Depletion Today Keeps the Apple Away: Effects of Workplace Resource Processes on Daily Health Behavior and Recovery

by

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Abstract

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The workplace has become an increasingly demanding environment in which individuals must expend personal resources in order to meet job demands (Hobfoll, 1989). Without ample opportunity to recover these depleted resources, employees risk physical and psychological strains (Meijman & Mulder, 1998). It was proposed that depletion and recovery that occurs throughout the workday would impact recovery activities outside of work. Further, two new constructs were examined as moderators of the proposed relationships: personal energy recovery climate (PERC) and non-work recovery interferences (NWRI). A two-week daily diary study was conducted, with 145 working adults completing four surveys throughout each workday. Resource levels related to healthy and destructive recovery behaviors, particularly during the work afternoon and after work. Recovery behavior, in turn, positively predicted well-being at bedtime. PERC and NWRI were significantly related to employee resources and well-being, respectively. Finally, trait self-control predicted healthy recovery behavior after work and predicted variance in the within-person relationship between resources and healthy recovery behavior. These results have implications for theories of self-regulation and employee recovery, and they have practical implications for health promotion within organizations.

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Dedication

This dissertation is dedicated to Richard Yeager, for being the very first person to believe in my ability to create and execute wonderful ideas.

Chapter 1
Literature Review

Organizations are complex, demanding environments that require employees to be highly productive, engaged, and adaptive (Griffin, Neal, & Parker, 2007). Changes in role requirements, emotional and physical demands, and social structures compel individuals to constantly be on their toes, think critically, and maintain high levels of energy and vigilance. The increasing demands of the modern workplace may be taking a toll on worker health; the CDC reports annual rises in obesity and heart disease, and an increase in unhealthy behaviors such as poor diet, inactivity, and excessive alcohol use (Mozaffarian et al., 2015; Shaikh, Siahpush, Singh, & Tibbits, 2015). Recently, government organizations within the United States have spearheaded initiatives to address the rapidly declining health of the nation's workforce. The National Institute for Occupational Safety and Health (NIOSH) funds research that focuses on worker health and has expanded its focus from primarily safety and accident prevention to the newer Total Worker Health initiative, which addresses the well-being of individuals within and outside of the workplace (Anger et al., 2014). As a result, the time to identify and examine the underlying processes driving workplace health outcomes is now. The proposed research draws from multiple occupational health and self-regulation theoretical

perspectives, all of which highlight the role of employees' personal resources in their health and well-being. The primary aim is to move the field forward: toward an understanding of employee experiences inside and outside of the workplace that influence their choices to engage in healthy and unhealthy behaviors.

Individuals strive to obtain, preserve, and protect personal resources such as finances, social status, esteem, and personal energies (Hobfoll, 1989). Personal energetic resources in particular are vital to daily employee engagement and performance because these job outcomes require conscious effort and controlled processing of thoughts and emotions (Binnewies, Sonnentag, & Mojza, 2009). However, the personal energetic resources needed for such processes are limited and can be drained throughout the day (Muraven & Baumeister, 2000). Each day, individuals engage in activities at work that require the investment of these personal resources. There are limited physical, emotional, and cognitive resources that can be invested (Baumeister, Vohs, & Tice, 2007), and individuals experience strains when these resources are threatened (Edwards, 1992; Sonnentag & Frese, 2003). For example, previous research has demonstrated that effortful control of emotions, thoughts, and behavior leads to exhaustion and negative job-related outcomes (Trougakos et al., 2015). Resources can and must be replenished in order to maintain optimal levels of performance and well-being.

The recovery process, during which employees replenish resources that have been depleted due to work obligations, has been traditionally considered to be

one that employees must maintain on their own time, outside of work hours (Zijlstra & Sonnentag, 2007). For example, employees may engage in exercise or leisure activities after work in an attempt to recover lost resources. Employers who encourage their workers to take time to exercise and get enough rest after work aren't entirely off-base. Research shows that employees who are able to exercise after work may buffer the negative effects of work-family spill-over of negative emotions and stress on their physical health (Lee et al., 2015). However, individuals have responsibilities to attend to after work, often preventing off-work time from being dedicated to recovery (Crain et al., 2014). In addition, these obligations outside of work, such as childcare, household maintenance, additional jobs, and volunteering (Greenhaus & Allen, 2011), may hamper the work recovery process and even further drain personal resources. Lack of recovery may be a threat to organizations because recovery is necessary for employees to continue to manage work demands and prevent job exhaustion (Siltaloppi, Kinnuenen, & Feldt, 2009). As a result, it behooves organizations to invest in employee recovery *during work hours* as well as off-work hours in order to foster a healthy, productive environment. Yet, research examining the role of organizations in prompting employee recovery is scarce.

The present study investigated the underlying recovery and depletion processes that employees experience during and after the workday and the effects of these processes on resource states, individual recovery and health behaviors, and

well-being. A literature review will be presented first, describing previous work on the nature of employee resources and resource depletion and recovery. The depletion and recovery process will be discussed from three theoretical perspectives: the Conservation of Resources model (Hobfol, 1989), the Effort-Recovery Model of workload (Meijman & Mulder, 1998), and the strength model of self-control (or ego depletion; Muraven & Baumeister, 2000). Following the literature review, a new theoretical model will be proposed that extends recovery theory in two main ways. First, the model will integrate previous theory on self-regulation, depletion, and recovery of personal resources with complimentary research on coping in order to explain the drivers of health behavior, the replenishing power of health-related behavior, and the depleting characteristics of destructive coping behavior. Second, the new model will explore the impact of the work and non-work environment on the recovery process. Toward this second goal, new constructs of personal energy recovery climate and non-work recovery interference will be presented as potential moderators of the employee recovery process. After the new theoretical model is presented, hypotheses will be developed for the empirical study that has tested portions of the broader theoretical model. Following development of hypotheses, a detailed description of the 10-day diary study will be presented. Finally, results will be presented, and the theoretical contributions and practical implications of the paper will be discussed.

Personal Resources and Self-Regulation of Behavior

Employee resources comprise a relatively elusive construct that lacks clarity of definition and scope (Halbesleben et al., 2014). "Resources" is a broad term that loosely describes anything that is beneficial to a person, within and outside of that person (Hobfoll, 1989). Table 1 provides several examples of resource types typically found in the literature. While resources can be internal or external to the individual, the present study is focused on internal personal resources, and energetic resources in particular.

Employee personal resources have been defined as "positive aspects of the self that refer to individuals' ability to control and impact upon their environment successfully," and lead to desirable outcomes such as job engagement and well-being (Xanthopoulou, Bakker, & Fischbach, 2013, p. 75). Sometimes referred to as *psychological* capital (Bakker & Demerouti, 2014), personal resources are thought to serve as a buffer against stressors, provide motivation for goal-striving, and promote personal development (Xanthopoulou et al.). Personal resources have been operationalized by some researchers as individual differences that involve confidence in the ability to impact one's environment (Airila et al., 2014) and include optimism, self-efficacy, self-esteem, conscientiousness, trait positive affect, proactive personality, and emotional stability (Bakker, Demerouti, & Sanz-Vergel, 2014). For example, Conservation of Resources theory (Hobfoll, 1989) suggests

that the more self-esteem a person has, the less stress and the greater well-being they experience.

While traits such as self-efficacy and optimism have been linked to enhanced well-being through their ability to facilitate the further generation of resources and resilience against stressors (Hobfoll et al., 2003), personal resources also exist as states that vary throughout the workday and predict within-person variance in health (Nägel & Sonnentag, 2013). Some evidence has been found to support the malleable nature of personal resources (Bakker & Demerouti, 2014) and highlights the need for further research on day-to-day fluctuations in these states. Specifically, self-regulatory resources (such as self-control strength) and personal energies (physical, emotional, and cognitive) are likely to vary throughout the day (Halbesleben, Neveu, Paustian-Underdahl, & Westman, 2014) and impact health and well-being because they relate to an individual's ability to exercise control over innate impulses and engage in effortful self-regulation of behavior, emotions, and thought. Personal energy states are limited and operate similarly to self-regulatory resources in that they must be replenished after periods of depletion (Hunter & Wu, 2015). Because personal, internal energy is considered the resource required for effortful self-control of actions, thoughts, and feelings (Galliot et al., 2007), the focus of this paper is on individuals' perceptions of their energetic resource states.

Employee Resource Recovery Process

Employee energetic resources are depleted throughout the workday because of work demands; however, resources that have been depleted throughout the workday may be regained through the effort-recovery process (Meijman & Mulder, 1998). Employee resource recovery can be defined as both a process and a state. The process of recovering begins when demands upon the individual have ceased and continues as personal resources, depleted during demanding episodes, return to pre-stressor levels (Sonnentag & Fritz, 2007). This process occurs in three phases: (1) resource depletion ends, (2) passive recovery of depleted resources occurs (e.g., through relaxation) and (3) active recovery occurs (e.g., through activities that build resources; ten Brummelhuis & Trougakos, 2014). Demands upon the employee may include workload and task demands, pressure from home life that have spilled over to the workplace, interpersonal work conflict, or other types of stressors or stressful situations such as being in a state of poor health (Meijman & Mulder, 1998). Through the recovery process, individuals whose demands or stressors have ceased are able to recover resources that have been drained by engaging in a number of passive or active recovery activities. The final point, at which the employee no longer experiences work strains and has returned to a level of fully recovered personal resources, is also known as the state of work recovery (Meijman & Mulder, 1998).

Resource recovery likely involves an underlying psychological process that is similar across persons, with behaviors and choices of recovery activities that vary between persons (Sonnentag & Fritz, 2007). Relaxation and psychological detachment from work (i.e., focusing on non-work thoughts and avoiding work-related rumination) are often explained as the underlying mechanisms driving the recovery process (Trougakos, Beal, Green, & Weiss, 2008). However, the specific activities that individuals find to be relaxing and capable of inducing psychological detachment are different for each person. For example, while it is a behavior contrary to physical health, smoking during a work break might help an individual relieve work stress and begin the recovery process. Smoking is certainly not a recovery activity for everyone and may lead to adverse health effects and further distal stressors. Nevertheless, for regular smokers, a smoke break is capable of inducing relaxation and recovery. Exercise, which is often considered a recovery activity, especially by those who engage in physical activity regularly, is another example of a behavior that may influence recovery for some but not others. Individuals with physical challenges or those who do not enjoy exercise may perceive exercise as a stressor, and this may prevent exercise from being a recovery experience for them. The individual differences in what constitutes a recovery activity make it imperative to investigate the underlying mechanisms (rather than only the specific activities) that drive employee recovery in order to develop a

comprehensive understanding of the process that can be meaningfully applied in the workplace.

Employee resource recovery can be further conceptualized with the help of the effort-recovery model (Meijman & Mulder, 1998), Conservation of Resources (COR) theory (Hobfoll, 1989), and the strength model of self-control (Muraven, Tice, & Baumeister, 1998). Specifically, the complementary effort-recovery model and COR theory are useful for explaining the recovery process, whereas the strength model of self-control provides an example of one particular personal resource and the process of its depletion and recovery.

Effort-recovery Model. According to the effort-recovery model of workload, recovery refers to the point at which an individual is no longer exposed to work demands (Meijman & Mulder, 1998). Recovery is a process of resource replenishment; it begins when a particular workload has ceased, and it ends when the individual returns to a baseline level, or when no more demands are placed upon the individual. Meijman and Mulder (1998) explain that work demands are the formal aspects of the work context that impact the "duration and intensity of exposure to load factors" and the time between load "exposures and opportunities for recovery" (p. 10). Work demands include work activities and standards for completion (work assignment), payment for work and work-day schedules (work conditions), tools and workplace design (work environment and facilities), and social and organizational relationships (work relations). Work demands may

combine to create physical, emotional, and/or cognitive load (workload) that drains employees' energetic resources (Meijman & Mulder, 1998).

Workload is a function of work demands, the motivation to exert effort for work tasks, and job decision latitude, and it drains employee resources (Meijman & Mulder, 1998). For example, remuneration (a work condition type of work demand) may increase motivation to exert effort for a particular task, leading to an employee deciding to increase her workload over a period of time. Workload then leads to two outcomes: the actual work product and the short-term physical and psychological reactions to the workload. If the employee is unsure whether the task was completed correctly, that employee may continue to ruminate or seek additional information even after the product is submitted. Vague standards for completion (a work assignment type of work demand) may increase both workload and perceived stress, leading to the accumulation of cognitive demands even at the completion of a task. This workload may accumulate over the course of the day, and the particular combination of work demands the employee experiences may prevent the employee from being able to engage in recovery. As a result, individuals who would otherwise have the physical and cognitive capacity to meet all work demands may not be able to do so if they have not been able to sufficiently recover from previously accumulated demands. Consequentially, for recovery to occur, there must be a break in the workload so that the physiological and

psychological systems called upon during a stressful event are no longer taxed (Meijman & Mulder, 1998).

Conservation of Resources Theory. Conservation of Resources theory (COR; Hobfoll, 1989) has become one of the most popular theoretical frameworks in organizational research (Halbesleben et al., 2014). COR holds that individuals strive to acquire, maintain, and safeguard their personal resources. In order to perform in the workplace, employees must find ways to recover resources depleted by work demands and store up reserves of resources to protect themselves from future instances of resource depletion. According to COR, resources include external, tangible assets (e.g., finances) and internal personal energies and characteristics (e.g., self-control, emotion regulation, attention). When stressors threaten these resources, individuals act to preserve them and gather and store additional resources. According to this theory, employees may also generate additional resources that can be applied to the workplace above and beyond the baseline suggested by the effort-recovery model (ten Brummelhuis & Trougakos, 2014). In order to recover depleted resources and generate additional resources, it is necessary for stressors causing resource depletion to cease and for employees to psychologically detach from work. Thus, the recovery process is best explained by a combination of the efforts-demands model and the COR perspective: demands upon the individual must cease, and the individual should generate additional resources to stave off future resource depletion.

Ten Brummelhuis and Trougakos (2013) have cited off-work activities such as social events (time spent with family or volunteering with others), watching television, reading, and sport and exercise participation as recovery activities. Although off-job activities are cited as the main means for resource recovery, it is likely that breaks taken during work such as a lunch break has the potential to aid in the recovery of depleted resources (Trougakos et al., 2008). Consequentially, it is possible for organizations to impact the extent to which their employees are able to recover from work demands.

