being. Regression analysis results indicated a significant positive relationship between days since last recovery activity and need for resource recovery as well as a significant negative relationship with days since last recovery activity and psychological well-being. On average, participants reported the last time they engaged in recovery activities was very recent (i.e., within the last day from the time of responding). This suggests that those who indicated a longer timeframe since the last time they engaged in the activities also reported higher need for resource recovery and lower psychological well-being. This speaks to the information outlined above, that participants who frequently and consistently engage in resource-replenishing activities experience lower need for resource recovery and higher psychological well-being, regardless of high work demands being present.

Another piece of evidence to explain this initially surprising relationship is that the majority of participants do not feel that their choice of recovery activities is limited (M = 1.98, SD = 0.86). Participants answered this question from a 1 (*none at all*) to 5 (*a great deal*) scale

and, as indicated by the mean for this question, participants generally reported *none at all* to *a little* for the extent to which they feel limited in their choice of recovery activities. Furthermore, this variable significantly predicts many of the main study variables, such that the less limited participants feel, the higher quality of recovery (β = -.22), state relaxation (β = -.19), psychological well-being (β = -.23), and the less need for resource recovery (β = .23) they experience. These relationships are all statistically significant. This variable is obviously related to perceived choice and control over recovery activities, which is clearly linked to better experiences through recovery activities and broader life dimensions (e.g., psychological well-being). Lastly, it is important to note that, on a scale of 1 (*strongly disagree*) to 7 (*strongly agree*), the majority of participants reported that they do not feel guilty for engaging in their recovery activities (M = 2.81, SD = 1.48).

Although hypothesis 2 was not supported, this is not entirely surprising given the hypothesis 1b findings and the associated interpretation just presented. Increased work demands do not seem to affect the number of hours, days, or effort workers put forth into recovery activities. It is possible that those who are under high work demands and have less available time and more need for recovery are the ones who are more likely to engage in high quality and more efficient recovery activities without using the excuse that they do not have enough time or energy to do so. Although the data from this study cannot fully support this idea, this seems to be a promising area of future inquiry through additional data points (e.g., asking participants how much available time they feel they have to engage in recovery activities). In short, it does not seem to be the case that those with more demands necessarily experience poorer quality recovery or are unable to engage in recovery as research in this area suggests.

The findings pertaining to hypothesis 3 also contradict the original expectations, but these findings are not entirely surprising either, given the preceding discussion points. Work-related demands are positively associated with recovery (as opposed to the hypothesized negative association) as shown through psychological detachment, mastery, and control. Of these recovery activity quality dimensions, the positive relationships of mastery and control with work demands were significant. No evidence of non-linearity was present, but restricted range of psychological detachment scores was present, and this may at least partially explain the nonsignificant effect observed with this dimension of recovery quality. It is evident that the majority of participants experience high psychological detachment through their typical (and presumably effective) recovery activities (M = 4.31, SD = .54), resulting in little variability of scores on this dimension to reach significance.

Despite evidence of restricted range in the measure of the relaxation dimension of recovery quality, this variable and post-recovery state relaxation scores have similar significant positive relationships with work-related demands, as shown in Table 5 (β = .19 and .23, respectively). Even after splitting participants into a low versus high work demand group (based on a negative vs. positive *z*-score for the work demand indicator detailed in the measures section), those reporting high work demands also reported higher psychological detachment, mastery, control, relaxation, and state relaxation than those with low work demands. These differences were statistically significant for mastery, control, relaxation, and state relaxation.

Together, the present findings pertaining to tests of the first three hypotheses support the conclusion that effective recovery activities are helpful when responding to high work demands. Further, these findings also support the idea that more demands are not necessarily the enemy of better recovery. The presence of demands creates a need for recovery, making high quality

recovery possible. If demands are not high, recovery may not be as needed (and the effects of such recovery may actually be or at least be perceived to be reduced). An extension of these points is that efforts to help workers with their recovery needs is typically focused only on reducing work demands. Instead, these findings illustrate the powerful impact of choice and quality of recovery activities.

Similar to the finding from the test of hypothesis 3, perceived nonwork demands did not moderate the relationships between work-related demands and need for resource recovery or psychological well-being. Despite this lack of support for hypothesis 4, basic correlation analyses (Table 2) showed that perceived nonwork demands were significantly and positively associated with work-related demands (r = .13). Digging further into related research question 1, perceived nonwork demands was not significantly related with quality of recovery, but perceived nonwork demands was significantly and positively associated with need for resource recovery (r = .16).

Even though perceived nonwork demands are significantly and positively associated with work-related demands and need for resource recovery, perceived nonwork demands are also, surprisingly, significantly and positively associated with effort put forth during recovery activities when looking at the results from hypothesis 2 (Table 4). In other words, it seems that when individuals perceive higher work and nonwork demands along with a high need for resource recovery, they put more effort forth in their recovery activities as opposed to those who perceive lower work and nonwork demands and experience lower need for resource recovery.

This observed effect may be at least partially explainable through COR theory (Hobfoll, 1989, 2001), which suggests that individuals are inherently motivated to gain resources. Because of this basic motivation, people have a desire and tendency to enhance their resource pool, which

is done through the investment of more resources. Building one's resource pool not only makes it easier to continue gaining further resources through resource caravans, but it also helps to protect individuals against future resource loss. An implication here is that perhaps individuals in the present study experience higher recovery quality through the investment of more resources, which allows them to continuously rely on that resource supply when responding to work and nonwork demands, without experiencing the consequences that are typically associated with high demands (i.e., lower psychological well-being and higher need for resource recovery). By constantly replenishing their resource supply through effective recovery, this logic explains how individuals are able to respond to high work and nonwork demands while simultaneously keeping their well-being intact and displaying a lower need for resource recovery.

Another explanation may also relate to the work by Schwartz (2004) on decision making styles comparing maximizers versus satisficers. Maximizers are those who are constantly seeking the best options that will lead to the best outcomes in almost everything they do. They generally put their full effort and energy forth in many domains of their life, displaying a true engagement with life itself. Satisficers, on the other hand, generally prefer fast decisions instead of the best decisions. They pick the first readily available option that is good enough, even if that is not the best option possible. It is possible, in fact rather likely given the nature of our MTurk sample (i.e., engaging in multiple opportunities to make extra money, even though the majority of participants already perceive their income as adequate, $M = 3.49$, $SD = .89$), that a large proportion of the participants in this study hold a maximizer mindset. When work and nonwork demands are high, individuals with this type of mindset are likely to seek the best options in their recovery strategies (i.e., more active, higher quality activities). Taken together, both of these explanations challenge the commonly accepted notion that when an individual is drained, they

are automatically less likely to invest the effort and resources needed to engage in effective recovery. Future research should more directly test and challenge this preconceived idea that is so prevalent in current recovery research by continuing to explore individual differences and/or decision making styles that may influence how people respond to demands and recovery needs.

Extending past these first four hypotheses, hypothesis 5 was not supported using either operationalization of quality of recovery (the traditional operationalization existent in recovery literature that includes relaxation as a fourth quality of recovery or the revised operationalization of quality of recovery including psychological detachment, mastery, and control). Although it was not shown that quality of recovery moderates the relationships between work-related demands and need for resource recovery or psychological well-being, additional exploratory follow-up analyses yielded interesting findings. Specifically, state relaxation was tested as a moderator of the relationship between work-related demands and (a) need for resource recovery and (b) psychological well-being. State relaxation following recovery experiences significantly moderated the relationship between work-related demands and need for resource recovery (as shown below in Table 16) and psychological well-being (as shown below in Table 17), supporting a conditioned effect between work-related demands and recovery outcomes. This suggests that participants who felt more relaxed after their recovery activities also experienced less need for resource recovery and higher psychological well-being even when work-related demands were high, compared to those who felt less relaxed after their recovery experiences.

Table 16 Work-Related Demands Predicting NFRR with State Relaxation

Variable	coefficient	BootMean coefficient	BootSE	BootLLCI	BootULCI
Constant	2.95	2.94	0.34	2.26	3.61
Work-Related Demands	0.77	0.77	0.19	0.40	1.14
State Relaxation	-0.23	-0.23	0.06	-0.35	-0.11
Work-Related Demands X State Relaxation	-0.13	-0.13	0.06	-0.25	-0.01
Age	-0.01	-0.01	0.00	-0.02	0.00
Female	0.02	0.02	0.09	-0.16	0.18
Education	0.09	0.09	0.03	0.03	0.14
Physical Limitation	0.18	0.18	0.05	0.09	0.28

Model Summary

R-sq	*MSE*	*F*	*df*1	*df*2	*p*
0.22	0.75	5.58	1.00	406.00	0.0186

Note. $N = 414$. NFRR = need for resource recovery.

Table 17 Work-Related Demands Predicting PW with State Relaxation

Variable	coefficient	BootMean coefficient	BootSE	BootLLCI	BootULCI
Constant	4.45	4.45	0.34	3.79	5.11
Work-Related Demands	-0.43	-0.42	0.29	-1.02	0.15
State Relaxation	0.39	0.40	0.07	0.25	0.53
Work-Related Demands X State Relaxation	0.19	0.18	0.09	0.01	0.38
Age	0.01	0.01	0.00	0.00	0.02
Female	0.00	0.01	0.09	-0.17	0.19
Education	-0.03	-0.03	0.03	-0.08	0.03
Physical Limitation	-0.26	-0.26	0.05	-0.36	-0.16

Model Summary

R-sq	*MSE*	*F*	*df*1	*df*2	*p*
0.23	0.83	10.64	1.00	406.00	0.0012

Note. $N = 414$. PW = psychological well-being.

This finding serves as preliminary support for the idea that state relaxation is potentially an important and rather proximate outcome of recovery experiences. PROCESS model 1 was used again to test the REQ relaxation dimension as a moderator between work-related demands and need for resource recovery and psychological well-being. Despite state relaxation and the REQ relaxation dimension being significantly correlated (r = .48), these two measured variables did not function identically as moderators of the relationship between work-related demands and need for resource recovery or psychological well-being. This suggests that relaxation as a quality of recovery experiences does not have the same positive moderating impact on need for resource recovery and psychological well-being as state relaxation following recovery. It is also worth noting here that separate models were run to test the other three dimensions (psychological detachment, mastery, and control) separately on this same moderation model. Only the dimension of control served as a significant moderator for the relationship between work-related demands and psychological well-being. This seems to be strong evidence for the idea that, in general, state relaxation following recovery experiences is the biggest influencer of psychological well-being and need for resource recovery as opposed to the quality of the actual recovery experience itself.

This finding is related to hypothesis 6 such that state relaxation served as a significant sequential mediator following recovery actions, supporting hypothesis 6. Because both the REQ relaxation dimension and state relaxation are highly correlated, an alternate model (recovery quality including only psychological detachment, mastery, and control) was tested to ensure the significance of the model was not solely attributed to having two similar variables included. The results from the second model suggest that state relaxation can be achieved through psychological detachment, mastery, and control alone.

To tease apart these mechanisms by which a real recovery outcome (i.e., state relaxation) may be achieved, the same model was tested on each single dimension of recovery instead of the overall recovery quality score to see if the effect was evident through all four dimensions or if it was primarily channeled through one or two. Of these dimensions, there were significant indirect effects for the relationship between work-related demands and outcomes of need for resource recovery and psychological well-being with mastery and relaxation separately (leading to state relaxation) serving as partial mediators for both outcomes. Control served as a significant mediator leading to state relaxation for the relationship between work-related demands and psychological well-being, but not for need for resource recovery.

Surprisingly, the indirect effect of psychological detachment serving as a mediator (leading to state relaxation) was not significant for either relationship between work-related demands and outcomes of need for resource recovery or psychological well-being. This contradicts previous literature suggesting that psychological detachment may be the most important recovery quality element (Sonnentag & Fritz, 2007). This could be due to restricted scores on this measure within the present sample, but this finding also highlights the possibility that recovery does not require complete or total detachment from work.

Positive work rumination through repetitive thought can have constructive consequences (e.g., recovery from depression) and may be relevant considering the present finding (Watkins, 2008). Psychological detachment from work is still important in many cases, but future research may want to compare negative and positive work thoughts with relevant study variables to better understand if detachment is fully needed. The results here suggest it may be time for future research to continue teasing apart these dimensions of recovery quality and refrain from

accepting the idea in current literature that psychological detachment is the dominant and most important recovery quality experience.

An additional exploratory model was tested in which the REQ relaxation dimension (as opposed to state relaxation) served as a sequential mediator following the quality of recovery actions on the three dimensions (psychological detachment, mastery, and control). Results revealed that the REQ relaxation dimension was also a significant sequential mediator for psychological well-being, but not for need for resource recovery. This suggests that state relaxation following recovery experiences may be the stronger predictor of a broader recovery-related outcome (i.e., psychological well-being), but not necessarily of a more focused recovery-related state (i.e., need for resource recovery).

Regardless, it is interesting to see that state relaxation served as a sequential mediator with the REQ relaxation dimension dropped altogether. This does not necessarily mean the relaxation component of the REQ should be dropped from the Recovery Experiences Questionnaire altogether, especially because the indirect effect sizes are not huge, but these results along with earlier hypothesis results suggest there may be value for future research to more fully explore the possibility of relaxation being positioned more as an intermediate outcome of recovery than as a fourth quality of recovery experiences. This point is important and notable given the evidence in this study and others (Keating, 2016; Oerlemans et al., 2014; Sonnentag, 2001; van Hooff et al., 2011) that active forms of recovery lead to better recovery-related outcomes than passive forms of recovery, given that the latter is typically implicitly linked to relaxation than the former.

The results from hypothesis 7 further explain the findings from hypothesis 6 by showing that increased effort during recovery experiences leads to significantly higher quality of

recovery, higher state relaxation, higher psychological well-being, and lower need for resource recovery. It is interesting to note here that the relaxation dimension of recovery quality was not positively associated with effort put forth in recovery activities. This makes sense given the idea that if more effort is put in the activity, the experience itself is likely not going to be relaxing. Although increased effort put forth during recovery activities is not positively associated with relaxation as a recovery experience, it is interesting to see that more effort put forth is positively associated with state relaxation *after* the recovery experience.

This supports previous evidence that positive effects result from putting more effort towards recovery activities and is aligned with the developing support mentioned above for the notion that active forms of recovery may be more beneficial than passive forms of recovery. The present findings contribute to the limited literature in this area and help provide clarity to the mixed findings in this literature so far.

Evidence to this point is found not only in the quantitative analyses but was also evident throughout qualitative responses in this study. One participant mentioned that their recovery activity of lifting weights is "not restorative or peaceful," but that, "after the workout is where the restorative properties come in". This participant went on to describe that lifting weights, "will also make you resilient over time both mentally and physically which improves one's ability to recover over time". Another participant noted that, after working out, they "feel invigorated immediately after" while also noting that it, "keeps me healthy and gives me energy and health". Both of these statements align with the quantitative data and underlying hypotheses; the state of relaxation and other restorative properties that result from the experience of recovery may be a stronger predictor of outcomes such as need for resource recovery and psychological well-being more so than just the experience of recovery itself.

Research by Bennett et al. (2016) on recovery activity profiles is relevant here, such that recovery experiences can work in a sequence to provide maximum benefits. This also links to the active vs. passive conceptualizations of recovery mentioned above, such that active activities allow individuals to experience better recovery experience quality as well as better recovery outcomes (e.g., state relaxation, need for resource recovery, psychological well-being).

It is also important to emphasize here the possibility that passive-active combinations of activities may be more influential than strictly active or passive recovery efforts. For example, one participant listed meditation as one of their recovery activities and mentioned it helps with "improved concentration and being able to remain calm when in extreme physical pain" when engaging in another listed recovery activity of lifting weights. This suggests that more passive activities (e.g., meditation) may help individuals to reap even more benefits of their active recovery activities (e.g., lifting weights) than they otherwise would with the active activity alone. This means that relaxation could potentially be a precursor *and* an outcome of good recovery. The data from the current study cannot fully support this, but this idea could be a promising area for future research to explore.

Research Questions

The results of research questions 1 and 2 are integrated in the preceding discussion of hypotheses 4 and 1, respectively. To recap, research question 1 results showed that perceived nonwork demands is not significantly related to quality of recovery, but that perceived nonwork demands was significantly and positively associated with need for resource recovery. Research question 2 results revealed that those who already engage in their preferred recovery activities

experienced significantly higher quality of recovery, state relaxation, and psychological wellbeing, along with significantly lower need for resource recovery.

Research question 3 is worth mentioning separately in this section. Multiple regression analysis was used to address the research question of whether the presence of nature (on a Likert scale from completely built environment to completely natural environment) during recovery activities is associated or has a conditioning effect with (a) the quality of recovery, (b) state relaxation, (c) need for recovery, and (d) psychological well-being. Results showed that (a) the presence of nature is not significantly associated with the quality of recovery overall but is significantly and positively associated with mastery (β = .22), control (β = .12), and relaxation separately (β = .12). The presence of nature is (b) significantly positively associated with state relaxation (β = .22). The presence of nature is not significantly associated with (c) need for resource recovery (β = .01) or (d) psychological well-being (β = .09) in the regression-based models. However, after splitting the presence of nature into high vs. low grouping variables, independent samples *t*-test results showed that those with a high presence of nature during recovery activities did report higher psychological wellbeing (M = 5.77, SD = .92) versus those with low presence of nature during recovery activities (M = 5.54, SD = 1.07). This mean difference was significant, $t(481) = -2.52$, $p = .01$.

These significant positive relationships of the presence of nature with mastery, control, relaxation, and state relaxation were further probed through PROCESS model 92. This model tested quality of recovery, state relaxation, and the presence of nature as moderators on the relationship between work-related demands and quality of recovery and state relaxation. The results of this model yielded interesting results displayed below in Table 18 and Figure 6. Table 18 illustrates there is a significant main effect of state relaxation on need for resource recovery (*b*

= -.54). When looking at the interaction between state relaxation and the presence of nature (*b* = .17), the confidence interval just crosses over the 0 threshold, making this interaction not statistically significant, but worth further exploring after plotting the interaction.

Table 18 Interaction Effects of Quality of Recovery, State Relaxation, and Presence of Nature on the Relationship Between Work-Related Demands and NFRR

Variable	**coefficient**	**BootMean coefficient**	**BootSE**	**BootLLCI**	**BootULCI**
Constant	3.39	3.39	0.99	1.4536	5.3354
Work-Related Demands	0.48	0.48	0.12	0.2554	0.7040
Quality of Recovery	0.13	0.12	0.30	-0.4590	0.7041
State Relaxation	-0.54	-0.53	0.20	-0.9232	-0.1212
Presence of Nature	0.08	0.08	0.39	-0.6891	0.8478
Work-Related Demands X Presence of Nature	-0.06	-0.06	0.05	-0.1551	0.0390
Quality of Recovery X Presence of Nature	-0.16	-0.15	0.12	-0.3843	0.0771
State Relaxation X Presence of Nature	0.17	0.17	0.09	-0.0032	0.3365
Age	-0.01	-0.01	0.00	-0.0193	-0.0034
Female	0.02	0.02	0.09	-0.1529	0.1862
Education	0.09	0.09	0.03	0.0335	0.1427
Physical Limitation	0.18	0.18	0.05	0.0927	0.2738

Model Summary

R-sq	*MSE*	*F*	*df*1	*df*2	*p*
0.23	0.76	10.77	11.00	401.00	0.0000

Note. $N = 413$, NFRR = need for resource recovery.