Self-Regulatory Resources and the Strength Model of Self-control. Self-regulatory resources are needed for motivational and volitional processes and require personal energetic resources that individuals draw upon to engage in goal-directed behavior. This differs slightly from conceptualizations of cognitive and attentional resources. Attentional effort draws from a limited cognitive resource (Kanfer & Ackerman, 1989). Self-control has been likened to attentional and cognitive resources, but draws from a separate psychological and energetic source (Vohs et al., 2008). Cognitive resources imply a processing capacity; engaging this capacity can drain self-regulatory resources (Beal et al., 2005). When employees utilize controlled processing to regulate thoughts, behaviors, or emotions that result from job demands or stressful experiences, their limited self-control capacity is engaged and depleted (Muraven & Baumeister, 2000). In other words, we have both limited attention spans and limited willpower.

When we engage our willpower to maintain our attentional effort, the self-control capacity is depleted. Engaging self-control, on the other hand, does not always deplete attentional resources.

Self-control, also known as willpower, constitutes one type of personal resource, and it has been characterized as a psychological or energetic property within individuals (Vohs et al., 2008). Self-control refers to the ability to control or alter one's instinctual or natural responses that would otherwise inhibit goal-directed behavior (Muraven & Baumeister, 1998; Muraven &Slessareva, 2003). Like other theories of self-regulation, the strength model of self-control operates under the assumption that individuals strive to attain end goal-states that are discrepant from current states. In order to strive towards desired states, individuals must invest a personal resource that is responsible for engaging the executive component of the brain and overriding impulses. This self-control resource is temporarily depleted but can be replenished with adequate recovery time. Muraven and Baumeister's strength model of self-control relies on five key assumptions: (1) employing the executive components of the self involves self-control, (2) self-control is a limited resource that can overturn a limited number of impulses at once, (3) any function requiring self-control derives its energy from the same resource, (4) the strength of one's self-control guides that person's self-control outcomes (success or failure), and (5) when one exerts self-control over a thought, feeling, behavior, urge, etc., that person expends his or her self-control strength.

Muraven and Baumeister (2000) explain that individuals vary on their baseline levels of self-control strength. Additionally, within-persons, self-control strength varies across time depending on the extent to which it has been depleted and replenished. They use a muscle metaphor to help describe their theory: like a muscle, individuals vary in terms of strength. Additionally, the use of a muscle leads to the need to recover, and fatiguing the muscle will lead to decrements of subsequent performance. Baumeister (2001, 2014) has demonstrated this effect, known as ego depletion, in a number of studies. When asked to engage in a task that requires self-control strength, and then asked to engage in a subsequent task requiring self-control, the more self-control that is exhibited in the initial task, the worse the individuals will perform in the second task.

If given ample opportunity to recover, the self-control "muscle" is able to replenish and is ready for further exertion. Muraven and Baumeister (2000) mention sleep and relaxation as primary mechanisms for this. Recovery theory (Sonnentag 2001; Trougakos & Hideg, 2015) suggests that there are specific recovery activities that enable the recovery of personal resources: activities that allow for relaxation, psychological detachment, autonomy, and mastery experiences (Sonnentag & Fritz, 2007).

Finally, Muraven and Baumeister propose that over time, when individuals engage in consistent and multiple acts of self-control, they are able to build and strengthen their self-control "muscle." Hagger et al. (2010) conducted a meta-

analysis of the strength model of self-control in order to test the ego depletion effect and the training, conservation, and recovery hypotheses of the strength model. As mentioned above, the training hypothesis suggests that self-control can be built over time. The conservation hypothesis suggests that individuals can actively choose to exert a certain amount of self-control strength in order to conserve the rest for future use. The recovery hypothesis suggests that with adequate rest, self-control strength can be recovered. The authors found support for the extension hypotheses of training and conservation, but did not have a large enough sample size to test the recovery hypothesis.

In their meta-analysis of 83 studies, Hagger, Wood, Stiff and Chatziasarantis (2010) found that successful self-control leads to long-term attainment of desired outcomes. They examine the Muraven and Baumeister (2000) muscle metaphor, which posits that similar to an athlete's muscle strength depletion, self-control resource depletion leads to increased physical effort, fatigue, and task difficulty. The Hagger et al. meta-analytic evidence supports the idea that the longer the amount of recovery time, the more self-control capacities will be restored, in line with the muscle metaphor. Sleep, relaxation, and other recovery activities assist in the recovery of self-control resources. Sleep is most often cited as the primary means for the recovery of the self-control strength.

Self-control strength has been implicated in a number of important workplace variables, including stress and emotion regulation (Converse, 2005;

Hagger et al., 2010; Lord, Diefendorff, Schmidt, & Hall, 2010; Vohs, Baumeister, & Ciarocco, 2005). Attempts to manage the emotional impact of stressors or regulate emotional displays draw upon and drain self-control strength. High levels of stress and emotional exhaustion, often resulting from inadequate recovery, are linked to negative outcomes such as interpersonal work conflict (Jamarillo, Mulki, & Boles, 2011) and disengagement and burnout (Demerouti, Bakker, de Jonge, Janssen, & Schaufeli, 2001). Activities that allow individuals to recover from job demands are likely to assist in replenishing the self-control strength necessary for individuals to manage strains, regulate emotions, and stay engaged at work.

The depletion of the limited self-control strength, known as ego-depletion, is implicated in a number of lapses in self-regulation of health-related behavior, such as maintaining a healthy diet, engaging in physical activity, or abstaining from drug and alcohol use (Kelley, Wagner, & Heatherton, 2015). Because much of health-behavior is goal-related, the same self-regulatory resources used throughout the workday are also required to engage in healthy habits (Mann, de Ridder, & Fujita, 2013; Pearson, 2012). Lapses in self-regulation include hesitating to initiate goal pursuit, terminating goal pursuit prematurely, and ruminating about failures instead of moving forward (Diefendorff & Chandler, 2011).

Importance of Employee Resource Recovery

When the recovery of personal resources is prevented, most often when work demands accumulate, negative effects on individual health and well-being, as well as job performance, manifest (Sonnentag & Fritz, 2007). While individuals may remain functional in their response to low or moderate workloads, negative effects occur when there is insufficient recovery over a period of time. Employees whose personal resources have been depleted due to job demands experience a number of negative consequences, including decreased performance (Demerouti, Bakker, & Leiter, 2014), impaired emotional labor (Giardini & Frese, 2006) and impression management (Vohs, Baumeister, & Ciarocco, 2005), increased counterproductive work behaviors (CWBs; Meier & Spector, 2013; Penney, Hunter, & Perry, 2011), reduced organizational citizenship behavior (Trougakos, Beal, Cheng, Hideg, & Zwuig, 2015), health decrements and other strains (Sonnentag, Arbeus, Mahn, & Fritz, 2014).

Inherently, certain job environments, more than others, afford employees the ability to take work breaks. Healthcare workers, for instance, experience high levels of burnout in part because they must assist patients for long hours with little, if any, rest (Morse, Salyers, Rollins, Monroe-DeVita, & Pfahler, 2012; Wessells et al., 2013). Because work environments differ in the degree to which breaks from work are allowed or encouraged, many employees are faced with increased demands throughout the workday without ample opportunity to engage in the

recovery process. Employees often work in depleted states when their energetic resources are drained following taxing work events (Trougakos, Hideg, Cheng, & Beal, 2014). In the short term, working in a depleted state may lead to negative affect, exhaustion, decreased vigilance, and irritability at work. If left in depleted states for long durations, individuals experience chronic negative consequences such as declining health and deteriorated well-being (Sonnentag & Fritz, 2015). Without opportunities to recover depleted resources, employees may find themselves unable to work at optimal levels (Meijman & Mulder, 1998). Therefore, recovery is critical not only to job performance factors, but also employee health in general.

Sources of Employee Resource Recovery

Considering the negative effects of depleted resources summarized above, it is imperative to consider potential mechanisms through which employees may recover their depleted resources. While a substantial amount of research exists to suggest the role of relaxation and leisure activities in recovery (Newman et al., 2014; Sonnentag, Arbeus, Mahn, & Fritz, 2014), health-related behaviors are also crucial. A variety of health-related behaviors and leisure activities can contribute to employee recovery from work demands.

Health-related Behavior. Health-related behavior refers to those individual behaviors that contribute to overall health and wellness. It has been

defined as “patterns, actions, and habits that are related to health maintenance, health restoration, and to health improvement,” that results in “enhanced quality of life” and can be categorized as preventative (preventing or detecting illness), illness-related (defining health states and discovering remedies), or sick-role behaviors (activities undertaken for the purpose of getting well) (Glanz, Rimer, & Viswanath, 2008, p. 12). These are activities that healthcare professionals believe should be engaged in daily, and include diet, exercise, and sleep (Ford, Bergmann, Boeing, & Capewell, 2012).

Diet involves an individual’s nutritional intake, and this is typically measured in terms of how closely nutritional intake adheres to national recommendations and the diversity of foods eaten within recommended food groups (Wirt & Collins, 2009). The U.S. Department of Agriculture (USDA) presents dietary guidelines to Americans every five years, with the current publication providing recommendations from 2015 to 2020 (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2015). In a cross-sectional examination of the relationship between diet and academic performance, student diet quality (N= 282) was found to predict scores on readings and writing assessments (Florence, Asbridge, & Veufelers, 2008). However, because this study was conducted on a youth sample, it may not be generalizable to the adult working population.

A healthy diet may also contribute to employee recovery from work demands. Healthy diets provide individuals with energy and alertness that carries them throughout the day, whereas foods devoid of nutritional value will leave individuals sluggish and decrease cognitive acuity (Florence, et al., 2008; Neck & Cooper, 2000).

Exercise refers to the physical activity that individuals may choose to engage in and may be measured in terms of type (e.g., yoga, running, weightlifting), duration, and intensity (Sliter & Sliter, 2014). The Office of Disease Prevention and Health Promotion (ODPHP) developed the Physical Activity Guidelines for Americans (PAG) in 2008 and recommends that adults should engage in

> At least 150 minutes (2 hours and 30 minutes) a week of moderate-intensity, or 75 minutes (1 hour and 15 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous- intensity aerobic activity. Adults should also do muscle-strengthening activities that are moderate or high intensity and involve all major muscle groups on 2 or more days a week (p. vii).

The U.S. Department of Health and Human Services and the U.S. Department of Agriculture (2015) express that physically inactivity, as a behavioral pattern for adults 18 years and older, should be avoided. Often times, jobs themselves afford

individuals with the opportunity to be physically active. However, many modern employers expect employees to be sitting for the majority of the day, and it is the responsibility of those workers to engage in physical activity on their own (Chau et al., 2014; Ryan, Dal, Ranat, & Grant, 2011).

Neck and Cooper (2000) provide exercise and diet recommendations for high level executives, arguing that the "endless meetings and extremely long hours" necessitate extra care to be taken to maintain physiological and psychological health in order to maintain desirable levels of job performance. Their article provides a review of the links between physical fitness and job performance, as exercise programs are key in helping high level managers and executives cope with the stressful demands of their jobs. They highlight the importance of endurance and strength, both physically and mentally, as key components of job success. In an evaluation of firefighter wellness programs in the United States, Poston, Haddock, Jahnke, Jitnarin, and Day (2013) found that individuals who regularly engaged in physical activity and wellness program initiatives were less likely to experience anxiety, less likely to be smokers, and less likely to be obese. The wellness program participants also reported higher job satisfaction.

Exercise contributes to recovery by providing individuals with psychological detachment and helping to decrease stress and increase positive moods (Feuerhahn, Sonnentag, & Woll, 2014). In a five-day daily diary study (N = 126) with two daily event sampling points in time, Feuerhahn et al. (2014)

examined the effect of exercise during leisure time on positive affect. They found evidence to suggest that the mechanisms driving the positive relationship between exercise and affect are psychological detachment, a sense of belonging, and positive physical self-perceptions. Essentially, individuals who exercise in their leisure time were able to detach from work and engage in positive experiences that resulted in evening positive affect.

Previous research conducted by the author has demonstrated that physical activity may help employees regain personal resources necessary to stay engaged during the workday (LeNoble & Richard, 2015). In a three-week daily diary study, a sample of 88 working adults reported their levels of positive affect, job engagement, and whether they had completed any physical activity the evening before, that morning, or during a work break. Results indicated that employees were more engaged on days that they exercised than on days that they were inactive. The exercise—engagement relationship was mediated by positive affect, suggesting that participating in physical activity provided a boost of resources that helped employees stay engaged during the workday. Moreover, this relationship was stronger for individuals with lower self-control, which provides evidence that individuals with a lower baseline of self-control resources may benefit greatly from exercise. The authors recommend that future research further examine the mechanisms through which physical activity enhances employee well-being (LeNoble & Richard, 2015).

The final health-related behavior, sleep, may be measured in terms of quality and duration (Fischer et al., 1997). High levels of both factors are necessary for recovery benefits for most individuals. The National Heart, Lung, and Blood Institute (NHLBI; 2012) recommends that adults require approximately seven to eight hours of sleep each night.

Sleep is a well-known recovery activity, and its duration and quality often dictate the extent to which individuals will be active and engaged at work the next day (Rook & Zijlstra, 2006). Rook and Zijlstra used the daily diary method to record the amount of time employees spent on work and non-work activities over the course of seven days (N = 46). They found that sleep quality and physical activity were the strongest predictors of recovery (operationalized as reduced fatigue).

Leisure Activities. Activities that employees engage in after work also impact their personal energy the next day. In a five-day diary study, Ten Brummelhuis and Bakker (2012) assessed the amount of time employees (N = 74) spent engaging in various activities after the workday in order to determine the effect of off-job activities on vigor and engagement the following workday. They found that leisure activities, which they operationalized as those activities involving social experiences, physical activity, or little effort, predicted next-morning vigor and job engagement. Additionally, they found support for psychological

detachment and relaxation as mediators of the off-job activities to vigor relationship. As a result, leisure is a second categorization of recovery activities.

Leisure activity has been conceptualized in a variety of ways (Brajša-Žganec, Merkaš, & Šverko, 2011). Essentially, leisure refers to time individuals use to engage in activities that promote subjective well-being. Newman, Tay, and Diener (2014) define leisure as, "the amount of activities/time spent outside obligated work time and/or engagement in leisure as subjectively defined" (p. 559.) Types of leisure include those that fulfill the need for novelty, belonging, enjoyment, self-expression, creativity, competition, and relaxation (Tinsley & Elredge, 1995). Leisure can also involve activities where individuals aim for achievement and social interaction. According to Lloyd and Auld (2002), leisure categories include mass media, social activities, outdoor activities, sports, cultural activities, and hobbies. Specific leisure activities include, but are not necessarily limited to, going to movies, visiting museums, attending concerts, attending sporting events, going on outdoor excursions, going shopping, dining in restaurants, going to bars or clubs, visiting friends and family, engaging in a hobby, attending religious events, reading, watching television, and playing video games. The extent to which individuals find any of the aforementioned activities as leisurely is entirely subjective, with some activities contributing to more recovery than others depending on personal preference. There is no consensus on the exact

classification of leisure activities (Brajša-Žganec et al., 2011), just that leisure activities indeed contribute to recovery (Newman et al., 2014).

Leisure activity promotes subjective well-being through the mediating factors of psychological detachment, autonomy, mastery, meaning, and affiliation (Sonnentag & Fritz, 2007). In a recent review of literature linking leisure activity to well-being, Newman, Tay, and Diener (2014) examined 363 theoretical and empirical papers to examine the mechanisms by which leisure might promote individual wellness. Their resulting definition of leisure includes structural and subjective components, or the amount of time spent engaging in activities that are "not occupied by paid or unpaid work or personal chores or obligations" and "preferred activities pursued...for their own sake, fun, entertainment, or self-improvement" (p. 556). The authors argue that leisure structure is defined by the amount of time that is spent outside work and the number of different activities one engages in during off-work time. Subjective leisure involves the perceived nature of what constitutes a leisure activity as well as the perceived amount of enjoyment received by engaging in particular off-work activities.

Newman et al. (2014) identified trends in the literature regarding theoretical psychological mechanisms driving the relationship between time spent engaging in leisure and subjective well-being. Particularly, they identified detachment-recovery, autonomy, mastery, meaning, and affiliation as mediators of the relationship between leisure activities and well-being. These findings support multiple theories

in the motivation and recovery domain, including the effort-recovery (Meijman & Mulder, 1998) and psychological detachment models (Sonnentag & Fritz, 2015), which propose that leisure assists in the recovery of depleted resources, and self-determination theory (Ryan & Deci, 2000), which holds that individuals are motivated to engage in activities that provide them with the ability to choose for themselves what to do, learn and build new skills, and contribute meaningfully. Newman et al.'s (2014) findings are also consistent with a plethora of empirical findings indicating that individual well-being is largely a product of the quality of interpersonal relationships (De Dreu & Beersma, 2005; Ilies, Johnson, Judge, & Keeney, 2011; Spector & Jex, 1998; Volmer, Binnewies, Sonnentag, & Niessen, 2012). Overall, it is clear that the time individuals spend outside of work greatly impacts their health and wellness, especially to the extent that it buffers the negative effects of work demands and provides experiences of happiness and meaningfulness.

Sonnentag and Fritz (2015) found evidence to suggest that psychological detachment mediates the relationship between recovery leisure experiences and individual well-being variables of burnout and life satisfaction. Leisure activities that allow individuals to psychologically detach from work lead to decreased strain and enhanced recovery. In their review of between- and within-person studies of detachment impacting well-being, Sonnentag and Fritz (2015) found evidence that psychological detachment mediates the relationship between recovery leisure

experiences and individuals' burnout and life satisfaction. Additionally, Sonnentag and Fritz explain that when employees experience high levels of work demands, their ability to psychologically detach from work—and thus recover from those demands—is impeded.

Employees who are unable to engage in enjoyable leisure experiences are more likely to experience exhaustion and disengagement, especially when their work pressures are high (Sonnentag, Arbeus, Mahn, & Fritz, 2014). Reciprocally, exhausted employees are less likely to successfully psychologically detach from work in order to begin the recovery process. In their study of 109 employees over four weeks, Sonnentag et al. found that employees who are exhausted from work and experience a great deal of time pressure are less likely to engage in necessary leisure experiences. As a result, they less able to engage in psychological detachment or experience sufficient recovery.

Conclusion: Limitations of Previous Research

Overall, research has established the importance of recovery from work demands and the impact of recovery activities on well-being. Specifically, employees who are able to engage in recovery activities, which include health-related behaviors and leisure activities (all of which involve some degree of psychological detachment from work, relaxation, autonomy, or mastery; Sonnentag & Fritz, 2007) are capable of replenishing depleted resources and buffering the

negative effects of high levels of job demands on their health (Sonnentag & Fritz, 2015). Additionally, positive experiences (Frederickson, 2001) and small breaks throughout the day (Trougakos & Hideg, 2015) are likely to prevent full depletion by facilitating small episodes of resource recovery. Important questions remain unanswered: how might recovery processes that occur inside the workplace impact health behavior and well-being outside of work? To what extent does the organizational and environmental context impact individual recovery?

Despite the established relationships between resource depletion and decreased self-regulation of behavior, organizational research has focused primarily on the effects of recovery on job outcomes and well-being outcomes, largely ignoring health behavior outcomes, while health research that investigates important health behaviors has largely ignored the role of the workplace. Furthermore, previous recovery research has focused on leisure experiences, physical activity, and sleep, but has largely ignored a key source of energetic resources: diet. Glucose levels have been implicated in studies of resource depletion (Baumeister, 2015), as individuals who reach depleted states demonstrate lower levels of glucose present in their blood. Additionally, nutritious diets provide individuals with energy, cognitive clarity, and cognitive functioning, while the consumption of unhealthy foods often results in sluggishness, irritability, and decreased cognitive functioning (Florence, Asbridge, & Veugelers, 2008; Neck & Cooper, 2000). Because of the relationship between a healthy diet and overall

physical and mental well-being, it is surprising to see it absent in organizational research that has investigated similar behaviors (e.g., exercise and sleep).

Despite notable progress in recovery research, several disjointed areas of research must be combined to fully understand employee recovery processes. Some studies have examined recovery processes at work (Trougakos & Hideg, 2015), whereas others have examined similar processes outside of work (Sonnentag & Fritz, 2015); however, recovery is best understood by incorporating both domains and assessing depletion and recovery as a continuous process that occurs both during work hours and during off-work time. The extent to which the ebb and flow of energetic resources throughout the workday and the state of resources at the end of the workday impact the ways in which employees recover their depleted resources in their non-work lives is unclear. Employee experiences do not exist within separate home and work-life vacuums; depleted resources do not automatically reset when an individual leaves the workplace. Because the resources that are required to exert effortful behavior at work and at home are the same, it makes the most sense to examine these processes over the course of an entire day. While many studies have examined work-related outcomes of the depletion process (e.g., burnout, reduced engagement), this knowledge must be combined with non-work-related outcomes of depletion (e.g., health behavior, sleep) because these variables can be expected to impact subsequent work-related processes.

Another gap in our understanding of the recovery process is the influence of environmental factors on recovery. Because research has demonstrated that personal resources share a reciprocal relationship with job resources over time (Bakker, Demerouti, & Sanz-Vergel, 2014), the organization serves as an environmental context that is likely to impact daily levels of employee resources. As a result, organizational climate, or "shared perceptions of...organizational policies, practices, and procedures" (Schneider, Erhart, & Macey, 2013, p. 362) is likely to impact employee resource recovery. Additionally, the social context outside of work, such as relationships with friends and family, is likely to impact employee recovery from job demands. Recovery research is just beginning to examine the influence of the environment on individual recovery, focusing primarily on the organizational context (Sonnentag, 2015) and ignoring the home environment, or examining it primarily as an outcome (Demerouti, Bakker, Sonnentag, & Fullagar, 2012). While much research on the work-family interface has investigated the reciprocal influences of work life on home life and vice-versa (Demerouti, Taris, & Bakker, 2007; Taris et al., 2006), there have been no examinations of the impact of the non-work environment on individual recovery in particular. While we know that recovery outside of work impacts next-day work engagement (Sonnentag, 2003), and positive experiences at work impact after-work energy levels (Demerouti et al., 2012), the impact of experiences in the non-work domain on individual recovery unclear.

The current project aims to address the problematic compartmentalization of these streams of research by investigating the factors contributing to personal resource recovery, health behavior, and well-being. First, the literature and theory discussed above will be integrated and expanded into a new comprehensive model of employee recovery, concluding with a broad set of theoretical propositions. Second, an empirical research study that tests hypotheses emerging from this new theoretical framework will be proposed.

Chapter 2
Propositions

The following section discusses proposed extensions of employee resource recovery theory. Namely, new ideas regarding the nature of resource processes, the role of personal energetic resources in the self-regulation of health behavior, the differential impacts of healthy vs. destructive coping, and the impact of the organization and environmental context on individual recovery will be presented.

Daily Resource Processes

> Insofar as self-regulation liberates human behavior from being driven solely by external stimuli and automatic, reflexive, or instinctual responses, it contributes greatly to the diversity and flexibility of human behavior. Thus, the capacity for self-regulation must be counted as one of the most precious endowments of the human self. (Muraven, Baumeister, & Tice, 1999, p.446)

Throughout the workday, resources are depleted and recovered (Trougakos et al., 2015). The extent to which employees feel that their resources are fully recovered in the morning predicts their job performance for that day (Binnewies et al., 2009). If recovery processes do not keep up with depletion processes throughout the day, individuals leave work exhausted (Trougakos et al., 2015). Given that personal energies are required for successful self-regulation of behavior (Vohs et al., 2008), the level of resources with which an employee leaves work should have important implications for the recovery process. Emotionally,

physically, and mentally depleted states may result in impaired willpower to engage in healthy behaviors that would replenish resources (e.g., eating nutritious food, being physically active, or attaining quality sleep). Employee in severely depleted states may also be unable to refrain from unhealthy behaviors (i.e., smoking or drinking alcohol excessively) that, according to Mann et al. (2013) and Kelley and colleagues (2015), further deplete personal resources. Then, because of the inability to recover resources through health behavior or abstinence from unhealthy behavior, employees are likely to experience lower resource levels the next day, leading to a downward spiral of resource loss over time.

Consider the following metaphor comparing personal resource depletion to dehydration. Perhaps an athlete arrives to practice or a game fully hydrated, having just consumed plenty of water before starting morning drills—drills that will then begin depleting the athlete of water (depletion). During a water break, the athlete is able to take a few moments to head to the water fountain (recovery). If there are multiple performance episodes that require large amounts of water, and no water break occurs, the athlete will likely experience a dehydrated or depleted state. In sum, the athlete starts the day well-hydrated and can become dehydrated through engaging in strenuous activity without replenishing fluids. Additionally, while many athletes drank plenty of water and hydrated the evening and morning before the practice or game, some athletes may have skipped drinking any water

beforehand; these athletes will be at a severe disadvantage and are likely to experience performance decrements.

Similar to dehydration, resource depletion can lead to hostility (Christian, 2010), slowed cognitive facilities (Ma et al., 2012; Reinard, Scharmach, & Stahlberg, 2013), and exhaustion (Dragone, 2007). Metaphorically speaking, some organizations are more likely than others to encourage employees to take as many "trips to the water fountain" as they need to "stay hydrated." While contemporary coaches know the dangers of forcing their athletes to engage in a full day of practice or scrimmages without taking water breaks, many organizations have failed to acknowledge the dire consequences of allowing employees to experience sustained and chronic resource depletion states (Comen, Stebbins, & Frohlich, 2016). Just like the stereotypical hard-driving coaches of the past, these organizations seem to expect their employees to rest and recover "on their own time," maintaining an opinion (either explicitly, or indirectly through practices and pressures) that recovery takes time away from productivity and is simply for the weak. They are expecting their quarterbacks to make the winning pass while weakened by dehydration. While the dehydrated quarterback may know how to make the winning pass and fully intend to make the winning pass, a dearth of physical energy is likely to prevent the intended outcome from manifesting.

It is proposed that, at any given point, depletion of energetic resources in a particular domain (physical, emotional, or cognitive) will increase the amount of

self-control (i.e., willpower) that is needed to initiate or continue activity in that domain (physical activity, emotion regulation, cognitive processing). For instance, individuals who are physically depleted (e.g., at the *end* of the workday) are likely to require more self-control to willingly engage in physical activity and keep themselves from ending a workout prematurely. Conversely, the presence of abundant energetic resources in a particular domain will likely reduce the amount of self-control necessary for initiating or persisting in other behaviors in that domain. For example, an employee who ends the workday with an abundance of physical energy will require very little self-control strength to engage in exercise after work.

In sum, individuals must maintain an adequate level of personal energetic resources in order to continue to engage in the pursuit of health-related goals (Schwarzer, 2008). During the workday, physical, emotional, and cognitive energies are depleted by work tasks or other job demands. As energies are depleted, individuals must draw upon their self-control in order to continually mobilize their limited personal energies and allocate them toward tasks due to the fact that the natural tendency is to rest when depleted. During recovery activities, the physical, emotional, and cognitive resources are replenished, relaxing the self-control muscle and allowing it to recover from prior exertion. Figure 3 demonstrates the proposed physical, emotional, cognitive, and self-control energy (PECS) model.

Expanding the Control Theory Feedback Loop to Include Energetic Resources

> To work is to use energy, and thus the psyche should, in theory, be less capable of working upon the internal and external environment when its energy is lower. (Gailliot, 2015, p. 38)

Individuals set goals in the workplace and their personal lives, and the processes by which they set, maintain, strive toward, and revise their goals is known as self-regulation (Lord et al., 2010). Control Theory (CT; Carver & Scheier, 1982; Powers, 1973) is considered a cybernetic theory of self-regulation characterized by a negative feedback loop that compares an individual's current state to his desired state (Vancouver, 2000). The main components of this negative feedback loop include *Inputs* or perceptions of current states; the *Comparator* function that compares the inputs to the goal; the *Standard* or the goal itself against which current states are compared; the *Output*, or the resulting amount of discrepancy detected and the course of action decided that will attempt to reduce that discrepancy; the *Gain*, or the importance of the goal-state discrepancy as determined by higher-order goals within an individual's goal hierarchy; the actual *Behavior* that is expressed into the environment; and any *Disturbances* or factors external to the individual that impact his or her goal-striving behavior (Figure 1).

Self-control constitutes a self-regulatory resource, a personal energy that can be conserved, depleted, recovered, and trained (Hagger et al., 2010). Hunter and Wu (2015) suggest that personal energies operate similarly, that personal

energy must be recharged like a battery. It is therefore proposed that personal energetic resources (physical, emotional, and cognitive) and self-control function similarly because they are reciprocally linked. When there is a gap between the perceived current state (input) and the standard, personal energies are called upon to produce behavior that reduces the discrepancy. Given that behavior is often goal-driven (Deci & Ryan, 2000), it's unlikely that the self-control muscle is drained each time a discrepancy must be reduced, or else the self-control muscle would never have time to rest and recover. Instead, we suggest that the self-control muscle is only taxed when personal energies are depleted. When energy is adequate, the negative feedback loop occurs relatively automatically. However, when energies become depleted, individuals must "push" themselves and draw upon their self-control to initiate or continue behavior. As a result, self-control strength is driven by availability of energetic resources in that high resource levels will facilitate the reduction of discrepancies without drawing upon self-control, whereas low resource levels will lead to tax the self-regulation "muscle."