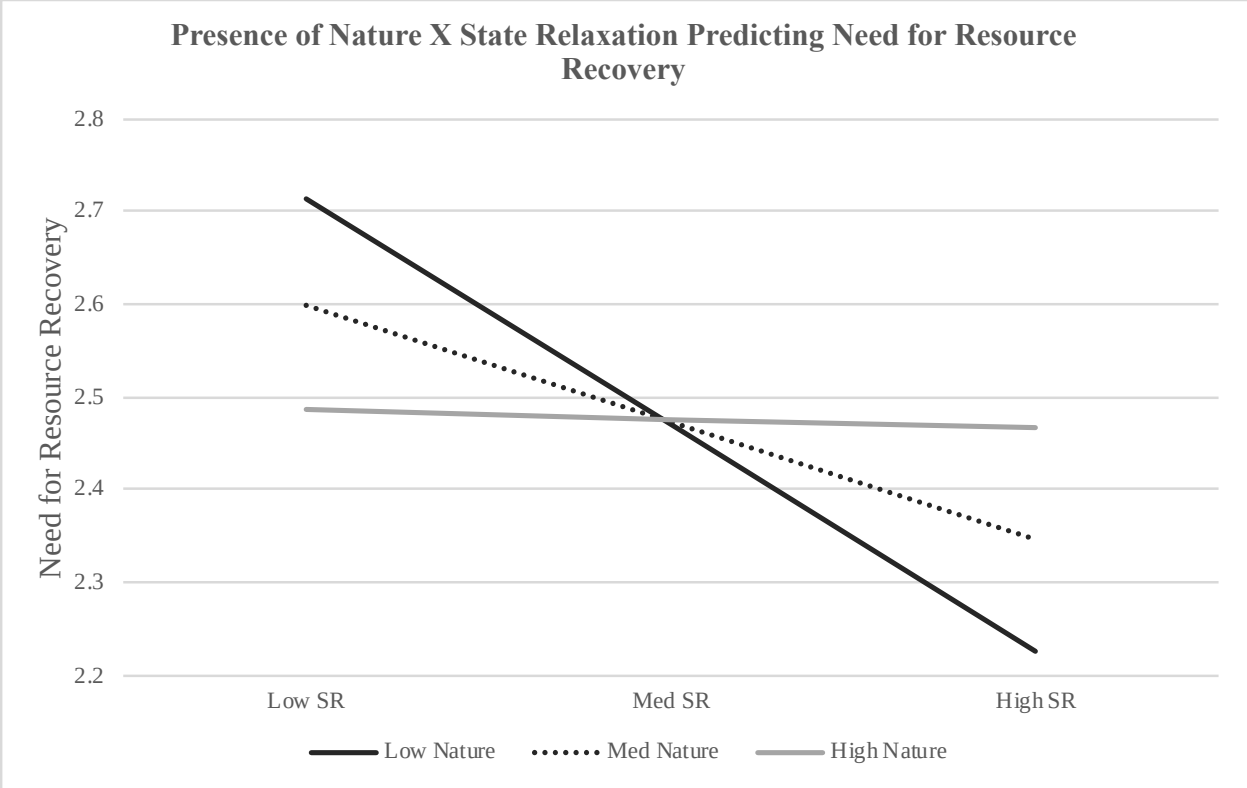

Figure 6 Moderating effects of state relaxation and nature on the outcome of need for resource recovery

Figure 6 visually represents this interaction first by showing the negative relationship between state relaxation and need for resource recovery (also established in Table 18 through a significant main effect of this negative relationship). Further, Figure 6 illustrates that when state relaxation is low, need for resource recovery is high, but it is highest for those who have less nature present during recovery activities. This suggests that the presence of nature helps to keep need for resource recovery lower, even when state relaxation is low. Interestingly, this effect of the presence of nature during recovery activities is not consistent as state relaxation increases. Specifically, when state relaxation is high, greater presence of nature is actually associated with higher need for resource recovery. It is important to note here, though, that a floor effect seems to be evident with the need for resource recovery outcome. Low levels of need for resource

recovery overall are evident, which is a possible limitation and explanation for the non-significant results and why the interaction does not hold the same effect when state relaxation is high. Regardless, from this side of the interaction, it seems that state relaxation is the dominant predictor of need for resource recovery and the presence of nature does not have as great of an effect when state relaxation is high. The presence of nature is not harmful to need for resource recovery in this case, it just does not have as great of benefits attached to it as it does when state relaxation is low.

Interpreting Figure 6 further, high presence of nature during recovery activities seems to level out these two extremes of the interaction, such that high presence of nature keeps individuals' need for resource recovery fairly low, regardless of the level of state relaxation. There is still a slightly negative relationship here, such that need for resource recovery is lowest for those who reported high presence of nature during recovery activities and high post-recovery state relaxation. Together, this suggests that the presence of nature is a fairly stable element to rely on during recovery activities to keep need for resource recovery relatively low. The presence of nature is even more beneficial towards keeping need for resource recovery levels low when paired with post-recovery state relaxation. In other words, more nature that is present during recovery activities coupled with higher post-recovery state relaxation leads to lower levels of need for resource recovery.

This interaction (although not statistically significant) ultimately suggests that the presence of nature can condition or maybe supplement to the effect of recovery activities, especially when post-recovery state relaxation is low. For example, when a recovery activity that is associated with lower state relaxation is chosen (e.g., drinking non-alcoholic beverages such as water, coffee, tea, or soda), it will likely lead to lower levels of need for resource recovery if

nature is present than if the person is engaging in this form of recovery activity in a heavily built environment. This is encouraging to see as passive activities such as the example above are sometimes all that seems available, but simply having some aspect of nature included (i.e., sitting outside) when engaging in the passive activity can yield positive effects (i.e., higher state relaxation and lower need for resource recovery). This relationship unfortunately is not evident for the outcome of psychological well-being, but it is encouraging to see the interaction effect (that may be significant with more statistical power) at least on the outcome of need for resource recovery. Given the limitations here and non-significant effect, this information ultimately just serves as an exploratory analysis and is laying the groundwork for future research. This could be a promising area for future research to focus more extensively on the role nature plays in recovery activities.

It is also worth noting here that the extent to which the environment was peaceful when engaging in recovery activities is significantly and positively associated with quality of recovery (β = .44), state relaxation (β = .57), and psychological well-being (β = .24), and significantly negatively associated with need for resource recovery (β = -.10). There was no significant moderating effect of the presence of nature on these variables and no evidence of a significant interaction with the presence of nature and the extent to which the environment is peaceful with the above study variables, but this also yields promising areas for future research to explore given the moderate to large effect sizes mentioned above with the regression-based model. Incorporating aspects of Attention Restoration Theory (James, 1892, 1984) can begin to direct future research in this area by incorporating aspects of the theory such as involuntary attention and fascination with other relevant quality of recovery variables.

Limitations

The first potential limitation is that about 18% of the total recovery activities listed were ones that were included as examples in survey instructions. Specifically, participants were asked to "identify the three restorative or resource replenishing activities, other than sleeping, in which you most frequently engage (examples: running, reading, eating, etc.)". As mentioned earlier, reading made up about 11% and eating made up about 7% of the total listed recovery activities. Had these examples not been given in the instructions, participants may not have listed these as frequently and other dominant activities may have emerged. However, this is not a critical flaw given that these are common activities people engage in on a daily basis, especially eating. The magnitude of these responses may have been higher because they were given as examples, but these activities likely would have been frequently reported regardless of the examples in the instructions.

A second potential limitation to this study is the nature of the data (i.e., all self-report data) and survey fatigue. A future direction to reduce concerns of all self-report data could be to incorporate non self-report measures, such as physiological indicators of relaxation (e.g., heart rate, blood pressure) or indicators of activity with wearable activity trackers.

Regarding survey fatigue, participants were asked to respond to the complete REQ for a total of three times. This results in responding to 48 similar items on this 16-item scale. This, along with all self-report data could be considered a limitation to this study. However, this study had an 11% drop-out rate (those that dropped out during or after the REQ items) and survey completion times suggest participants were generally engaged in the survey. The average time for completing the survey was about 24 minutes, but the range was between ten minutes to two hours.

The breakdown of timing categories is as follows: 10-29 minutes (75%), 30-49 minutes (19%), 50-69 minutes (5%), 70-89 minutes (less than 1%), 90+ minutes (less than 1%). Because one of the criteria for participation in this study was to have a HIT approval rate of at least 95 (which is slowly earned by successfully completing many surveys), this alludes to the idea that participants are fairly well-versed in completing surveys on the MTurk platform. Participants were told the survey should take approximately 30 minutes to complete and a majority of them completed it under this time frame. This is expected given the above suggestion that MTurk workers are generally quick at completing surveys (though still providing high quality data as evident through the qualitative responses). There is no direct evidence suggesting that the abundance of REQ items affects the time to complete the survey and, as suggested by the timing categories, those that may not have been as fast at taking surveys did in fact take their time (even up to two hours). It is suspected that participants were either able to process and respond to the items quickly or took their time in doing so, but this did not have a large impact on drop-out rates as mentioned. All told, the abundance of REQ items could have caused survey fatigue, but there is no direct evidence suggesting this is a major concern.

A third limitation is that although the MTurk participation filtering criteria were set to only allow participants in the U.S., 3% of the study population were located from eleven countries outside the U.S. The research aim of providing recovery recommendations to the average American full-time worker is still fulfilled given that 97% were located in the U.S., but this was a limitation of the study by also analyzing data from participants located in other countries. This limitation may impact the generalizability of the results to the average American full-time worker (although there were no significant differences in core study variables between

U.S. and non-U.S. participants as evident through a variety of independent samples *t*-test analyses).