Furthermore, it is proposed that the *Gain*, or the importance of the goal being compared to an individual's current state, likely plays a role not only in determining the intended output (as Control Theory suggests), but also in determining the amount of energetic and self-control resources an individual will be willing to allocate toward engaging in that intended behavior. It is generally proposed that the depletion of domain-specific energetic resources (physical,

emotional, cognitive) will activate the expenditure of self-control strength, and that self-control strength is required for effortful control of behavior. When individuals are trying to conserve self-control strength (for example, in anticipation of more important future task), they may reduce effort (behavior) in response to personal energy depletion so as not to tax the self-control muscle. In this case personal energetic resources will be positively related to effort (behavior). However, if the current task (goal) is important, the positive relationship between resource states and behavior will be weakened such that individuals may choose to continue allocating personal energetic resources at a high rate despite depletion.

Proposition 1: Personal energetic resources include physical, emotional, and cognitive energy and function similarly to self-regulatory resources: they can be consciously conserved, they can be recovered following break in their use, and their baseline levels should be able to be increased over time with practice or "training."

This conceptualization can explain why there have been discrepant findings (Evans et al., 2015) in the attempts to replicate Muraven and Baumeister's (2000) limited energy model of self-control, with some studies finding that individuals are able to perform well on a task despite previously engaging in a draining task (they are likely to have conserved energetic resources in the face of an unimportant goal). It may also partially explain discrepant findings in self-efficacy research, in which the relationship between self-efficacy and effort allocation are not always positive (Vancouver, Gullekson, Morse, & Warren, 2014). Individuals can conserve their

energetic resources to use when they are in pursuit of important goals that they believe they are capable of accomplishing. When a goal is important, individuals will respond to low energy by reducing behavior; doing so requires no self-control. However, when a goal is important, individuals will continue to allocate effort toward reducing the discrepancy in spite of the depletion of energetic resources. To do so, they must draw upon self-control. As a result, it is likely that important goals are likely to drain self-regulatory resources at a higher rate compared to unimportant goals.

Proposition 2: If personal energetic resources function similarly to self-control, a person's resource states (the resource level present at any given time), is a function of their baseline resource pool and the sum of previous resource depletion and recovery.

Proposition 3: Individuals have a natural tendency to conserve energetic resources following depletion; therefore, low energetic resources will reduce goal-directed effort (i.e., reduce the relationship between a perceived discrepancy (output) and behavior).

Proposition 4: The Gain *of a goal will moderate the effect of energetic resources on the relationship between the* Output *and the resulting* Behavior. *When the goal (*Standard) *is important, depleted individuals will behave similarly to non-depleted individuals, such that they will both exhibit a strong positive relationship between perceived discrepancy (output) and behavior (effort). When the goal is unimportant, the depletion of energetic resources will result in a weakened relationship between output and behavior (Figure 2).*

Proposition 5: The allocation of additional energetic resources during depletion (i.e., in the case of important goals) requires will-power and therefore depletes self-control strength.

Personal Energetic Resources and the Self-regulation of Health Behavior

> By exercising control over a few healthy habits, people can live longer, healthier lives. (Bandura, 1998, p. 624)

Much of health-related behavior is goal-oriented (Mann, de Ridder, & Fujita, 2013; Pearson, 2012). Specifically, individuals set goals that represent internally desired states such as an ideal weight or level of physical fitness, the elimination of a health condition or disease, or the termination of an unhealthy habit such as smoking or alcohol abuse (Schwarzer, 2008). Health self-regulation in particular involves dual goals: termination of unhealthy behavioral habits and adoption of healthy behaviors in their place. In the pursuit of healthy lifestyles that involve health behavior change (the abandonment of unhealthy habits in favor of healthy ones), individuals must engage the executive component of the self to override the automatic behaviors that constitute unhealthy habits (Baumeister, 2014). Because individuals have a limited capacity to engage in such controlled processing, the pursuit of a health behavior goal may exhaust self-regulatory resources and lead to lapses in behavior as a function of ego-depletion—at least until a healthy habit is formed. This is why some people are able to maintain daily exercise routines (they have formed habits and therefore no longer require as much,

if any self-control strength to exercise) while others pay for gym memberships that are never used.

Proposition 6: Depletion of personal energetic resources (physical, emotional, and cognitive) can hamper the pursuit of health-related goals and the formation of health-related habits by draining self-regulatory strength.

While engaging in healthy behavior typically replenishing personal energetic resources, the extent to which the behavior drains self-regulatory resources likely involves a motivational component. For example, even though a healthy lunch entrée is likely to provide someone with energy to continue working during the day, choosing a healthy lunch entrée while co-workers are offering an unhealthy but desirable food option is likely to deplete self-control strength. Individuals who wake early, *before the workday,* to exercise (without this being a habit) are typically initiating physical behavior under a condition of reduced physical energy, which should (temporarily) deplete self-control strength; however, they are usually able to recover those resources (and gain emotional and cognitive resources that also replenish the self-control "muscle") shortly after depletion due to the benefits of physical activity.

Proposition 7: While healthy behavior can boost personal energies needed for successful self-regulation, health behavior can be temporarily draining to the self-control strength when in the presence of a more enticing alternative.

If personal energetic resources have been depleted over the course of the workday, it is more likely that individuals will experience ego-depletion and lapses in self-regulation that lead to participation in unhealthy behavior. For example, rumination, or the preoccupation with past negative events or failures, is considered the result of failed self-regulation (Diefendorff & Chandler, 2011) and often results from individuals experiencing negative experiences at work (Nicholson & Griffin, 2015). This constant thought about negative work events prevents psychological detachment, a key component of the recovery process (Nicholson & Griffin, 2015; Sonnentag et al., 2014). The prevention of recovery through rumination leads to continued resource depletion, draining an individual's ability to self-regulate even when away from work. As a result, health related behaviors that required controlled processing and effortful investment of self-regulatory resources are likely to suffer.

Limited self-regulatory resources are vital for successful self-regulation of behavior in and outside of the workplace (Muraven & Baumeister, 2000). Within organizations, employees strive toward job-related goals, such as improved performance, and they rely on self-regulatory resources, which draw from physical, emotional, and cognitive energies (Deci & Ryan, 2002), in order to alter automatic behavioral tendencies in favor of those which will help them achieve their goals (Vancouver, 2000). When individuals experience stressors in the workplace that distract their attention from job tasks, cause intense emotions that must be regulated, trigger unwanted action patterns, or activate cognitive rumination,

energetic resources are depleted and self-regulation is hindered (Deci & Ryan, 2002).

Outside of work, similar processes occur: employees utilize their remaining energetic resources after work to strive toward personal goals that require willpower to pursue (e.g., practicing a musical instrument, adhering to a healthier diet, scheduling time for family and friends; Bandura, 2001). Employees whose resource recovery process have been prevented during the workday will experience depleted personal energy states and will therefore be less able to successfully engage in effortful self-regulation of behavior necessary to attain these goals after work. Consequentially, their health and well-being will suffer.

Proposition 8: Resource recovery processes are the same at work and outside of the workplace.

Proposition 9: End-of-workday resource depletion initiates a downward resource spiral that decreases an individual's ability to allocate any remaining resources toward effortful health-related or leisure behavior. This, in turn, continues the resource depletion process as healthy behaviors that would facilitate resource recovery are stymied.

Integrating Coping Theory into the Recovery Process

> If people lack knowledge about how their lifestyle habits affect their health, they have little reason to put themselves through the travail of changing the detrimental habits they enjoy. (Bandura, 2004, p. 144)

It is presently proposed that recovery activities may be conceptualized in three different ways: categorized by behavioral domain, coping strategy, and temporally. First, recovery activities may be categorized by the domain of behavior to which they correspond. This is the traditional and primary view in the majority of recovery literature (Sonnentag & Fritz, 2015). Using this conceptualization, recovery activities may involve either health-related behavior (diet, exercise, sleep) or leisure activities (relaxing, social activities). However, as recovery activities aim to combat the depleting nature of work in order to regain resources, they may also be conceptualized as coping activities or behaviors. As a result, the second categorization of recovery activities corresponds to their coping style as healthy coping or destructive coping. Recovery literature has yet to integrate advances in coping research and has not considered the possibility that there may be a dark side to recovery activities in the form of behaviors that are unhealthy and destructive to one's health yet still provide relaxation and psychological detachment. Finally, recovery activities may be categorized temporally, based upon when the recovery activity occurs compared to the exposure to a depleting stressor. As a result, recovery activities can be considered proactive or reactive.

Coping Theory. In order to manage the depleting demands of the workplace, many individuals engage in coping cognitions and behaviors, or initiatives that attempt to reduce or alleviate stress (Carr & Umberson, 2013; Wickramasinghe, 2010). According to coping theory, when attempting to handle stressors in the workplace, individuals may engage in problem-focused strategies (which are mostly approach-focused) or emotion-focused strategies (which are mostly avoidance-focused; Carver, Scheier, & Weintraub, 1989; Lazarus, 1991). Problem-focused coping refers to cognitions or behaviors that aim to change the source, or the stressor itself. Emotion-focused coping, also known as emotion regulation, refers to cognitions or behaviors that aim to alleviate the negative emotions caused by exposure to the stressor.

A more recently proposed category of coping behavior is proactive coping, or "efforts undertaken in advance of a potentially stressful event to prevent it or modify its form before it occurs" (Aspinwall & Taylor, 1997, p. 417). Proactive coping involves the accumulation of resources and the recognition of potential sources of stress. It occurs before an actual stressor is appraised (Apinwall & Taylor, 1997), whereas the problem-focused vs. emotion-focused distinction has primarily focused on reactive coping (Lazarus & Folkman, 1984). The primary difference between proactive and reactive coping is the time at which they occur; temporally, proactive coping is before the initial stressor appraisal, while reactive

coping occurs after. The actual coping tactics used might be the same in both proactive and reactive coping situations.

Coping strategies predict emotional well-being and health status; however, not all potential coping behaviors are healthy (Wethington et al., 2015). In particular, behaviors which are emotion-focused and stressor-avoidant in nature may be detrimental to individual health. For this paper, destructive coping refers to behaviors which may temporarily improve energetic resources (e.g., induce positive emotion, increase mental or physical alertness) at the expense of long-term health. Examples of destructive coping include physical inactivity, binge or unhealthy eating, and using alcohol, tobacco, or other substances to reduce stress or increase energy (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2015).

Healthy and Destructive Coping Behaviors as Recovery Activities. Although research has linked proactive coping to positive outcomes (Greenglass & Fiksenbaum, 2009), the proactive strategies these researchers examined could all be considered healthy coping behaviors. However, proactive coping can also be destructive when an employee engages in a coping strategy to address a future stressor even though that particular strategy is likely to reduce one's well-being (e.g., staying up all night to finish a presentation that will occur tomorrow afternoon). Similarly, reactive coping can also be healthy or destructive. The current theoretical model therefore makes an additional distinction between

healthy vs. destructive coping in addition to the proactive vs. reactive distinction proposed previously (Apinwall & Taylor, 1997). Healthy coping will be used to describe engagement in health-related and leisure activities that are consistent with long-term health and occur either before or after perception of a stressful event. Regardless of the temporal context, healthy coping constitutes attempts to cope with burdensome demands using strategies that are in line with an individual's long-term health and well-being. Conversely, destructive coping will be defined as coping efforts that run contrary to long-term health (Wethington, Glanz, & Schwarts, 2015). Destructive coping strategies (i.e., taking a smoke break at work; drinking alcohol excessively after work), which may be used to mitigate the negative emotions and anxiety felt by stressors, are less effective for stress reduction than healthy behaviors and clearly lead to health decrements. Destructive coping includes health-averse behaviors such as physical inactivity, binge eating, excessive substance use (e.g., depressants, stimulants, etc.), and a conscious decision to get less sleep than is needed.

The distinction between health and destructive coping is important for understanding the recovery process because they are expected to have opposite effects on the resource recovery process. Specifically, while health-related behavior and leisure activities may temporarily drain energetic resources and require self-control to initiate, they increase well-being in the long run by providing additional resources or recovering depleted resources. Destructive coping, on the other hand,

requires little or no self-control to initiate and temporarily increases energetic resources by improving emotional, physical, or mental states; however, these strategies are likely to reduce well-being at a later time by draining personal energetic resources or preventing opportunities for resource recovery. For example, giving up sleep might reduce perceived stress of needing to meet a deadline, but it prevents energetic resources from being recovered and may lead to a downward spiral of resource loss. As another example, physical inactivity might allow for temporary relaxation but will prevent the opportunity for the recovery of physical, emotional, and cognitive energy that exercise would have facilitated. There are also deleterious long-term effects of lack of sleep, inactivity, and poor diet on individual health and well-being. In fact, over 30% of deaths in the U.S. in 2000 were attributed to physical inactivity, poor diet, tobacco use, and alcohol use, all of which are operationalizations of destructive coping behaviors (Mokdad, Marks, Stroup, & Gerberding, 2004).

There are mixed results regarding the relationships between health-related behaviors and destructive coping behaviors. For example, unexpected relationships have been identified between health promotion program participation and tobacco and alcohol use (Poston et al., 2013). While the authors expected that wellness participants would exhibit fewer destructive coping habits, they found no difference in alcohol and tobacco consumption between members of firefighter wellness programs and firefighters who did not participate in wellness programs. Similarly,

Conroy et al. (2014) found significant between-persons relationships between physical activity and alcohol use in a sample of 150 adults.

There are competing hypotheses that might explain these relationships and a dearth of studies examining relationships between stressors, coping, and physiological health to provide clarification (Wethington et al., 2015). On one hand, coping itself requires an investment of personal resources (Carr & Umberson, 2013); therefore, individuals who have been depleted by demands throughout the workday may not have enough personal resources remaining to engage in healthy behaviors. These individuals may instead engage in destructive coping, which are unlikely to require any self-control strength. On the other hand, some individuals who are depleted at work may engage in more health behaviors when they feel depleted in an attempt to recovery these resources. Consistent with the previous proposition that initiating effort while in a reduced energy state requires self-control, there should be between-persons differences in how individuals respond to reduced resources based on average or baseline self-control strength.

Proposition 10: Individuals with high trait self-control will be more likely to engage in healthy recovery activities even when resource states are low; conversely, individuals with low trait self-control are more likely to engage in destructive coping behaviors when resource states are low because these behaviors require little to no self-regulatory strength.

Proposition 11: Healthy coping requires self-control and may temporarily deplete energetic resources but will subsequently increase energetic resources and improve health and well-being.