A fourth limitation refers to one of the potential covariates that was intended to be used in the analyses. Participants were asked if they had any major life events within the last few weeks and, if so, how much of an impact the life event had on their typical work or nonwork routine. There was only a small portion who indicated "yes" to having a major life event (and responded to the follow-up impact question) and by including this variable in the analyses it significantly reduced the sample size to include only these participants in the analyses. Therefore, this variable was not included as a covariate in the analyses. This variable did not seem to significantly affect the results, but it would have more closely ensured typical work and nonwork routines were being measured had it been included as a covariate.

Finally, a fifth limitation is regarding the effect sizes, specifically with the mediation effects for hypothesis 6, which is testing the alternate stress-recovery framework. As mentioned, the confidence intervals had to exclude zero to be considered significant. The confidence intervals excluded zero in these mediation models deeming them significant, but the confidence intervals were close to zero. This suggests that the indirect pathways were not large in magnitude, but these do still seem to be valuable insights when taking into account other study variables and hypothesis tests. Future research should continue to explore the relaxation/state relaxation dimensions as an outcome of the recovery process to confirm or deny the potentially meaningful results found in this study.

Implications

As a whole, this study highlights the importance of investing effort into optimal recovery activities given the positive effects (i.e., higher psychological well-being and lower need for resource recovery) when quality of recovery is high. Table 15 provides actionable guidance for individuals who may be struggling to effectively recover their resources after responding to work-related demands. The table provides a list of the activities deemed highest quality through this study, which can serve as an effective resource for both individuals and organizations when better understanding work recovery and the dimensions that must be evident for optimal recovery.

This study takes a more uplifting view through highlighting the positive effects of optimal recovery, but it is still important to have an understanding of the negative effects that recovery literature has shown evidence of thus far. Although no direct variables related to the workplace (e.g., job performance, turnover, absenteeism, presenteeism) were assessed in relation to recovery quality in this study, previous research suggests that when high levels of work-related demands are present and resources are not replenished, organizations can generally expect to see decreased job performance, increased worker intentions to leave the organization, and negative effects on work-related behaviors (Bakker et al., 2013; Moloney et al., 2018; Sonnentag & Fritz, 2015).

The present study sheds more light on the positive side of this, showing that when work-related demands are high and resources are replenished, positive effects result such as higher psychological well-being and lower need for resource recovery. As discussed earlier, this study shows how workers can effectively replenish their resources through specific recovery activities even when work-related demands are high, which ultimately contributes to the current recovery

literature that often highlights the negative effects of work-related demands and poor recovery quality (as shown through broad activity categorizations).

Given this, organization leaders should take these results into account and offer opportunities for their workers to recover both at work and outside of work. This includes micro breaks, which can easily be implemented throughout the workday. This could include going for walks, having short yoga sessions, or other activities (preferably physical or higher effort) where a worker can get away from their work and engage in something to recover their resources. However, it is also important to keep in mind another large aspect of results from this study; the idea that control is significantly associated with psychological well-being and need for resource recovery. While it may be easiest to implement a one-size-fits-all approach to an intervention in the workplace, it may be frustrating to see that this approach does not work when individual differences come into play. This suggests that control and choice over what an individual engages in is important to consider given the finding that participants who preferred other activities than they were able to frequently engage in experienced significantly lower recovery quality than those who already engage in their preferred activities. This implies that those who already engage in their preferred activities experience increased control and fewer limitations on their recovery choices, which then allows these individuals to get more out of their recovery experience (i.e., significantly higher psychological detachment, mastery, control, and relaxation). This also directly impacts recovery outcomes of wellbeing and need for recovery. Specifically, those who perceive a higher degree of control and can choose their optimal recovery activities experience significantly higher psychological wellbeing and significantly lower need for resource recovery versus those who prefer other activities that they do not (or cannot) currently engage in.

Additionally, organization leaders can have a positive impact on workers' recovery activities by offering programs to educate workers on effective recovery, reimbursements for high quality recovery activity equipment (e.g., bikes, gym memberships, hiking gear), discounts on healthcare costs when workers engage in high quality recovery activities, and also by modeling high quality recovery behaviors. This includes not only preaching about high quality recovery activities, but also practicing what they preach by engaging in high quality recovery activities. There are many ways for organizations to support their employees to replenish the resources they lose when responding to work-related demands in the workplace, and organizations can expect to see positive impacts not only on worker well-being, but likely return on investment (ROI) through more positive work-related behaviors in general (e.g., increased productivity and organizational citizenship behaviors, lower healthcare costs).

Future Research

Several future research directions are mentioned above in the discussion section where appropriate based on the hypotheses to which they relate. To recap, these suggestions include (a) asking participants how much available time they feel they have to engage in recovery activities (from hypothesis 2), (b) explore individual differences and/or decision making styles when responding to demands at work and outside of work (from hypothesis 4), (c) further explore the possibility of relaxation being positioned more as an intermediate outcome of recovery (i.e., state relaxation) than as a fourth quality of recovery experiences (from hypothesis 6), (d) consider positive and negative rumination of work thoughts and tease apart whether full psychological detachment from work is necessary (from hypothesis 6), (e) explore the idea of active-passive recovery activity combinations for higher quality recovery (from hypothesis 7), and (f) further

exploring the presence of nature and how peaceful the environment is when engaging in recovery activities (from research question 3).

Over and above these briefly mentioned in the discussion section, there are a number of additional future research directions that will help guide emerging recovery literature. The first future direction is related to coding the activities into the types mentioned in Sonnentag (2001). Previous research has taken a categorical approach as the foundation of the research study (Ragsdale et al., 2016; Sonnentag, 2001; Sonnentag et al., 2017) and utilizes five broad categories of recovery activities (physical, social, low-effort, household and childcare, and work-related) and has participants indicate how often they engage in these different categories of activities. By taking a qualitative approach and trying to deduct down to these specific categories, it was evident these five categories are not the most comprehensive way of categorizing recovery activities. One initial theme that emerged (along with considering results from hypothesis 7) is that, instead of a "physical" category, future research should explore the idea of differentiating between physical effort and mental effort. For example, the activity of learning and studying is not, by the definition used (Sonnentag, 2001), a physical activity. However, this activity still requires a significant amount of effort and energy put forth, but more so mental effort than physical.

Additionally, it was difficult to categorize activities under just one category depending on the context that the participant mentioned and because of the varying perceptions of the qualitative coders for this study. The categorization of activities was subjective to the three independent coder's perceptions and, more often than not, full agreement was not evident within the coder's responses. For the sake of simplicity and consistency, only the overlapping codes between the three independent coders were accepted. However, multiple categories emerged for

a majority of the activities as expected. This suggests it is not realistic for future research to categorize activities into just one category.

For example, one of the listed recovery activities was driving. Some participants said they drive with friends, some only listed driving without mentioning anything about a social context. Therefore, some of these activities could be categorized as social as well. Furthermore, driving could certainly be work-related too, considering an occupation like an in-home physical therapist. In this example, perhaps workers in this occupation use driving to their next patient's home as micro breaks where they can personally recover before they give care to another patient. The work itself may be demanding, but the driving in between may help them to replenish their resources before going to provide care for their next patient. In this context, driving is work-related, perhaps social, but also likely low effort. The point trying to be made here lies on the idea that future research should avoid categorizing recovery activities into only one category. Expanding the categories could be an area for future research to explore as mentioned, but it is also important to keep in mind the complexity of the activity context, individual perceptions, and the variety of ways the activities can be grouped.

Related to the example given above about the in-home physical therapist, a second direction for future research to take is more explicitly considering micro breaks and recovery experiences outside of the traditional idea that evenings after work are the only time to recover. The framing of the original Recovery Experiences Questionnaire (Sonnentag & Fritz, 2007) asks participants to respond to the items with respect to their free evenings. As past research suggests (Cranley et al., 2015; Hunter & Wu, 2016), micro breaks at work can be beneficial for recovery and can be a quick but effective opportunity to replenish resources. In the current study, 38% of participants reported that they engage in their recovery activities after work, but a moderate

amount reported engaging in activities on the weekend (35%), before work (14%), and during work breaks (13%) as well. This in itself is enough to encourage future research to change the framing of the REQ to include more than just free evenings because, as the above results suggest, quality recovery happens at times outside of free evenings. This finding highlights the value of the way this study approached the adaptation of the instructions and even the REQ items themselves because the focus was on specific recovery activities that individuals engage in at any point in the day, not just about how they feel in their free evenings in general. By keeping the original framing of the REQ instructions, this sets up a limiting frame about what can constitute recovery.

On a related note, the current study supports the idea that when using the REQ, the framing of the items should be adapted to a specific activity or event that participants can report on as opposed to thinking about something like free evenings in general. This type of framing limits the impact of treating recovery as a process where individuals' experiences lead to outcomes such as need for resource recovery or psychological well-being. As suggested by the hypothesis results, quality of recovery is significantly associated with these types of outcomes along with state relaxation. This also supports the idea that the REQ should be used only for recovery experiences, not as outcomes of recovery experiences. To break this down further, this study supports the idea that the REQ should be used only to examine how much psychological detachment, mastery, and control (and even relaxation, as it is presented in the REQ) one experiences *during* their recovery activities, but should not be used to assess how much of these three dimensions one feels *after* activities. In simpler terms, the present study and findings suggest that the REQ should not be used as an indication of effects of recovery, but only the

quality of the recovery experiences themselves (as suggested in probing the results in hypothesis 5).

Another area future research could focus on is differences in recovery quality based on the industry someone works in. This was not explored in the present study but could offer valuable insight into how each type of worker may best be able to recover and replenish their resources. Finally, although including data from participants outside the U.S. was a limitation and beyond the focus of the current study, it is an area that future research could explore. No core study variables appeared to significantly differ cross culturally in this study but analyzing the cross-cultural differences in recovery quality and other relevant variables could reveal noteworthy results given that these exploratory independent samples t-test analyses were tested on 97% versus 3% of the sample.

Conclusion

By taking a comprehensive and qualitative approach to assessing the quality of recovery activities, the present data provide extensive insight into many of the hypotheses and research questions to better understand recovery processes, outcomes, and implications. Although many of the basic hypotheses that are supported in past literature were not supported in this study (e.g., the relationship between work-related demands and psychological well-being), many valuable explanations are outlined in the discussion section through further exploration of study variables. The four-dimension REQ and three-dimension REQ were extensively studied and tested multiple ways to ensure the same (or more explainable) conclusions were reached.

Relating to this, one of the primary outcomes of this study is the revealed support for the revised work recovery framework illustrated in Figure 1, showing that psychological

detachment, mastery, and control are the three primary recovery mechanisms that lead to state relaxation. State relaxation then serves as a sequential mediator following the quality of recovery actions, which finally results in positive effects for the main study outcomes (i.e., lower need for resource recovery and higher psychological well-being). Relating to this, this study also supports the idea that increased effort put into recovery activities (i.e., more active) results in greater benefits (e.g., higher psychological well-being and lower need for resource recovery), contributing to the contradictory literature thus far on active vs. passive recovery activities.

Another main outcome of this study is the development of a comprehensive list of recovery activities and their associated quality, type(s), dominant themes, and outcome of state relaxation (which proved to be an important predictor of many study outcomes, suggesting recovery quality is significantly associated with state relaxation and therefore important to report which activities will likely result in this state). This comprehensive taxonomy of recovery activities can guide future recovery research in addition to guiding organizations to ways in which they can offer and/or create interventions to replenish workers' resources both at work and outside of work.

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APPENDIX A

IRB APPROVAL LETTER

THE UNIVERSITY OF TENNESSEE
CHATTANOOGA

Institutional Review Board
Dept 4915
615 McCallie Avenue
Chattanooga, TN 37403
Phone: (423) 425-5867
Fax: (423) 425-4052
instrb@utc.edu
http://www.utc.edu/irb

TO: Emily Nixon **IRB # 19-122**
Dr. Chris Cunningham

FROM: Lindsay Pardue, Director of Research Integrity
Dr. Amy Doolittle, IRB Committee Chair

DATE: 9/19/2019

SUBJECT: IRB #19-122: Quality assessment of work recovery activities: Guidance for recovering from work-related demands

Thank you for submitting your application for exemption to The University of Tennessee at Chattanooga Institutional Review Board. Your proposal was evaluated in light of the federal regulations that govern the protection of human subjects.

Specifically, 45 CFR 46.104(d) identifies studies that are exempt from IRB oversight. The UTC IRB Chairperson or his/her designee has determined that your proposed project falls within the category described in the following subsection of this policy:

46.104(d)(2)(i): Research only includes educational tests, surveys, interviews, public observation and recorded information cannot readily identify the subject (directly or indirectly/linked)

Even though your project is exempt from further IRB review, the research must be conducted according to the proposal submitted to the UTC IRB. If changes to the approved protocol occur, a revised protocol must be reviewed and approved by the IRB before implementation. For any proposed changes in your research protocol, please submit an Application for Changes, Annual Review, or Project Termination/Completion form to the UTC IRB. Please be aware that changes to the research protocol may prevent the research from qualifying for exempt review and require submission of a new IRB application or other materials to the UTC IRB.

A goal of the IRB is to prevent negative occurrences during any research study. However, despite our best intent, unforeseen circumstances or events may arise during the research. If an unexpected situation or adverse event happens during your investigation, please notify the UTC IRB as soon as possible. Once notified, we will ask for a complete explanation of the event and your response. Other actions also may be required depending on the nature of the event.

APPENDIX B

INFORMED CONSENT FORM

PLEASE REVIEW THE FOLLOWING INFORMATION CAREFULLY SO YOU CAN PROVIDE INFORMED CONSENT TO PARTICIPATE IN THIS RESEARCH:

What is this study all about?
This study is being conducted by Emily Nixon, a graduate student in the Industrial and Organizational Psychology program at The University of Tennessee at Chattanooga. This research is being conducted under the supervision of Dr. Chris Cunningham, also of The University of Tennessee at Chattanooga. The purpose of this study is to identify and better understand activities people engage in to recover from job-related demands.

Please note that participants in this study must:

- *Be located in the United States*
- *Be at least 18 years of age*
- *Work at least 35 hours each week*

How will this work?
If you agree to participate you will be asked to respond to a brief internet-based survey (requiring approximately 30 minutes of your time). This survey will ask you to respond to questions regarding recovery activities you engage in and various questions regarding the quality, time frames, and motives for engaging in each activity you list. The survey will also include questions about your job, nonwork time, and well-being. *Note: It will be easiest/quickest for you to* ***complete this survey on a computing device with a keyboard*** *as there are several open-ended questions throughout the survey for which you will be asked to type your response.*

Benefits of this Study
By participating in this research, you will be contributing to a growing base of knowledge regarding strategies for recovering from job-related demands. This information will help researchers and educators identify optimal work recovery strategies to provide guidance for engaging in the most effective resource-replenishing activities. Additionally, you will earn $1.00 for "successfully and fully completing" this Human Intelligence Task (HIT) through Amazon's Mechanical Turk (MTurk) platform. Please note that this survey requires your full attention. Successful and full completion of this study requires that you pass attention check questions embedded in the survey AND that you respond as fully as possible throughout the entire survey. ***NOTE that if you fail any attention check items, your survey session will automatically end, and you will not have the opportunity to complete the work for this HIT. In this situation, you will not be paid for your work on this HIT.***

What are the risks to me?
The anticipated risks of this study are limited to the potential inconvenience of taking time to respond to the survey. If you feel uncomfortable responding to any question within the survey, you are allowed to skip it. You can also withdraw from the study at any time. We certainly hope you will respond as fully as possible, though, because we cannot complete this research without input from workers like you. ***NOTE that if you withdraw from this study without completing the survey, you will not be paid for this HIT because, by definition, you will not have completed this HIT.***

What about my privacy?
Your participation in this research will be kept strictly confidential. All data you provide through this survey will be securely gathered and stored in encrypted and password protected files accessible only by the researchers listed below. No names or identifying information will ever be shared with other persons not involved with this research.

Voluntary participation:
It is your choice to participate in this research and you may withdraw from this study at any time. If you decide to quit before you have finished the survey, however, your answers will NOT be recorded. Because we can only make use of fully complete surveys, we greatly appreciate your full participation.

How will the data be used?
The results of the study will be used for research purposes only. Group-level (not personally identified) results from the study will be presented in educational settings and at professional conferences, and the results may be published in a professional journal in the field of psychology. The data gathered through this survey will help to inform workers on optimal work recovery strategies.

Contact information:
If you have concerns or questions about this study, please contact the chair of UTC's Institutional Review Board, Dr. Amy Doolittle, at amy-doolittle@utc.edu or 423-425-5563 or the faculty supervisor for this study, Dr. Chris Cunningham, at chris-cunningham@utc.edu or 423-425-4264.

By selecting "Yes" below and opting to continue and complete this survey, you acknowledge that you have read this information and agree to participate in this research, with the knowledge that you are free to withdraw your participation at any time without penalty.

Thank you in advance for your assistance and participation.

Sincerely,
Emily Nixon
Christopher J. L. Cunningham, Ph.D.
The University of Tennessee at Chattanooga

I have read the preceding information and am willing to participate fully in this research.
1. Yes
2. No

APPENDIX C

COPY OF SURVEY

Q1 **PLEASE REVIEW THE FOLLOWING INFORMATION CAREFULLY SO YOU CAN PROVIDE INFORMED CONSENT TO PARTICIPATE IN THIS RESEARCH:**

What is this study all about?
This study is being conducted by Emily Nixon, a graduate student in the Industrial and Organizational Psychology program at The University of Tennessee at Chattanooga. This research is being conducted under the supervision of Dr. Chris Cunningham, also of The University of Tennessee at Chattanooga. The purpose of this study is to identify and better understand activities people engage in to recover from job-related demands.

Please note that participants in this study must:

- *Be located in the United States*
- *Be at least 18 years of age*
- *Work at least 35 hours each week*

How will this work?
If you agree to participate you will be asked to respond to a brief internet-based survey (requiring approximately 30 minutes of your time). This survey will ask you to respond to questions regarding recovery activities you engage in and various questions regarding the quality, time frames, and motives for engaging in each activity you list. The survey will also include questions about your job, nonwork time, and well-being. *Note: It will be easiest/quickest for you to* ***complete this survey on a computing device with a keyboard*** *as there are several open-ended questions throughout the survey for which you will be asked to type your response.*

Benefits of this Study
By participating in this research, you will be contributing to a growing base of knowledge regarding strategies for recovering from job-related demands. This information will help researchers and educators identify optimal work recovery strategies to provide guidance for engaging in the most effective resource-replenishing activities. Additionally, you will earn $1.00 for "successfully and fully completing" this Human Intelligence Task (HIT) through Amazon's Mechanical Turk (MTurk) platform. Please note that this survey requires your full attention. Successful and full completion of this study requires that you pass attention check questions embedded in the survey AND that you respond as fully as possible throughout the entire survey. ***NOTE that if you fail any attention check items, your survey session will automatically end, and you will not have the opportunity to complete the work for this HIT. In this situation, you will not be paid for your work on this HIT.***

What are the risks to me?
The anticipated risks of this study are limited to the potential inconvenience of taking time to respond to the survey. If you feel uncomfortable responding to any question within the survey, you are allowed to skip it. You can also withdraw from the study at any time. We certainly hope you will respond as fully as possible, though, because we cannot complete this research without input from workers like you. ***NOTE that if you withdraw from this study without completing the survey, you will not be paid for this HIT because, by definition, you will not have completed this HIT.***

What about my privacy?
Your participation in this research will be kept strictly confidential. All data you provide through this survey will be securely gathered and stored in encrypted and password protected files accessible only by the researchers listed below. No names or identifying information will ever be shared with other persons not involved with this research.