Proposition 12: Destructive coping, which requires few self-control or energetic resources, will temporarily increase energetic resources but will subsequently deplete energetic resources and deteriorate health and well-being.

The Organizational Context of Resource Recovery

> Human health is a social matter, not just an individual one. (Bandura, 2004, p. 143)

Organizations have the potential to impact diet, exercise, and sleep through various policies, practices, and pressures (Sliter, 2013; Sonnentag & Pundt, in press). Any company that has break rooms with refrigerators and microwaves, offers on-campus dining options, caters for holidays or other events, and has employees who are legally allowed or required to take a break for lunch has an impact on employee diet. The extent to which options are nutritious will certainly impact individual health behaviors related to food. Companies that offer on-site physical activity or that sponsor off-site fitness memberships are contributing to employee exercise. Conversely, companies may be inadvertently contributing to poor physical activity behavior by preventing employees from taking breaks that would allow sufficient time to exercise. Distally, organizations may also prevent exercise by draining employee resources to the point where individuals are too

exhausted after work to be physically capable of exercise recovery activities. Finally, organizations may also impact employee sleep. Individuals who are required to work extra hours may have less time to complete off-job responsibilities and must sacrifice adequate sleep to do so. Individuals whose employment includes on-call hours may also be interrupted during sleep to attend to work matters. While this is a necessary part of many jobs, awareness of the recovery process may encourage these companies to promote other forms of recovery so as to prevent employee burnout when sleep is not able to be consistently high quality.

While it is not necessarily the responsibility of organizations to promote all possible leisure activities (due to financial constraints and the nature of some types as posing a liability), a general promotion of employee engagement in leisure as a recovery method is recommended (Eschleman, Madsen, Alarcon, & Barelka, 2014). Eschleman et al. (2014) recently found that engagement in creative activities was positively related to both employee recovery experiences of mastery, control, and relaxation and job outcomes of creativity and extra-role behaviors. The authors explained that while companies already provide employees with information about physical health, information about ways to recover should be provided as well. Additionally, these findings suggest that organizations invested in the wellness of their employees should consider promoting employee engagement in recovery activities outside of diet and exercise, including creative activities such as fine art classes, creative writing courses, and musical instrument lessons. Organizations can

contribute to employee ability to engage in leisure activities in a similar manner to the way they may contribute to health-related behavior.

By allowing individuals to take reasonable breaks during the workday, organizations may provide employees with the opportunity to engage in leisure activities of their choice. Exemplary organizations may also sponsor employee involvement in local and community leisure activities. Conversely, organizations that require individuals to sacrifice personal time to complete job tasks may be preventing their employees from engaging in leisure activities necessary for recovery. Additionally, if an organization claims to promote wellness by sending company-wide emails about local farmer's markets or offers to pay for gym memberships, yet forces its employees to work such long hours that they must sacrifice countless hours of sleep each night, beneficial outcomes are unlikely to occur. Because organizational policies, practices, and pressures are likely to impact the extent to which employees are likely to engage in recovery activities inside and outside of the workplace, it behooves organizations to promote proactive styles of recovery activity engagement so that employees are able to cope with job demands before energetic resources are depleted.

Proposition 13: In organizations that promote personal energy recovery, health behavior may be easier to engage in. As a result, energetic resources are less likely to be depleted and self-control strength is less likely to be taxed in climates that support personal energy recovery.

Proposition 14: Organizational climate will also alter the Gain *of health-related goals; individuals may be rewarded for their healthy behavior, making it more likely that they will engage in healthy behavior even when energetic resources are depleted.*

Proposition 15: Workplace health interventions may enhance employee recovery opportunities by encouraging and increasing opportunities for healthy behaviors (diet, exercise, sleep) and participation in leisure activities. Organizational climate will influence the success of any workplace health interventions.

The Impact of the After-Work Environment on Recovery

> Indeed, it has been shown that perceived sufficiency of the time available for work and social life predicts the level of well-being only if the individual's needs are fulfilled within that time. (Demerouti, Sanz-Vergel, Petrou, & van den Heuvel, 2016, 391)

While most research on the interface between demands at work and demands at home focuses on the extent to which family life and work life interfere with or enrich one another (Greenhaus & Allen, 2011), an additional factor should be investigated in relation to recovery processes: the extent to which non-work obligations interfere with individual recovery. Even if an organization promotes employee recovery, perhaps by banning work-related emails after the close of business, it is possible that non-work obligations prevent an individual from engaging in the types of recovery activities he or she needs in order to recover resources. Empirical evidence suggests that individuals who must engage in household tasks during off-work time experience poorer psychological detachment

and relaxation, and consequentially, have less energy at work the following day (ten Brummelhuis & Bakker, 2012). While many individuals intend to engage in healthy recovery activities after work, their after-work environment may prevent them from doing so. Work-family conflict research has recognized the limited energy resource model as a potential explanatory mechanism for why performance in work and family roles may suffer (Allen et al., 2012). Because the resources one has to expend toward reducing goal-state discrepancies are limited, a demanding work role may deplete individuals and reduce the amount of energy they have for their family role, and vice-versa. As a result, goal conflict theories of motivation provide the best theoretical background for how and why individuals' non-work lives may hinder their health.

Individuals strive to grow and develop themselves by setting personal goals (Boudreaux & Ozer, 2013). Boudreaux and Ozer explain that when successfully attained, personal goals lead to better job performance, well-being, and overall life satisfaction. However, given that goal-striving requires limited physical, emotional, and cognitive resources (Muraven & Baumeister, 2000), individuals often attempt to strive toward more goals than they have the personal resources to attain. The existence of goal conflict, which refers to situations in which striving toward one goal reduces goal-striving for a second goal, is linked to poor performance outcomes (Locke, Smith, Erez, Chah, & Schaffer, 1994). For example, one may desire to be highly successful in their career, highly successful in their family role,

and maintain optimal health habits. When career and family roles require the investment of energetic resources, effort may be allocated toward career and family goals and personal health goals may suffer.

Research has demonstrated that family goals often take precedence over personal goals. Parents will sacrifice their health for the sake of their children, with working mothers experiencing the highest amount of stress (Ross, Mirowsky, & Goldsteen, 1990). When after-work roles interfere with individual health goals, it is likely that individuals will not have enough energetic resources available to engage in healthy recovery activities. Instead of preparing a healthy meal, individuals may select a fast food option after work and forgo their workout, for instance. However, some people are better at managing conflicting goals than others (Boudreaux & Ozer, 2013). It is likely that this may be due to differences in baseline resources levels, where individuals with higher trait self-control may have higher levels of resources that can be allocated toward multiple goals.

Proposition 16: Non-work recovery interferences will reduce the extent to which employees are able to engage in recovery activities after the conclusion of the workday, especially for individuals with low trait self-control.

Chapter 3
Current Study

The above propositions represent a broad attempt to expand theory and promote further research on employee recovery. It would require a number of different research methods to fully test each proposition. The current project has tested particular aspects of the broader theoretical model. The following sections therefore present a set of more specific hypotheses which stem from the above theoretical framework and then present the methodology that has been employed to empirically test those hypotheses.

The proposed examination of recovery and depletion (at work and outside of work) has furthered our understanding of the impact of personal energetic resources on employee health in three main ways. First, the study examined the general proposition that employees who have minimized resource depletion (adequate recovery) during the workday are more likely to abstain from unhealthy behavior, engage in healthy behavior, and participate in relaxing or leisurely activities that further the recovery process. Second, it examined the impact of intra- and extra-organizational factors (organizational climate and non-work obligations, respectively) on the extent to which employees are engage in recovery activities. Third, the study examined links between recovery activities after work, well-being at bedtime, and the energetic resource levels with which employees begin the

workday. In summary, this research has investigated the recovery and depletion process throughout the entire work—non-work cycle, as well as the impact of resource availability on health-related behaviors (diet, exercise, and sleep) and indices of well-being, all while considering the overall organizational and environmental context in which this process occurs.

Workday Hypotheses

As the workday proceeds, personal energetic resources that employees had at the beginning of the day are likely to be depleted. The more draining experiences a person experiences over the course of the day, the more their limited personal energetic resources are likely to be depleted (Hofmann, Vohs, & Baumeister, 2012). Figure 4 represents the complete model of resource states and recovery activities during the workday and after work.

Workday Within-persons. The theoretical model presented in the previous section suggests that individuals may be able to recover some of their personal energetic resources at work if they are able to engage in recovery activities throughout the day and that individuals who engage in fewer recovery activities over the course of the workday will have fewer energetic resources available later in the day. Further, resource states are likely to predict whether employees engage in healthy or destructive recovery activities (both during the workday and after work) because of their differential requirements for self-control. The relationships

among resource states and recovery activities are expected to be consistent throughout the day, with T1 referring to either the morning (predicting midday survey variables) or the middle of the day (predicting end of day survey variables) and T2 referring to either the middle of the day or the end of the day.

1. Resource states at T1 are positively related to healthy recovery activities (H1A) and negatively related to destructive recovery activities (H1B) between T1 and T2.
2. Healthy recovery activities between T1 and T2 are positively related to resource states at T2.
3. Destructive recovery activities between T1 and T2 temporarily increase energetic resources at T2 (H3A), but will result in decreased well-being at bedtime (H3B).
4. There is an indirect relationship between resources at T1 and resources at T2, mediated by healthy (H4A) and destructive (H4B) recovery activities.

Workday Between-persons. Because previous research has indicated that high levels of self-control serve as a buffer against work stressors. This may be partially due to the fact that individuals with high trait self-control are more likely engage in healthy recovery activities that build resources, as opposed to destructive recovery activities that deplete resources. The theoretical model presented above also suggests that trait self-control may be particularly important when energetic resources are depleted because putting forth more energy when resources are low

draws upon one's self-control. Individuals with naturally high levels of self-control are likely to be at an advantage in this case.

5. Trait self-control relates to recovery activities between T1 and T2. In particular, trait self-control will be positively related to healthy recovery activities (H5A) and negatively related to destructive recovery activities (H5B).
6. Trait self-control moderates the relationship between resource states at T1 and recovery activities between T1 and T2, such that the relationship between healthy recovery and resource states will be weaker for individuals with high trait self-control (H6A), while the relationship between destructive recovery and resource states will be weaker for individuals with lower trait self-control (H6B).

Workday Organization-level. Organizational climate is a topic of interest in occupational health psychology, and specific climates (e.g., safety climate, violence prevention climate) have been theorized to predict a number of organizational outcomes relevant to wellness research, such as employee commitment (El-Kassar, Chams, & Karkoulian, 2011), the success of health and wellness interventions (Elliot et al., 2012), and hospital employee performance (Katz-Navon, Naveh, & Stern, 2005; Singer, Lin, Falwell, Gaba, & Baker, 2009). Climate research is particularly well suited to investigate the effects of perceived organizational practices, policies, and procedures on employee recovery processes. Especially in respect to the success or failure of health interventions (Hemmelgarn,

Glisson, & James, 2006) and worksite wellness programs (Elliot et al.), organizational climate is thought to be critical. Approaching the issues of employee recovery from a climate perspective will help organizations to determine organizational influences on recovery from work demands. Understanding a climate of personal energy recovery will help to develop interventions aimed at improving employee recovery processes, and in turn, engagement, productivity, and worker well-being.

The personal energy recovery climate construct has been recently developed, and a measure of this construct (called the PERC) is in the process of being validated by the author of this manuscript. The personal energy recovery climate refers to *employee perception of the practices, policies, and pressures related to organizational promotion of health related behavior and leisure activities that assist employee recovery of energetic resources depleted by work demands.* This conceptualization differs from a psychological recovery climate (Sonnentag, 2015), which focuses on perceptions of organizational practices, procedures, etc. that support or constrain recovery during non-work time. The personal energy recovery climate acknowledges recovery that might occur both after work and during work and focuses on the recovery of a broader range of personal energies (physical, emotional, cognitive).

A *positive recovery climate* exists when the organization emphasizes and encourages the engagement in health behaviors and leisure activities that promote

physical and psychological recovery from work demands. Conversely, a *negative recovery climate* exists when the organization disregards employees' need to recover from work demands by preventing or discouraging health behaviors and leisure activities necessary for physical and psychological recovery.

Personal energy recovery climate is likely to impact the extent to which employees are encouraged to engage in recovery activities during the workday. In organizations that promote recovery, the overall work environment is likely to facilitate healthy choices while discouraging unhealthy choices. For example, some organizations may instate an unhealthy food tax, where they provide healthy food options in the on-site cafeteria at a more affordable price while increasing the cost of unhealthy options (Sawada, Ota, Shahrook, & Mori, 2014). On the other hand, organizations that do not promote recovery may fail to provide safe or readily accessible areas for physical activity, leading the employee to choose inactivity over taking a walk during a break.

7. Personal energy recovery climate directly relates to recovery activities. Specifically, positive recovery climate is positively related to healthy recovery activities (H7A) and negatively related to destructive recovery activities (H7B).
8. Personal energy recovery climate moderates the relationship between resource states and recovery activities such that a supportive personal energy recovery climate will weaken the relationship between resources at T1 and healthy recovery activities between T1 and T2 (H8A), while an unsupportive personal

energy recovery climate will weaken the relationship between resources at T1 and destructive recovery activities between T1 and T2 (H8B).

After Work Hypotheses

The after work model of resource states, recovery activities, and well-being at bedtime mirrors the workday model. Employee resource states after work are likely to influence the type of recovery activities, healthy or destructive, that employees engage in after work and before bed. Additionally, trait self-control is likely to drive recovery behavior regardless of resource states. Finally, employees may experience recovery interferences outside and independent of the workplace that reduce their ability to engage in healthy recovery before bed. All of these factors are likely to predict employee well-being at bedtime. (See Figure 4.)

After Work Within-persons. At the conclusion of the workday, employees are likely to be at a much more depleted state than when they arrived in the morning. Based on prior research, engagement in after work recovery activities (including healthy behavior and leisure activity) is expected to help employees recover the resources depleted throughout the workday (Sonnentag & Fritz, 2015). However, employees who leave work at severely depleted levels are unlikely to have the energy to participate in recovery activities after work. Because abstinence from unhealthy behaviors and engagement in healthy behaviors both require self-regulatory resources (Schwarzer, 2008), employees with low resource states at the

end of the workday are less likely to engage in desirable health-related behavior and may engage in destructive recovery activities after work.

Employee well-being at bedtime is likely to be dependent on the extent to which resources depleted at work have been recovered. The process by which resource states at the end of the workday (T2) are expected to impact well-being at bedtime mirror the workday process described above. The extent to which employees are capable of recovering these depleted resources after work is likely to be impacted by their engagement in recovery activities. Furthermore, while engaging in unhealthy, destructive coping behaviors may have temporarily provided psychological detachment or relaxation after work (in the short term), it is likely that unhealthy behaviors after work will lead to poorer well-being and fewer resources the next morning. For example, a social evening with friends or family (and a few more servings of alcohol than recommended) may lead to positive affect in the evening, but decreased well-being the next morning, especially if the individual ate a large quantity of unhealthy food and the duration of the social outing resulted in fewer hours of sleep than usual.

9. Employee resource states at the end of the workday will be positively related to healthy recovery activities (H9A) and negatively related to destructive recovery activities (H9B) after work.
10. Healthy recovery activities after work will be positively related to well-being at bedtime.

11. Destructive recovery activities after work will be positively related to perceived well-being at bedtime (H11A), but will negatively related to resources the next morning (H11B).
12. Employee resource states at the end of the workday are indirectly related to well-being at bedtime, mediated by healthy recovery activities (H12A) and destructive recovery activities (H12B) after work.

After Work Environment Within-persons. Recovery activities are vital for the recovery of personal resources that have been depleted at work. However, non-work interferences with recovery are likely to prevent adequate engagement in recovery activities. Non-work recovery interferences refer to *obligations in one's personal life outside of the work domain that interfere with one's ability to engage in recovery activities*. Healthy recovery activities require more energetic resources and often take up more time than destructive recovery activities. For example, it is quicker and requires less energy to order take-out for dinner than to prepare a meal that includes appropriate servings of multiple food groups, especially if non-work obligations require one's time and attention. It is likewise quicker and requires less energy to skip a workout and opt for inactivity than to engage in physical activity when non-work obligations are high.

Similarly, non-work recovery interferences may directly impede recovery activities, regardless of an individual's energy level. Obligations often arise that compel individuals to give up their plans to engage in recovery activities. This

could occur for both healthy and destructive recovery activities, as individuals can be interrupted at any time or while engaging in any behavior. Non-work obligations could also lead to individuals rushing through their recovery time, preventing the replenishment of energetic resources. The non-work recovery interference (NWRI) construct has been recently developed, and a measure of NWRI is in the process of being validated by the author of this manuscript.

End-of-day well-being is hypothesized to be impacted by the extent to which employees have been able to recover depleted resources. Therefore, recovery interference could moderate the relationship between end-of-workday resources and evening well-being by influencing the extent to which employees engage in recovery activities.

13. Non-work recovery interferences are expected to directly relate to after work recovery activities and well-being at bedtime. Specifically, recovery interferences will be positively related to destructive recovery activities (H13B) and negatively related to healthy recovery activities (H13A).
14. Non-work recovery interferences are also expected to moderate the relationship between resource states at the end of the workday and recovery activities after work, such that the relationship between resources and healthy recovery will be weaker when recovery interferences are low (H14A), while the relationship between resources and destructive recovery behavior will be stronger when recovery interferences are high (H14B).

After Work Between-persons. The effects of trait self-control on recovery after work are hypothesized to be identical to its effects on recovery during the workday. Individuals with higher trait self-control are more likely to be able to regulate their behavior after work despite low levels of resources at the end of the day.

15. Trait self-control is expected to directly relate to recovery activities after work. In particular, trait self-control will be positively related to healthy recovery activities (H15A) and negatively related to destructive recovery activities (H15B).
16. Trait self-control is also expected to moderate the relationship between resource states at the end of the workday and after-work recovery activities, such that the relationship between resources and healthy recovery will be weaker when self-control is high (H16A), while the relationship between resources and destructive recovery will be weaker if self-control is low (H16B).

Chapter 4
Method

Participants and Procedure

A 10 consecutive workday experience sampling method was employed with four data collection points over the course of each day. While 200 participants originally signed up to participate in the study, there were useable data points from 145 individuals, which is similar to sample sizes used in similar studies that detected cross-level interaction effects (Sonnentag, Binnewies, & Ohly, 2013). Participants were recruited through social media, word of mouth, and email distributions and represented a wide range of industries. Participants had to work a minimum of 30 hours a week and must work regular working hour schedules. Of the total sample of participants, 64% were female, 75% aged 26-55 (with 20% age 25 or under, 54% age 26-40, and 22% age 41-55), and 80% worked eight or more hours per day. Administrative assistants accounted for 28% of the participants, while 20% were comprised of upper and middle management, and 23% were trained professionals. Demographic characteristics such as age, sex, and education were uncorrelated to outcome variables.

Individuals were encouraged to download and create accounts with one smartphone application: MyFitnessPal, which is free of charge. A subset of participants agreed to monitor physical activity and nutrition information through

the application in addition to responding to subjective exercise and diet questions. There were 104 participants who completed a MyFitnessPal entry at least once, 83 who completed at least three MyFitnessPal entries, and 23 who completed MyFitnessPal entries for every day of the study.

To incentivize participation, participants were provided with payment for each of the surveys they completed. Each participant received $5.00 for the initial one-time between-person questionnaire, $0.75 per daily survey (four per day for 10 days), and an additional $10.00 for completing at least 80% of the surveys, for a total possible payment of $45.00 per participant.

Links to the Qualtrics survey platform were emailed to participants four times each workday: 7:00AM, 11:00PM, 3:00PM, and 7:00PM. Participants were instructed to complete a survey upon entering the workplace (when resources are likely to be highest), before they took their lunch break, at the end of the workday before they departed, and before bed. Table 2 demonstrates the surveys that were administered at each point during the day. Survey links remained open for three hours after each time point to allow participants ample opportunity to complete the questionnaires within an allotted time window.

Measures

A complete list of items for all measures is included in the Appendix.

Trait Self-control and Personal Energy Recovery Climate

The Tangney, Baumeister, and Boone (2004) 36-item self-control scale (reliability estimate = .91) and the LeNoble et al. (2016) newly developed 14-item Personal Energy Recovery Climate (PERC) measure (reliability estimate = .91) was administered in the initial between-persons questionnaire that included demographic questions. Both scales included five-point Likert-type items. An exploratory factor analysis with the Principal Components Method extraction and the Varimax rotation (Williams, Brown, & Onsman, 2012) were conducted the initial PERC scale of 30 items that were developed from the recovery literature. Items with a factor loading below 0.40 and with less than a 0.10 difference between loadings were removed, resulting in a four-factor model. A confirmatory factor analysis was conducted on the 14-item measure, resulting in satisfactory fit indices (x^2= 94.35, DF= 71, CFI = .96, TLI = .95, RMSEA = .04, SRMSEA = .05).

Non-work Recovery Interference

The non-work recovery interference measure was developed by adapting items from the Netemeyer, Boles, & McMurrian (1996) work-family conflict scale into items that relate to recovery and recovery interferences. An exploratory factor analysis using the Principal Components Method extraction and the Varimax

rotation was conducted (Williams, Brown, & Onsman, 2012) on these items, which resulted in the reduction of one item that had a loading below 0.40. Then a confirmatory factor analysis was conducted to test the factor structure. The model fit indices demonstrated reasonable fit for one factor with all five items (x^2= 13.39, DF= 5, CFI = .99, TLI = .98, RMSEA = .09, SRMSEA = .02). The newly developed non-work recovery interference measure was administered once each day as part of the evening/before bed survey. The Cronbach's reliability estimate for this scale was .95.

Health Behavior

Sleep Quality. Sleep quality was measured with two Likert-type items each morning in the before work survey: "My sleep last night was restful" and "I woke up feeling refreshed" (0 = not at all; 5 = highly agree). These items are similar to recent diary study sleep quality items that measure sleep quality in terms of restfulness (reported reliability = .74; Diestel, Rivkin, & Schmidt, 2015).

Workday Recovery Activity

To measure recovery activity behavior during the workday, a checklist of recovery activities was created for the purposes of the study and was included in the before lunch and end of workday surveys. Recovery items were generated from literature on activities employees may engage in to promote recovery (Rook & Zijlstra, 2006) and research on work breaks, including those that require low effort

(such as relaxation or sleep; Trougakos & Hideg, 2009) and those that may require more effort (i.e., physical activity). Each item constitutes a behavior that may help employees recover depleted resources and includes both healthy (diet, exercise, sleep, leisure) and destructive (i.e., eating unhealthy snacks, taking a smoke break) recovery activities. Scores for both healthy and destructive recovery were calculated by counting each checked behavior as one point and adding together the total amount of behaviors checked.

Job Stressors

To control for experiences that have depleted employee resources, a checklist was included in the before lunch and end of workday surveys. This checklist was based on the job stressors literature and included six stressor items such as work overload, role ambiguity, and conflict with others (Cooper & Marshall, 1976). Each stressor checked was weighted by the degree to which the participant reported that the stressor bothered them, on a scale of 1 (did not bother me) to 5 (bothered me very much). Job stressor scores were then calculated by adding together the number of stressors checked.

Resource States: Personal Energies and Resource Efficacy

Many current measures of personal energetic resources examine resources using generalized language such as “in general” or “at the end of the workday” (Frone & Tidwell, 2015; May et al., 2004; Schaufeli & Bakker, 2010). To best

capture current resource states, two sets of Likert-type items were adapted from the May et al. (2004) end of day resources measure and the Frone and Tidwell (2015) work fatigue inventory. One set of items, derived from the May et al. measure, captured the experience of personal energy, including items tapping into physical, emotional, and cognitive energy (e.g., *Currently, to what extent do you feel mentally energetic?*). The Cronbach's alpha for the combined three items in the present study is .84, which is the average reliability across the ten days of the study. The reliability for this measure ranged from .82 to .86. The second set of items, derived from the Frone and Tidwell (2015) 3D-WFI, measured the belief that one's current level of personal energy will be sufficient to accomplish tasks requiring self-regulation, herein referred to as *resource efficacy*. The Cronbach's alpha for the combined three resource efficacy items in the present study is .85, with a range of .83 to .87. An example item measuring resource efficacy is: *Currently, to what extent do you feel capable of thinking and concentrating?* Drawing from Social Cognitive Theory (SCT; Bandura 2001), it is expected that an employee's perceived levels of personal energy are distinct from that employee's resource efficacy. While both are expected to impact outcomes in the same direction, it is likely that feelings of resource efficacy are driven by both personal energy and state levels of self-control strength. For example, if personal energy is high but self-control strength has been depleted through recent acts of self-regulation, then belief in one's ability to use current personal energy toward self-regulation may be low.

Resource state was therefore operationalized in two ways: as *personal energy* and as *resource efficacy*.

Recovery Activities after Work

Recovery activities were measured using the Sonnentag and Fritz (2007) Recovery Experience Questionnaire (REQ). The factor structure of the state (i.e., daily) version of the scale was recently validated (Bakker, Sanz-Vergel, Rodriguez-Munoz, & Oerlemans, 2015). This is a 16-item Likert-type measure that assesses the extent to which employees were able to recover from work and includes four items to assess each of four dimensions: mastery, autonomy, relaxation, and psychological detachment. A sample items include, "I forgot about work," and "I took time for leisure." The Cronbach's alpha reliability estimate for the daily REQ scale in the present study was .89, with a daily reliability range of .86 to .92 over the course of the study.

Exercise. Participants recorded the type and duration of physical activity in which they engaged each day. All participants were encouraged to utilize the MyFitnessPal smartphone application in order to standardize the classification of different types of physical activity. The application estimated daily caloric expenditure based on physical activity information and incorporated it into the overall calorie consumption goal for each day. For self-report exercise intensity, participants answered whether they exercised that day. If they answered yes, they

rated the perceived intensity of that exercise as high intensity, average intensity, low intensity, or leisurely. Therefore, exercise intensity was scored as 0 for no activity, and from 1 to 4 based on perceived intensity.

Diet Quality. Diet was assessed both objectively and subjectively. The MyFitnessPal smartphone application was used to track objective diet quality over the course of the study. Participants who volunteered to use MyFitnessPal could log into their accounts anytime during the day and record their food choices. At the beginning of the study, participants received personalized daily recommendations through anonymous calculations within the application that were not recorded for the study. Fiber and sugar were included in addition to macronutrients due to their established importance in overall diet quality (Meyer et al., 2000), healthy body weight (Miller et al., 1994), and heart disease (Liu et al., 1982). In the online survey completed before bed each evening, participants selected from "Met," or "More than/below" for each macronutrient and overall calories, using their application as a reference. For sugar, they selected from "at or below" or "over", and for fiber, they selected from "at or above" or "under". Objective diet quality for the day was scored by assigning points for meeting recommendations for calories and each macro/micronutrient. Because of the demanding nature of using and reporting MyFitnessPal data, participation in the study was still possible if individuals did not feel comfortable using the application. To incentivize the use of MyFitnessPal for its desirable objective dietary data, individuals who completed

the MyFitnessPal section of the survey at least 3 consecutive days each week were entered into a separate $100.00 drawing.

Subjective diet quality was also assessed in order to (1) receive responses from participants who did not record food for that day and (2) to account for the subjective nature of meeting or failing to meet health goals which could have an impact on resource depletion independent of objective diet quality. Two Likert-type self-report questions were asked each evening before bed: "Overall, my diet today was healthy" and "I made food choices today that were in line with my health goals" (0 = not at all; 5 = highly agree).

Destructive Coping Behavior. Unhealthy behavior was measured using self-report questions. Alcohol consumption was assessed by asking participants to report the number of drinks they consumed that day using 12 ounces of beer, five ounces of wine, or one and a half ounces of spirits as the standards for a single drink (National Institute on Alcohol Abuse and Alcoholism, n.d.). Tobacco use was assessed by asking participants to report the number of times they used tobacco products over the course of the day (Al-Ibrahim & Gross, 1990). Because it is likely that social factors influence drinking and smoking, an additional item was included to control for the extent to which drinking and smoking might increase when individuals engage in more social activities (as opposed to being driven by depletion). Each day, participants were asked the amount of time (hours and

minutes) that they engaged in face-to-face social activities with at least one other person outside of work.

Bedtime Well-being

Physical well-being was measured using the physical symptoms inventory (Spector & Jex, 1998). This includes 13 Likert-type items that assess the extent to which respondents experienced a number of physical symptoms such as backache, eye strain, and loss of appetite, for example. The items were worded to reflect the experience of physical symptoms participants feel at the time they answer the bedtime survey. An additional Likert-type item was included which asked, "Right now, how do you feel physically?" Psychological well-being was measured using a one-item measure of mood (a five-point graphic smiley scale similar to the FACES measure of job satisfaction; Kunin, 1955) and one Likert-type item which asked, "Right now, how do you feel psychologically?" Additionally, bedtime well-being composite score was calculated by adding the scores from the physical and psychological items and the mood score and then subtracting the number of physical symptoms.