Voluntary participation:
It is your choice to participate in this research and you may withdraw from this study at any time. If you decide to quit before you have finished the survey, however, your answers will NOT be recorded. Because we can only make use of fully complete surveys, we greatly appreciate your full participation.

How will the data be used?
The results of the study will be used for research purposes only. Group-level (not personally identified) results from the study will be presented in educational settings and at professional conferences, and the results may be published in a professional journal in the field of psychology. The data gathered through this survey will help to inform workers on optimal work recovery strategies.

Contact information:
If you have concerns or questions about this study, please contact the chair of UTC's Institutional Review Board, Dr. Amy Doolittle, at amy-doolittle@utc.edu or 423-425-5563 or the faculty supervisor for this study, Dr. Chris Cunningham, at chris-cunningham@utc.edu or 423-425-4264.

By selecting "Yes" below and opting to continue and complete this survey, you acknowledge that you have read this information and agree to participate in this research, with the knowledge that you are free to withdraw your participation at any time without penalty.

Thank you in advance for your assistance and participation.

Sincerely,
Emily Nixon
Christopher J. L. Cunningham, Ph.D.
The University of Tennessee at Chattanooga

Q2 **I have read the preceding information and am willing to participate fully in this research.**

3. Yes
4. No

Q3 This survey includes several items designed to ensure that you are paying attention while working through this survey. If you fail to respond to ***any TWO*** of the attention check questions in a reasonable/logical manner, your survey attempt will automatically be terminated as an unsuccessful HIT completion and ***payment will not be earned.***

You can avoid tripping these attention check items by following these guidelines: Read all items carefully. For all items, **respond honestly and fully.** The attention check items are those that seem not to fit well with other surrounding items. These attention check items will ask a question or make a statement to which an appropriate response is **clearly some level of agreement or some level of disagreement.** When you come across an item like this, make sure your response to these types of items indicates **clear agreement or disagreement.**
By clicking "I understand," you are indicating that you understand **full attention** is needed to successfully complete this survey and are aware that you **will not receive payment** if any two items include a nonsensical answer (because you will not have successfully completed this HIT).

1. I understand that my full attention is needed throughout this HIT to receive payment

Q4 Before beginning, you must also provide the necessary identification for you to continue with this HIT. Please type in your **Amazon MTurk workerID**:

_____

Q5 Select Captcha and Verify

Q6 **Instructions:** All of us respond to **work demands** and changes in our daily lives with the help of various psychological, physical, and social "resources". Some of our work and daily activities require more resources from us than they give back; these activities **"drain" us of resources.**

Participating in other activities, however, may help us **feel replenished or restored,** as if we gained more from the activity than it took away. These activities "replenish" or restore resources. Keeping this in mind, please **identify the <u>three</u> restorative or resource replenishing activities**, other than sleeping, in which you **most frequently engage** (examples: running, reading, eating, etc.) – think broadly about activities that you engage in **at <u>*work and outside of work.*</u>**

Please **rank-order these activities** below such that the **first activity** listed is the **one you engage in most frequently** and the **last activity** listed is the **one you engage in least frequently** among these options.

Q7 Please describe your #1 restorative or resource replenishing activity.

_____

Q8 Please describe the #2 restorative or resource replenishing activity.

_____

Q9 Please describe the #3 restorative or resource replenishing activity.

Q10 Please respond to the following items with respect to your **#1 activity** you listed: **${Q7}**

Q11 Please respond to the following items**, thinking in general about the activity listed above.** Keep in mind that the way you respond to one item does not indicate how you should respond to another item**. If you feel a particular item is not relevant, or does not apply to your specific recovery activity, select N/A.**

	Disagree strongly	Disagree	Neutral	Agree	Agree strongly	N/A
When I engage in this activity I forget about work.	❑	❑	❑	❑	❑	❑
While engaging in this activity, I learn new things.	❑	❑	❑	❑	❑	❑
I feel like I can decide for myself what to do when engaging in this activity.	❑	❑	❑	❑	❑	❑
Engaging in this activity helps me kick back and relax.	❑	❑	❑	❑	❑	❑
I don't think about work at all when I engage in this activity.	❑	❑	❑	❑	❑	❑
I seek out intellectual challenges when engaging in this activity.	❑	❑	❑	❑	❑	❑
Engaging in this activity allows me to decide my own schedule.	❑	❑	❑	❑	❑	❑
I do relaxing things when engaging in this activity.	❑	❑	❑	❑	❑	❑
When engaging in this activity, I feel distanced from my work.	❑	❑	❑	❑	❑	❑
This activity allows me to do things that challenge me.	❑	❑	❑	❑	❑	❑
When engaging in this activity, I determine for myself how I will spend my time.	❑	❑	❑	❑	❑	❑
I use the time engaging in this activity to relax.	❑	❑	❑	❑	❑	❑
I get a break from the demands of work when I engage in this activity.	❑	❑	❑	❑	❑	❑
This activity helps me to broaden my horizons.	❑	❑	❑	❑	❑	❑

Engaging in this activity allows me to take care of things the way I want them done.	❑	❑	❑	❑	❑	❑
I can teleport across time and space (indicate disagreement with this item).	❑	❑	❑	❑	❑	❑
I take time for leisure while engaging in this activity.	❑	❑	❑	❑	❑	❑

Q12 Now, please respond to the following statements, thinking about how you feel ***immediately after*** engaging in this activity.

	Not at all	A little	Moderately	A lot	Completely	N/A
My muscles are *so relaxed* that they feel *limp.*	❑	❑	❑	❑	❑	❑
My hands, arms, or legs are so relaxed that they feel *warm* and *heavy.*	❑	❑	❑	❑	❑	❑
My body is *physically relaxed.*	❑	❑	❑	❑	❑	❑
I feel *peace.*	❑	❑	❑	❑	❑	❑
I feel at *ease.*	❑	❑	❑	❑	❑	❑
I feel *carefree.*	❑	❑	❑	❑	❑	❑
I feel *rested.*	❑	❑	❑	❑	❑	❑
I feel *relaxed.*	❑	❑	❑	❑	❑	❑

Q13 How many **total hours** do you typically spend engaged in this activity **each week**?

_____

Q14 How many **days per week** do you engage in this activity?

_____

Q15 When do you typically engage in this activity? Select all that apply.

1. Before work
2. During work breaks
3. After work
4. On the weekend

Q16 How much **energy and effort** do you put into this activity?

1. None at all
2. A little
3. A moderate amount
4. A lot

5. A great deal

Q17 To what extent are you in a **built environment** (e.g., city streets, indoors) versus a **natural environment** (e.g., presence of trees, lakes, outdoor qualities) when you engage in this activity?

1. Completely built environment
2. Mostly built environment
3. Equal amount of built and natural qualities to the environment
4. Mostly natural environment
5. Completely natural environment

Q18 How **peaceful** is the environment in which you typically engage in this activity?

1. Not at all peaceful
2. Somewhat peaceful
3. Neither peaceful, nor unpeaceful
4. Mostly peaceful
5. Very peaceful

Q19 Please describe why you engage in this activity.

_____

Q20 When is the last time you engaged in this activity?

1. Today
2. Yesterday
3. Within the past week
4. Within the past 2 weeks
5. Within the last month
6. Within the last 2 months
7. Longer than 2 months

Q21 Please respond to the following items with respect to your **#2 activity** you listed: **${Q8}**

_____

Q22 Please respond to the following items, **thinking in general about the activity listed above**. Keep in mind that the way you respond to one item does not indicate how you should respond to another item**. If you feel a particular item is not relevant, or does not apply to your specific recovery activity, select N/A.**

	Disagree strongly	Disagree	Neutral	Agree	Agree strongly	N/A
When I engage in this activity I forget about work.	❑	❑	❑	❑	❑	❑
While engaging in this activity, I learn new things.	❑	❑	❑	❑	❑	❑

I feel like I can decide for myself what to do when engaging in this activity.	❑	❑	❑	❑	❑	❑
Engaging in this activity helps me kick back and relax.	❑	❑	❑	❑	❑	❑
I don't think about work at all when I engage in this activity.	❑	❑	❑	❑	❑	❑
I seek out intellectual challenges when engaging in this activity.	❑	❑	❑	❑	❑	❑
Engaging in this activity allows me to decide my own schedule.	❑	❑	❑	❑	❑	❑
I do relaxing things when engaging in this activity.	❑	❑	❑	❑	❑	❑
When engaging in this activity, I feel distanced from my work.	❑	❑	❑	❑	❑	❑
This activity allows me to do things that challenge me.	❑	❑	❑	❑	❑	❑
When engaging in this activity, I determine for myself how I will spend my time.	❑	❑	❑	❑	❑	❑
I use the time engaging in this activity to relax.	❑	❑	❑	❑	❑	❑
I get a break from the demands of work when I engage in this activity.	❑	❑	❑	❑	❑	❑
This activity helps me to broaden my horizons.	❑	❑	❑	❑	❑	❑
Engaging in this activity allows me to take care of things the way I want them done.	❑	❑	❑	❑	❑	❑
I take time for leisure while engaging in this activity.	❑	❑	❑	❑	❑	❑

Q23 Now, please respond to the following statements, thinking about how you feel ***immediately after*** engaging in this activity.