Chapter 5
Results

Table 3 provides the means, standard deviations, correlations, and reliability estimates of the studied variables. Multiple observations were nested within persons, and therefore the data were analyzed using multilevel modeling (MLM). MLM examines the amount of within and between-persons variance accounted for by the examined variables. The level 1 variables were measured at the within-person (day) level, and the level 2 variables were measured during the between-person (one-time) survey. MLM analyses allowed for the examination of both within-level and cross-level effects. Person-level variables were centered around the grand mean, while day-level variables were centered around the person mean, in line with similar studies (e.g., Demerouti et al., 2012). Hypotheses were tested using HLM software (Raudenbush & Byrk, 2002), with the exception of mediation analyses which were tested using MPlus software (Muthén & Muthén, 2005).

Only 60% of participants completed the MyFitnessPal items, resulting in MFP scores being available for only 725 out of 1182 possible observations. Likely due to the low response rate, the MFP scores were unrelated to the other study variables. Thus, to simplify the results section, MFP results are omitted from the remainder of the dissertation.

Analysis of Within-person Workday Hypotheses

Hypotheses 1-4 refer to within-person relationships among variables measured during the workday. There were two sets of hypothesis tests for each workday hypothesis: one set associated with morning recovery processes (from the start of the workday until just before lunch) and one set associated with afternoon recovery processes (from lunch until the end of the workday).

Resource States Predicting Recovery Activities. First, T1 resource state (personal energy or resource efficacy, in separate analyses) was entered as a level-1 predictor of healthy (H1A) and destructive (H2A) recovery activities between T1 and T2. Table 4 provides a summary of the within-person relationships between resource states and subsequent recovery activities during the workday.

Personal energies at the start of the workday were not significantly related to either healthy or destructive recovery behavior in the morning (measured just before lunch). Resource efficacy at the start of the workday was not significantly related to morning healthy recovery behavior, and, contrary to H1B, it was positively related to morning destructive recovery behavior ($\gamma = .02$, $p < .05$). Thus, H1 received no support in the first (i.e., morning) set of hypothesis tests.

Resource efficacy (but not personal energy) measured just before lunch was positively related to healthy recovery behavior in the afternoon (measured at the end of the workday; $\gamma = .10$, $p < .05$), which lends partial support for H1A. On the

other hand, resource efficacy before lunch was not significantly related to afternoon destructive recovery behavior, whereas personal energy before lunch was negatively related to afternoon destructive recovery behavior ($\gamma = -.01$, $p < .05$), partially supporting H1B. In sum, H1 received only partial support in the second (i.e., afternoon) set of hypothesis tests.

Recovery Activities Predicting Resource States. Healthy recovery activity between T1 and T2 was tested as a level-1 predictor of resource states at T2 (H2). Destructive recovery behavior between T1 and T2 was entered as a level-1 predictor of T2 resource states (H3A) and well-being at bedtime (H3B). In order to demonstrate the recovery of resources, resource states at T1 were controlled when predicting T2 resource states. Additionally, to increase confidence that changes in resource states were due to recovery behavior and not due to changes in stressors, these analyses controlled for stressors during the period of time from T1 to T2. Table 5 provides a summary of the within-person relationships between recovery activities and subsequent resource states during the workday.

A significant positive relationship was found between morning healthy recovery behavior and resource efficacy reported just before lunch ($\gamma = .12$, $p < .05$) but not personal energy reported just before lunch (although this relationship approached significance: $p < .10$). Thus, Hypothesis 2 received partial support in the morning hypothesis tests.

While healthy recovery behavior that occurred in the afternoon was positively related to resource efficacy reported at the end of the workday ($\gamma = .11$, $p < .05$), this relationship became non-significant once resource efficacy before lunch is controlled. Afternoon healthy behavior was also unrelated to personal energy at the end of the workday ($p > .05$). In sum, Hypothesis 2 was not supported in the afternoon hypothesis tests.

Hypothesis 3A proposed that destructive recovery behavior at T1 would relate to a temporary increase in resource states at T2. The relationship between destructive recovery activities in the morning and resource efficacy just before lunch approached significance in the expected direction ($\gamma = .13$, $p < .10$). Destructive recovery behavior in the morning was not significantly related to personal energy or resource efficacy reported just before lunch. Therefore, H3A was not supported by the morning hypothesis tests. Destructive recovery behavior in the afternoon was negatively related to personal energy (but not resource efficacy) reported at the end of the workday ($\gamma = -.41$, $p < .10$), which is opposite of what was hypothesized. Therefore, H3A was not supported by the morning or afternoon hypothesis tests. H3B, on the other hand, which predicted that destructive recovery behavior in the morning would be negatively related to well-being at bedtime, was supported ($\gamma = -1.30$, $p < .05$).

Recovery Activity as a Mediator of T1 and T2

Resource States. To test recovery activities as a mediator of the relationship between T1 and T2 resource states, the indirect effect of T1 resource states on T2 resource states through healthy (H4A) and destructive (H4B) recovery activities was tested. Table 9 provides a summary of the workday mediation findings. None of the analyses testing hypothesis 4 yielded significant results. While resources before lunch predicted destructive recovery behavior at the end of the day, and destructive recovery behavior then predicted resources at the end of the day, the indirect effect was non-significant ($p > .05$). H4A and H4B were not supported.

Analysis of Within-Person After Work Hypotheses

End of Workday Resources Predicting Recovery Behavior after Work.

The same analyses were used to test Hypotheses 9 – 12, which mirror H1 – H4, but focus on the processes occurring after work. Table 6 provides a summary of the within-person findings for healthy recovery and destructive recovery behavior after work. Healthy recovery behavior was operationalized as subjective diet quality (overall day-level, self-report diet quality rating controlling for diet quality during the workday), exercise intensity (overall day-level, self-report exercise intensity, controlling for physical activity completed during the workday), social time spent with others after work, and overall subjective recovery

experience, captured by the recovery experience questionnaire (REQ; Sonnentag & Fritz, 2007) Destructive recovery activities included day-level alcohol and tobacco use (controlling for any alcohol or tobacco consumed during the workday). In support of H9A, personal energy at the end of the workday was positively related to healthy recovery behavior [as measured by subjective diet quality ($\gamma = .07$, $p < .01$), exercise intensity ($\gamma = .03$, $p < .01$), social time spent with others after work ($\gamma = 2.10$, $p < .05$), and the REQ ($\gamma = .19$, $p < .05$)]. Resource efficacy at the end of the workday was only significantly related to exercise intensity ($\gamma = .05$, $p < .05$) and REQ ($\gamma = .51$, $p < .01$); it was not significantly related to subjective diet quality or social time. H9A was therefore partially supported.

There were no significant relationships between personal energy at the end of the workday and alcohol or tobacco use. Resource efficacy at the end of the workday was also unrelated to destructive recovery after work. As a result, H9B was not supported.

Recovery Behavior after Work Predicting Bedtime Well-being and Resources the Next Morning. Table 7 provides a summary of within-person relationships among recovery behavior after work and well-being. After work diet quality, social time, and REQ scores were positively related to bedtime well-being ($\gamma = .47$, $p < .05$; $\gamma = .02$, $p < .01$; and $\gamma = .34$, $p < .01$, respectively) and mood ($\gamma = .02$, $p < .01$; $\gamma = .03$, $p < .06$; and $\gamma = .01$, $p < .05$, respectively) and negatively related to bedtime physical symptoms ($\gamma = -.02$, p

<.01; γ = -.08, p <.01; and γ = -.001, p <.05, respectively). Exercise intensity scores were unrelated to well-being at bedtime. Thus, H10 was mainly supported.

As expected, alcohol use after work was positively related to bedtime well-being (γ = 1.16, p <.05). However, it was unrelated to bedtime mood or physical symptoms. Tobacco use after work was negatively related to bedtime well-being (γ = -2.91, p <.05) and bedtime mood (γ = -.15, p <.10) and positively related to physical symptoms (γ = .15, p <.05). In sum, partial support was found for H11A. Destructive recovery activities after work were related to neither next morning sleep quality next morning personal energy, nor next morning resource efficacy, providing no support for H11B.

Recovery Activities as a Mediator of the Relationship between End-of-Workday Resource States and Bedtime Well-being. Significant indirect effects were found for both end of workday energy and resource efficacy on bedtime well-being through REQ scores (indirect effect for energy = .10, p < .01, 95% CI = .03 to .17; indirect effect for resource efficacy = .17, p < .05, 95% CI = .03 to .31). Controlling for healthy diet during the workday, there was also a significant indirect effect of end of workday energy (but not resource efficacy) on bedtime well-being through overall daily diet quality (indirect effect = .03, p <.05, 95% CI = .001 to .06). Other mediation tests associated with H12A produced nonsignificant results (see Table 10 for a summary of findings for

H12); thus, hypothesis 12A was partially supported. As there were no significant indirect effects of energy or resource efficacy on well-being through destructive recovery behavior after work, hypothesis 12B was not supported.

Non-work Recovery Interference. Finally, non-work recovery interference (NWRI) after work was estimated as a predictor of after-work recovery activities (H13B for destructive and 13A for healthy). Table 8 provides a summary of the NWRI findings. NWRI was negatively related to REQ scores (γ = -.60, p <.01), exercise intensity (γ = -.02, p <.05), and social minutes (γ = -4.36, p <.01), but not related to subjective diet, providing partial support for H13A. NWRI was not significantly related to alcohol or tobacco use, failing to support H13B.

To test H14B (non-work recovery interferences moderating the T2 resource-destructive recovery activities relationship) and H14A (non-work recovery interferences moderating the T2 resource-healthy recovery activities relationship), interaction terms were created from the person-centered T2 resource state and person-centered NWRI variables, and these interaction terms were used as predictors of recovery activities.

NWRI was not a significant moderator of the relationship between end of day resources (neither energy nor efficacy) and destructive recovery activities, failing to support H14B. NWRI did moderate the relationship between end of workday energy and subjective diet quality, controlling for workday diet (γ = .02, p <.01); however, this effect was in the opposite direction than was expected (Figure

8). Individuals who experienced more recovery interferences displayed a stronger relationship between resources and subjective diet. NWRI was not a significant moderator of the relationship between end of workday resource efficacy and subjective diet quality (controlling for workday diet). H14A was not supported.

Between-Person Hypotheses Tests

There were four hypotheses that propose relationships at the between-persons level. Table 11 provides a summary of the workday between-person findings, and Table 12 provides a summary of the after-work between-person findings. First, the level-2 main effect of trait self-control on the level-1 outcome of workday recovery activities was estimated (H5A, healthy and H5B, destructive). Self-control was negatively related to healthy recovery activities before lunch (γ = -.01, $p < .01$), contrary to H5A. However, self-control was also negatively related to end of day destructive recovery activities (γ = -.01, $p < .01$), consistent with H5B. There were no significant relationships between trait self-control and either healthy recovery activities at the end of the day or destructive recovery activities before lunch ($p > .05$). Thus, H5A received no support, and H5B was only partially supported.

Second, trait self-control was entered as a level-2 predictor of slopes, moderating the level-1 relationship between resource states and subsequent recovery activities (H6A, healthy, and H6B, destructive). One analysis indicated a

significant cross-level effect for self-control on the relationship between personal energy just before lunch and recovery activities occurring in the afternoon (γ = -.002, $p < .05$), in support of H6A. This interaction is depicted in Figure 5. For individuals who are low in self-control, there was a positive relationship between personal energy before lunch and afternoon healthy recovery behavior. However, this relationship was negative for individuals with high self-control. This supports the hypothesis in that individual with high self-control will still engage in high amounts of healthy recovery even when resources are low. This negative relationship also suggests that individuals with high self-control who are high on resources will not engage in recovery, as it may be unnecessary for them. On the other hand, they seem to engage in recovery when they need it most (i.e., when resources are low). Self-control did not moderate the relationship between either personal energy or resource efficacy and destructive recovery activities, failing to support H6B.

The cross-level main effect and moderation analyses were also conducted on the effect of trait self-control on recovery activities outside of work (H15A, healthy and H15B, destructive) and the relationships between end of workday resource states and recovery activities after work (H16A healthy, H16B, destructive). Trait self-control was positively related to REQ scores (γ = .06, $p < .05$), subjective diet quality (γ = .03, $p < .01$), and sleep quality (γ = .02, $p < .01$). A positive relationship between trait self-control and exercise intensity approached

significance (γ =.01, $p < .10$). These results provide general support for H15A. Trait self-control was negatively related to daily use of alcohol (γ = -.01, $p <.10$) and tobacco (γ = -.01, $p <.10$), although these relationships only approached significance, providing only marginal support for H15B.

Trait self-control was a significant moderator of the relationship between personal energy (and resource efficacy) at the end of the workday and social time after work (γ =.18, $p < .01$ for energy, Figure 9; γ =.16, $p <.01$ for resource efficacy, Figure 10). In both cases, individuals with higher trait self-control exhibit a strong positive relationship between resources (or resource efficacy) and social time after work, failing to support H16A. The relationship between resource efficacy and social time after work is negative for individuals with low self-control, which is the opposite of what was hypothesized in H16A. Trait self-control did not moderate the relationship between resource energy or resource efficacy at the end of the day and the other healthy recovery activities (subjective diet quality, exercise intensity, and REQ scores). Additionally, trait self-control did not moderate the relationships among energy or resource efficacy at the end of the workday and destructive recovery behavior, providing no support for H16B.

Organization-Level Hypotheses Tests

Finally, the cross-level main effect of personal energy recovery climate was tested by entering PERC score as a level-2 predictor of the level-1 recovery

activities intercepts (H7A, healthy and H7B, destructive). There was a significant positive relationship between PERC and healthy recovery activities in the morning ($\gamma = .01$, $p < .05$). However, there was no significant relationship between PERC and healthy recovery activities in the afternoon ($p > .05$); therefore, H7A was only partially supported. There was also no significant relationship between PERC and destructive recovery behavior ($p > .05$) either in the morning or in the afternoon; therefore, H7B received no support.