	Not at all	A little	Moderately	A lot	Completely	N/A
My muscles are *so relaxed* that they feel *limp.*	❑	❑	❑	❑	❑	❑
My hands, arms, or legs are *so relaxed* that they feel *warm* and *heavy.*	❑	❑	❑	❑	❑	❑
My body is *physically relaxed.*	❑	❑	❑	❑	❑	❑

I feel at *peace.*	❑	❑	❑	❑	❑	❑
I feel at *ease.*	❑	❑	❑	❑	❑	❑
I feel *carefree.*	❑	❑	❑	❑	❑	❑
I feel *rested.*	❑	❑	❑	❑	❑	❑
I feel *relaxed.*	❑	❑	❑	❑	❑	❑

Q24 How many **total hours** do you typically spend engaged in this activity **each week**?

_____

Q25 How many **days per week** do you engage in this activity?

_____

Q26 What time of day do you typically engage in this activity?

1. Before work
2. During work breaks
3. After work
4. On the weekend

Q27 How much **energy and effort** do you put into this activity?

1. None at all
2. A little
3. A moderate amount
4. A lot
5. A great deal

Q28 To what extent are you in a **built environment** (e.g., city streets, indoors) versus a **natural environment** (e.g., presence of trees, lakes, outdoor qualities) when you engage in this activity?

1. Completely built environment
2. Mostly built environment
3. Equal amount of built and natural qualities to the environment
4. Mostly natural environment
5. Completely natural environment

Q29 How **peaceful** would you describe the environment in which you typically engage in this activity?

1. Not at all peaceful
2. Somewhat peaceful
3. Neither peaceful nor unpeaceful
4. Mostly peaceful
5. Very peaceful

Q30 Please describe why you engage in this activity.

_____

Q31 When is the last time you engaged in this activity?

1. Today
2. Yesterday
3. Within the past week
4. Within the past 2 weeks
5. Within the last month
6. Within the last 2 months
7. Longer than 2 months

Q32 Please respond to the following items with respect to your **#3 activity** you listed: **${Q9}**

Q33 Please respond to the following items, **thinking in general about the activity listed above.** Keep in mind that the way you respond to one item does not indicate how you should respond to another item. **If you feel a particular item is not relevant, or does not apply to your specific recovery activity, select N/A.**

	Disagree strongly	Disagree	Neutral	Agree	Agree strongly	N/A
When I engage in this activity I forget about work.	❑	❑	❑	❑	❑	❑
While engaging in this activity, I learn new things.	❑	❑	❑	❑	❑	❑
I feel like I can decide for myself what to do when engaging in this activity.	❑	❑	❑	❑	❑	❑
Engaging in this activity helps me kick back and relax.	❑	❑	❑	❑	❑	❑
I don't think about work at all when I engage in this activity.	❑	❑	❑	❑	❑	❑
I seek out intellectual challenges when engaging in this activity.	❑	❑	❑	❑	❑	❑
Engaging in this activity allows me to decide my own schedule.	❑	❑	❑	❑	❑	❑
I do relaxing things when engaging in this activity.	❑	❑	❑	❑	❑	❑
When engaging in this activity, I feel distanced from my work.	❑	❑	❑	❑	❑	❑
This activity allows me to do things that challenge me.	❑	❑	❑	❑	❑	❑
When engaging in this activity, I determine for myself how I will spend my time.	❑	❑	❑	❑	❑	❑

I use the time engaging in this activity to relax.	❑	❑	❑	❑	❑	❑
I get a break from the demands of work when I engage in this activity.	❑	❑	❑	❑	❑	❑
This activity helps me to broaden my horizons.	❑	❑	❑	❑	❑	❑
Engaging in this activity allows me to take care of things the way I want them done.	❑	❑	❑	❑	❑	❑
I take time for leisure while engaging in this activity.	❑	❑	❑	❑	❑	❑

Q34 Now, please respond to the following statements, thinking about how you feel ***immediately after*** engaging in this activity.

	Not at all	A little	Moderately	A lot	Completely	N/A
My muscles are *so relaxed* that they feel *limp.*	❑	❑	❑	❑	❑	❑
My hands, arms, or legs are so relaxed that they feel *warm* and *heavy.*	❑	❑	❑	❑	❑	❑
My body is *physically relaxed.*	❑	❑	❑	❑	❑	❑
I feel at *peace.*	❑	❑	❑	❑	❑	❑
I feel at *ease.*	❑	❑	❑	❑	❑	❑
I feel *carefree.*	❑	❑	❑	❑	❑	❑
I feel *rested.*	❑	❑	❑	❑	❑	❑
I feel *relaxed.*	❑	❑	❑	❑	❑	❑

Q35 How many **total hours** do you typically spend engaged in this activity **each week**?

_____

Q36 How many **days per week** do you engage in this activity?

_____

Q37 When do you typically engage in this activity?

1. Before work
2. During work breaks
3. After work
4. On the weekend

Q38 How much **energy and effort** do you put into this activity?

1. None at all
2. A little

3. A moderate amount
4. A lot
5. A great deal

Q39 To what extent are you in a **built environment** (e.g., city streets, indoors) versus a **natural environment** (e.g., presence of trees, lakes, outdoor qualities) when you engage in this activity?

1. Completely built environment
2. Mostly built environment
3. Equal amount of built and natural qualities to the environment
4. Mostly natural environment
5. Completely natural environment

Q40 How **peaceful** would you describe the environment in which you typically engage in this activity?

1. Not at all peaceful
2. Somewhat peaceful
3. Neither peaceful nor unpeaceful
4. Mostly peaceful
5. Very peaceful

Q41 Please describe why you engage in this activity.

_____

Q42 When is the last time you engaged in this activity?

1. Today
2. Yesterday
3. Within the past week
4. Within the past 2 weeks
5. Within the last month
6. Within the last 2 months
7. Longer than 2 months

Q43 To what extent do you feel your choice of recovery activities is limited?

1. None at all
2. A little
3. A moderate amount
4. A lot
5. A great deal

Q44 What are **the top 3 factors that limit your recovery activity choices**? *(Example: Taking care of children or other barriers that hinder your choices)*

Q45
#1 Factor

_____

#2 Factor

_____

#3 Factor

_____

Q46 Would you **prefer to engage in other recovery activities** (e.g., prefer to workout but cannot because of other obligations/responsibilities)? **Note: if you already engage in your preferred activities, you are not required to list additional activities.*

1. Yes
2. No

Q47 Please describe the other activities you wish to engage in and why.

_____

Q48 Please respond to these items with respect to your 3 recovery activities just listed.

	Strongly disagree	Disagree	Somewhat disagree	Neither disagree nor agree	Some what agree	Agree	Strongly agree
Engaging in these activities makes me feel guilty because there is always something else I could be doing for work.	❑	❑	❑	❑	❑	❑	❑
Engaging in these activities often makes me feel bad because I feel I am wasting time when I should be doing something productive for work.	❑	❑	❑	❑	❑	❑	❑
When I try to engage in these activities, I feel like I should be doing work instead.	❑	❑	❑	❑	❑	❑	❑
I eat cement occasionally (indicate	❑	❑	❑	❑	❑	❑	❑

disagreement with this item).							
Engaging in these activities is difficult for me because there are always more important things I need to do.	❑	❑	❑	❑	❑	❑	❑
Engaging in these activities when I have other things to do for work makes me feel guilty.	❑	❑	❑	❑	❑	❑	❑
When I try to engage in these activities, I typically feel remorse about not working.	❑	❑	❑	❑	❑	❑	❑

Q49 I have paid no attention to the survey so far.

1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

Q50 Below are statements with which you may agree or disagree. Using the scale below, **indicate your agreement with each item.** Respond to these items **based on how you are feeling today, at this moment.**

	Strongly Disagree	Disagree	Slightly Disagree	Mixed or neither agree nor disagree	Slightly Agree	Agree	Strongly Agree
I lead a purposeful and meaningful life.	❑	❑	❑	❑	❑	❑	❑
My social relationships are supportive and rewarding.	❑	❑	❑	❑	❑	❑	❑
I am engaged and interested in my daily activities	❑	❑	❑	❑	❑	❑	❑

I actively contribute to the happiness and well-being of others.	❑	❑	❑	❑	❑	❑	❑
I am confident and capable in the activities that are important to me.	❑	❑	❑	❑	❑	❑	❑
I am a good person and live a good life.	❑	❑	❑	❑	❑	❑	❑
I work twenty-eight hours in a typical work day (indicate disagreement with this item).	❑	❑	❑	❑	❑	❑	❑
I am optimistic about my future.	❑	❑	❑	❑	❑	❑	❑
People respect me.	❑	❑	❑	❑	❑	❑	❑

Q51 Please indicate how often each of these statements occur.

	Less than once per month or never	Once or twice per month	Once or twice per week	Once or twice per day	Several times per day
How often does your job require you to work very fast?	❑	❑	❑	❑	❑
How often does your job require you to work very hard?	❑	❑	❑	❑	❑
How often does your job leave you with little time to get things done?	❑	❑	❑	❑	❑
How often is there a great deal to be done?	❑	❑	❑	❑	❑
How often do you have to do more work than you can do well?	❑	❑	❑	❑	❑

Q52 Please indicate the **extent to which you agree or disagree** with the statements below.

	Disagree strongly	Disagree	Neutral	Agree	Agree strongly
My job requires all of my attention.	❑	❑	❑	❑	❑
I feel like I have a lot of work demand.	❑	❑	❑	❑	❑
I feel like I have a lot to do at work.	❑	❑	❑	❑	❑
My work requires a lot from me.	❑	❑	❑	❑	❑
I am given a lot of work to do.	❑	❑	❑	❑	❑

Q53 How accurate are each of the following statements at describing **how you would normally feel after your usual workday?**

	Disagree strongly	Disagree	Neutral	Agree	Agree strongly
I have to work hard on nonwork activities.	❑	❑	❑	❑	❑
My nonwork roles require all of my attention.	❑	❑	❑	❑	❑
I feel like I have a lot of nonwork demands.	❑	❑	❑	❑	❑
I have a lot of responsibility in my nonwork roles.	❑	❑	❑	❑	❑

Q54 How accurate are each of the following statements at describing **how you would normally feel after your usual workday?**

	Not at all accurate	Slightly inaccurate	Neither inaccurate, nor accurate	Slightly accurate	Completely accurate
I have been working so hard today that I am losing my ability to concentrate on what I'm doing.	❑	❑	❑	❑	❑
I have been so busy working today that I am beginning to feel I am losing control over all the work I have to do.	❑	❑	❑	❑	❑
If my work were finished for today, I would still have trouble concentrating on other things.	❑	❑	❑	❑	❑
I have worked so long and hard today that I do not have much attention left to give to my job tasks.	❑	❑	❑	❑	❑
My work has taken so much effort today that I am having difficulty keeping my thoughts straight.	❑	❑	❑	❑	❑
Despite my work efforts so far today, I am thinking as clearly as I was when I started working today.	❑	❑	❑	❑	❑
It will be difficult for me to show interest in other people when I finish working today.	❑	❑	❑	❑	❑

When I stop my work for today I will need more than an hour to begin feeling recovered.	❑	❑	❑	❑	❑
When I stop my work for today, I hope other people will leave me alone for a little while.	❑	❑	❑	❑	❑
After working today I will be too tired to start on other activities.	❑	❑	❑	❑	❑
I need to step away from my work very soon because a break would help me function better.	❑	❑	❑	❑	❑
I work fourteen months in a year (indicate disagreement with this item).	❑	❑	❑	❑	❑
When work is finished today I will need some time by myself to start recovering and restoring myself before starting something else.	❑	❑	❑	❑	❑

Q55 Below are several statements about you with which you may agree or disagree. Using the response scale below, **indicate your agreement or disagreement with each item**.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am confident I get the success I deserve in life.	❑	❑	❑	❑	❑
Sometimes I feel depressed.	❑	❑	❑	❑	❑
When I try, I generally succeed.	❑	❑	❑	❑	❑
Sometimes when I fail I feel worthless.	❑	❑	❑	❑	❑
I complete tasks successfully.	❑	❑	❑	❑	❑
Sometimes, I do not feel in control of my work.	❑	❑	❑	❑	❑
Overall, I am satisfied with myself.	❑	❑	❑	❑	❑
I am filled with doubts about my competence.	❑	❑	❑	❑	❑
I determine what will happen in my life.	❑	❑	❑	❑	❑
I do not feel in control of my success in my career.	❑	❑	❑	❑	❑
I am capable of coping with most of my problems	❑	❑	❑	❑	❑
There are times when things look pretty bleak and hopeless to me.	❑	❑	❑	❑	❑

Q56 This scale consists of a number of **words and phrases** that **describe different feelings and emotions.** Read each item and then mark the appropriate answer. Indicate **to what extent you have felt this way during the past few weeks.** Use the following scale to record your answers:

	Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
Afraid	❑	❑	❑	❑	❑
Scared	❑	❑	❑	❑	❑
Nervous	❑	❑	❑	❑	❑
Jittery	❑	❑	❑	❑	❑
Irritable	❑	❑	❑	❑	❑
Hostile	❑	❑	❑	❑	❑
Guilty	❑	❑	❑	❑	❑
Ashamed	❑	❑	❑	❑	❑
Upset	❑	❑	❑	❑	❑
Distressed	❑	❑	❑	❑	❑
Active	❑	❑	❑	❑	❑
Alert	❑	❑	❑	❑	❑
Attentive	❑	❑	❑	❑	❑
Determined	❑	❑	❑	❑	❑
Enthusiastic	❑	❑	❑	❑	❑
Excited	❑	❑	❑	❑	❑
Inspired	❑	❑	❑	❑	❑
Interested	❑	❑	❑	❑	❑
Proud	❑	❑	❑	❑	❑
Strong	❑	❑	❑	❑	❑

Q57 Below are several statements about you with which you may agree or disagree. Using the response scale below, **indicate your agreement or disagreement with each item.**

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
My current income allows me to have the lifestyle I want.	❑	❑	❑	❑	❑
I am currently able to meet my financial goals.	❑	❑	❑	❑	❑
I can afford to eat at the kind of restaurant I like.	❑	❑	❑	❑	❑

I can save for retirement at the rate I want to save.	❑	❑	❑	❑	❑
I can afford the type of housing I want.	❑	❑	❑	❑	❑
I can afford the basic transportation I need.	❑	❑	❑	❑	❑
I can pay my bills on time.	❑	❑	❑	❑	❑
I can afford the food I need to survive.	❑	❑	❑	❑	❑
I can run 2 miles in 2 minutes (indicate disagreement with this item).	❑	❑	❑	❑	❑
I am able to pay my expenses without overdrawing my bank account.	❑	❑	❑	❑	❑
I can afford to pay my utilities (heat, water, gas, etc).	❑	❑	❑	❑	❑

Q58 Please respond **honestly and completely** to the following questions, so we can accurately describe the overall sample of respondents in this research.

Q59 Age (years):

_____

Q60 I identify most as…

1. Male
2. Female
3. Other _____

Q61 I am…

1. Hispanic/Latino
2. Not Hispanic/Latino

Q62 With which of the following do you most closely identify?

1. American Indian or Alaska Native
2. Asian
3. Black or African American
4. Native Hawaiian or Other Pacific Islander
5. Middle Eastern or North African
6. White
7. Multi-race
8. Other _____

Q63 Highest level of completed education:

1. Some high school, but no degree
2. High school diploma
3. Some college but no degree
4. Associate's degree

5. Bachelor's degree
6. Some graduate school but no degree
7. Master's degree
8. Doctoral degree

Q64 Please report the **number of years you have worked at your current organization** (round to nearest whole number). **If less than one year, please type "<1 year".**

_____

Q65 In an **average week,** about how many **hours do you typically spend working?** Please round to the nearest whole hour (e.g., 40).

_____

Q66 Which of the following categories best describes the **industry in which you primarily work**?

1. Agriculture, Forestry, Fishing and Hunting
2. Arts, Education, and Recreation
3. Broadcasting
4. Utilities
5. Computer and Electronics Manufacturing
6. Primary/Secondary (K-12) Education
7. College, University and Adult Education
8. Other Education Industry
9. Construction
10. Other Manufacturing
11. Finance and Insurance
12. Government and Public Administration
13. Health Care and Social Assistance
14. Homemaker
15. Hotel and Food Services
16. Information Services and Data
17. Legal Services
18. Military
19. Mining
20. Publishing
21. Real Estate, Rental and Leasing
22. Religious
23. Retail
24. Scientific or Technical Services
25. Software
26. Telecommunications
27. Other Information Industry
28. Transportation and Warehousing
29. Wholesale
30. Other Industry

Q67 Which of the following best describes your **role in the industry**?

1. Upper Management
2. Middle Management
3. Junior Management
4. Administrative Staff
5. Support Staff
6. Student
7. Trained Professional
8. Skilled Laborer
9. Consultant
10. Temporary Employee
11. Researcher
12. Self-employed/Partner
13. Other

Q68 What is your job title?

_____

Q69 Is your work schedule typically **day only** (i.e., 9:00 AM - 5:00 PM) **or** does it include **nontraditional hours** and/or nights?

1. Standard (9-5)
2. Nontraditional

Q70 How many dependents are you responsible for supporting (adults and children)?

_____

Q71 What is your relationship status?

1. Single
2. Married
3. Widowed
4. Divorced
5. Other _____

Q72 How often do you typically provide care for a child(s) or other family member(s)?

1. Very Frequently
2. Frequently
3. Occasionally
4. Rarely

Q73 How many adults and children live in your household **(not including yourself)?**

_____

Q74 Which of the following best describes the area you live in?

1. Urban
2. Suburban
3. Rural

Q75 To what extent do you feel you have any **limitations that prevent you from engaging in physical activities?**

1. None at all
2. A little
3. A moderate amount
4. A lot
5. A great deal

Q76 Have there been any major life events within the last few weeks?

1. Yes
2. No

Q77 How much of an impact has the life event had on your typical work or nonwork routine?

1. None at all
2. A little
3. A moderate amount
4. A lot
5. A great deal

Q78 Thank you for taking time to respond to the questions in this survey. Clicking the **"Done" button** below will **submit this survey** and bring to an end the main work activity for this HIT. **To trigger review of your work and be considered for payment, you must return to the original MTurk posting for this HIT and enter your unique survey completion code.** Your work will be reviewed and payment will be issued, assuming you have responded completely throughout this activity and followed instructions along the way (as specified in the HIT).

Your **survey completion code** is constructed of these elements:
1) The first letter of your (first) middle name (example: James Albous Jones)
2) The last 4 digits of your primary phone number (example: 555-333-1223)
2) The last 3 letters of your last name (example: Smith)
From this example, the personID would be A1223ith

Now, please **enter your personal survey completion code** below. Then copy this down and **enter it into the "survey code" box in the original MTurk HIT posting.**

My survey completion code is:

_____

Q79 Thank you for your time and attention in completing this survey.
Please click "Done" to record your responses.
Be sure you go back to the original MTurk posting for this HIT and enter your survey completion code.

VITA

Emily Nixon was born in Traverse City, Michigan to Brian and Denise Nixon. She graduated magna cum laude with a Bachelor of Arts degree from Adrian College in Adrian, MI where she was a McNair Scholar in the Ronald E. McNair Post-Baccalaureate Achievement Program. There she majored in psychology with a double minor in both studio art and business administration while also running on the cross country and track teams. Upon graduation, she attended The University of Tennessee at Chattanooga (UTC) for graduate school. During her graduate degree, she was a graduate assistant in the Office for Undergraduate Research and Creative Endeavor. She also completed a predictive and data analytics internship at Base Camp Health, a healthcare analytics company, in Chattanooga, TN. Emily graduated in May 2020 with a Master of Science degree in Industrial-Organizational Psychology.