To test personal energy recovery climate as a moderator of the relationship between resource states and recovery activities, PERC score was entered as a level-2 predictor of slopes, moderating the level-1 relationship between resource states and subsequent recovery activities (H8A, healthy, and H8B, destructive). There was partial support for a cross-level moderation effect of personal energy recovery climate on the relationship between resource states and recovery activities. In particular, personal energy recovery climate moderated the positive relationships between start-of-workday personal energy and morning healthy recovery activities ($\gamma = -.002$, $p < .01$) and between start-of-workday resource efficacy and morning healthy recovery activities ($\gamma = -.01$, $p < .01$). In both cases, the relationships are weaker for individuals working in a more positive person energy recovery climate and stronger for individuals working in a weaker recovery climate. Figure 6 depicts the interaction effect for energy, and Figure 7 depicts the interaction effect for resource efficacy. This suggests that individuals in a poorer recovery climate must

have high start-of-workday resources (or resource efficacy) in order to engage in healthy recovery behavior before lunch. Conversely, individuals in a stronger personal energy recovery climate are more likely to engage in healthy recovery activities before lunch, even when their start-of-day personal energy (or efficacy) is low. This moderating effect did not occur for the relationship between resource states (energy or efficacy) before lunch and recovery behavior at the end of the workday. Thus, H8A was partially supported.

The PERC scores did not moderate the relationship between resource states (energy or efficacy) and destructive recovery behaviors either before lunch or at the end of the workday; thus, H8B was not supported. Figure 12 represents the supported hypotheses in the workday and after work models.

Exploratory Analyses

In addition to the analyses described above, exploratory analyses were also conducted.

Do Domain-Specific Energies Differentially Predict Recovery Behavior? Domain-specific energies (physical, emotional, mental) were examined as separate predictors of recovery behavior during the workday. In one case, these analyses led to significant results (reported in Table 4). There was a negative relationship between emotional energetic resources before lunch and healthy recovery at the end of the workday ($\gamma = -.11$, $p < .05$). In this case, it seems

that more emotional resources before lunch are associated with a lower need for recovery in the afternoon.

What Best Predicts Workday Personal Energy and Resource Efficacy? As workplace recovery behavior was a relatively poor predictor of personal energy and resource efficacy throughout the day, stressors and personal energy recovery climate were examined as potential predictors. In a model including personal energy recovery climate, morning stressors, and morning recovery behavior as predictors of personal energy and resource efficacy at the end of the workday (controlling for energy or resource efficacy before lunch, respectively), personal energy recovery climate was positively, and stressors were negatively, related to personal energy ($\gamma = .10$, $p < .01$; $\gamma = -.11$, $p < .01$) and resource efficacy ($\gamma = .04$, $p < .01$; $\gamma = -.10$, $p < .01$) at the end of the workday; neither healthy nor destructive recovery behaviors predicted incremental variance in these resource states beyond climate and morning stressors ($p > .05$). Exploratory analysis results of PERC as a cross-level predictor of resources are presented in Table 13.

Similarly, neither healthy nor destructive recovery behavior in the afternoon predicted incremental variance in personal energy or resource efficacy reported at the end of the workday above and beyond personal energy recovery climate ($\gamma = .12$, $p < .01$ for personal energy; $\gamma = .04$, $p < .01$ for resource efficacy) and morning stressors ($\gamma = -.30$, $p < .01$ for personal energy; $\gamma = -.14$, $p < .01$ for resource

efficacy). Together, these results suggest that the work environment and work stressors are better predictors of personal energy and resource efficacy states than particular recovery behaviors.

Do Yesterday's Recovery Interferences Predict Today's Workday Recovery? As resource states at T1 were not strong predictors of health behavior at T2, and to test the idea that individuals may seek healthy or destructive recovery during work as a way to cope with previous resource loss or lack of recovery outside of work, non-work recovery interferences from the previous evening were explored as predictors of healthy and destructive recovery behavior the next morning. Non-work recovery interferences from the previous evening were significantly related to healthy recovery behavior ($\gamma = .03$, $p < .05$) but not destructive recovery behavior ($p > .05$) in the morning. This lends support to the idea that healthy recovery behavior may be seen as a way to facilitate resource recovery during the workday when individuals were unable to engage in sufficient recovery the night before.

Does Between-Person Exercise Explain the Lack of an Exercise Effect on Well-Being? While previous research suggests that exercise is a beneficial recovery activity, the present study did not find support for the hypothesized relationship between exercise and bedtime well-being. Considering that personal energy at the end of the workday positively predicted

exercise, exercise habits may impact the degree to which physical activity promotes well-being at bedtime. Therefore, between-persons exercise variables were examined as a possible cross-level moderator of the relationship between exercise and well-being. While the typical exercise variable (which captures the frequency at which individuals engage in moderate-intensity exercise, from less than 1 day a week to 6 or 7 days a week) did not moderate the relationship significantly, it approached significance in the expected direction ($\gamma = 1.50$, $p < .10$). Individuals who regularly exercise at a moderate intensity level exhibited a positive relationship between physical activity and well-being, while individuals who do not regularly exercise at a moderate intensity level exhibited a negative relationship between physical activity and well-being at bedtime (Figure 11).

What are the Mechanisms Driving Recovery During and After Work? To better understand the work-to-non-work recovery mechanisms, a series of mediation analyses was conducted, and several significant mediation effects are worthy of note. First, there was a significant indirect effect of personal energy recovery climate on stressors before lunch, through energy at the start of the workday (between indirect effect = .04, $p < .05$, 95% CI = .01 to .07). Second, stressors before lunch had a significant effect on NWRI through resources at the end of the workday (indirect effect = .02, $p < .05$, 95% CI = .001 to .05). Third, resources at the end of the workday had a significant effect on recovery experiences through NWRI (indirect effect = .07, $p < .05$, 95% CI = .02 to .12). Finally, NWRI

was significantly negatively related to bedtime well-being (γ = -.54, p <.01), sleep quality reported the next morning (γ = -.04, p <.05), and next morning resources (γ = -.10, p <.01). The indirect effect of NWRI on next-morning personal energy and next-morning resource efficacy through the REQ approached significance in the expected directions (indirect effect on energy = -.03, p <.01, 90% CI = -.05 to -.003; indirect effect on resource efficacy = -.01, p <.01, 90% CI = -.02 to -.002); however, only the indirect effect of NWRI on next-morning resource states through sleep quality (indirect effect on energy = -.02, p <.05, 95% CI = -.05 to -.001; indirect effect on resource efficacy = -.06, p <.05, 95% CI = -.11 to -.002) was significant.

Together, these mediating links suggest that (1) unsupportive organizational climates may drain resources, leaving employees more susceptible to the negative impact of stressors experienced during the workday, (2) employees who are left depleted at the end of the workday may be more susceptible to recovery interferences which prevent them from engaging in recovery activities, and (3) by preventing recovery activities, recovery interferences reduce the likelihood that employees will have recovered the resources they need to meet work demands the next day. Figure 13 presents the pattern of mechanisms suggested by the above results. Exploratory mediational analyses are reported in Table 10.

Chapter 6
Discussion

Overall, these findings suggest that two types of self-regulatory resource states—personal energy and resource efficacy—play an important role in predicting an employee's recovery behavior both during and after the workday. Moreover, the daily resource depletion and recovery process is moderated by environmental variables internal and external to the workplace as well as individual differences in self-control. Finally, these processes are linked to employee well-being at the end of the day and also demonstrate some important carryover effects to the following workday.

Recovery Behavior and Self-Regulatory Resources During the Workday

Minimal Effects of Resources Early in the Day. The impact of resource states at the start of the workday on recovery behavior before lunch was found to be weaker than the impact of resource states before lunch on recovery behavior in the afternoon. Because sleep is a strong source of resource recovery (Muraven & Baumeister, 2000; Barber, Grawitch, & Munz, 2013), the weaker morning effects are understandable. When employees come to work well-rested from the previous evening's sleep, resource levels are likely to be highest, reducing the impact of resource levels on employee behavior. Recent research has suggested

that levels of personal resources necessary for work engagement decrease over the course of the workday (Sonnentag & Kuhnel, 2016) As the workday goes on, and depletion occurs, day-to-day variability in resource states before lunch should increase (compared to variability in resource states before work), which would explain why resource levels were more predictive of recovery behavior in the afternoon. In particular, resource efficacy was a significant predictor of healthy recovery, and energy was a significant predictor of destructive recovery behaviors at the end of the workday.

Resources and Afternoon Recovery Behavior. It is surprising that personal energies before lunch were not related to healthy recovery activities in the workday afternoon. On the other hand, resource efficacy before lunch did positively relate to healthy recovery behavior in the workday afternoon. If employees believe they have enough self-control strength available for self-regulation, they may be experiencing a low level of threat to that resource. Consequentially, they may be more likely to invest self-control into healthy recovery behavior in the afternoon. Trait self-control did moderate the relationship between personal energy level before lunch and healthy recovery behavior in the afternoon. Specifically, the relationship was positive for individuals with low trait self-control and negative for those with high trait self-control. It is likely that individuals with higher self-control forgo recovery opportunities before lunch because they do not yet feel depleted, while individuals with low self-control may

be easily distracted and take breaks when they're not needed. These findings also indicate that individuals with high self-control may be more resilient to resource drain and able to mobilize the self-control needed to engage in healthy recovery when energy levels are lower, while individuals with lower self-control will be less likely to engage in healthy recovery practices when their resources are taxed. If the training extension hypothesis of the strength model of self-control—which argues that individuals may strengthen or "train" their baseline level of self-control over time by repeatedly engaging in tasks that require self-control—is true (Hagger et al., 2010), then organizations may be able to improve employee self-regulatory resource pools in order to reduce their need to engage in recovery during work.

These findings also suggest that resource efficacy, or the confidence that one's current resources are enough to handle demands for self-control, may be more important in predicting afternoon healthy recovery behavior than perceived physical, mental, and emotional energy. It makes sense that, regardless of employees' perceptions of their current energy levels, what matters most is whether that energy is perceived as high enough to meet future job demands. If not, there may be less of a willingness to allocate what are already limited and potentially insufficient self-regulatory resources to healthy recovery behavior because employees may choose to conserve those resources for meeting job demands. Recovery behavior may be considered either a less important goal than accomplishing work tasks, or not a goal at all, especially when healthy recovery has

not been developed into a habit. As a result, this indicates that self-regulation may fail even when energy states are high and provides additional support for the proposition that personal energy is related to, yet distinct from, self-control levels.

As Hobfoll (1998) explains that resource loss is a salient stressor, destructive recovery behavior may serve as a coping mechanism for the psychological strain associated with workplace depletion. Yet, outside of a significant negative relationship between personal energy before lunch and afternoon destructive recovery behavior, there was little other support for this idea. So, rather than a function of resource states, recovery behavior may be highly habit-driven. This is further supported by the fact that the ICCs for healthy and destructive recovery are slightly higher in the afternoon than in the morning: as depletion occurs throughout the workday (Sonnentag & Kuhnel, 2016), it's likely that employees revert to habits when they do not have enough resources to allocate toward deciding between and engaging in potential recovery choices.

It is also important to note that the strongest predictor of both healthy and destructive recovery behavior at the end of the workday is healthy and destructive recovery behavior before lunch, respectively. This suggests that recovery behavior may not change much from the morning to the afternoon and may be better predicted by another day-level variable not captured within the current study. Changes in workload may account for this. For example, there may be fewer

opportunities for recovery on days that employees have busier schedules and more opportunities on days that employees have lighter schedules.

Resource Efficacy and Recovery Behavior. Perceptions of whether current physical, emotional and cognitive energetic resources are *enough* to handle the physical, emotional, and cognitive demands of the job are predictive of morning destructive recovery behavior, while personal energy is not. As it has been theorized that self-efficacy is the result of an implicit cognitive process by which individuals evaluate the demands of a task (Bledow, 2013), it is possible that resource efficacy represents the output of a feedback loop (Carver & Scheier, 1982) in which employees compare their current energy levels to the energy levels needed to meet job-related goals. So, through the cognitive process of comparing energetic states to energetic needs, employees are able to identify the extent to which they believe themselves to be capable of meeting work demands for self-regulation.

However, this poses the question of why the relationship between morning resource efficacy and destructive recovery behavior is positive. Based on control theory (Carver & Scheier, 1982) and the cybernetic model of stress (Edwards, 1992), low resources in the face of high demands should trigger a stress response, which would lead to an increase in destructive recovery behaviors as a coping method. Instead, resource efficacy and destructive recovery were positively related. One potential explanation is that the correlation between resource efficacy at the start of the workday and morning destructive behavior is driven by the effect of

morning destructive behavior on resource efficacy, rather than the reverse. Although destructive recovery that may have occurred before the workday was not captured by the current study, it's possible that employees reporting having engaged in such unhealthy behaviors before lunch began engaging in them before work. By temporarily relieving demands for self-control, those destructive recovery behaviors may have temporarily increased resource efficacy at the start of the workday. However, future research should further explore the unexpected positive relationship between resource efficacy and destructive recovery behavior.

Self-Regulatory Resources and Recovery Behavior After Work

Personal energy levels at the end of the workday significantly predicted after-work diet quality, exercise intensity, social time spent with others, and recovery experiences overall. This demonstrates the importance of depletion and recovery at work in predicting employees' ability to successfully engage in recovery at home. Previous research has suggested that employees who are exhausted, or experiencing "a consequence of intense physical, affective and cognitive strain," (Demerouti & Bakker, 2008, p.4) are less likely to be able to psychologically detach and recover after work (Sonnentag et al., 2014). Not only does the present study replicate these findings, but it also examines them from a self-regulatory resource perspective. Because personal energy recovery climate was the strongest predictor of energy levels at the end of the workday, this study also

provides a way for organizations to directly impact personal resources (through the development of policies, practices, and procedures that promote the recovery of personal energy).

Finally, recovery activities were significantly related to indices of well-being at bedtime. This is the first study to examine recovery activities separately as either healthy or destructive in nature. Previous research indicates that psychological detachment is the most important aspect of recovery (Sonnentag & Fritz, 2015). However, there are activities that promote detachment while also negatively impacting individual health. In the present study, a healthy diet and time spent with others were positively related, while using tobacco was negatively related, to well-being at bedtime. The differential effects of recovery activities on well-being highlights the importance of examining recovery activities separately in future research.

While diet and exercise were not significantly related to bedtime well-being in this study, previous research suggests that for the effect of a particular health behavior to occur, the behavior must be engaged in frequently and extensively (Ronis, Yates, & Kirscht, 1989); this suggests that the beneficial effects of diet and exercise may develop over time. Further, the exploratory cross-level interaction analysis, in which between-person differences in exercise patterns moderated the within-person relationship between exercise and well-being, provides initial evidence for the impact of habit on day-level relationships. When exercise is a

habit, fewer self-regulatory resources may be necessary to engage in physical activity. When fewer resources are depleted by engaging in exercise, the positive benefits on well-being may become more apparent. On the other hand, when exercise is not a habit, engaging in physical activity may feel more taxing than beneficial in the short term. Organizations that desire to develop a sustainable workforce may choose to invest in the development of their employees' health habits in order to promote high levels of energy at work and sufficient recovery in the non-work environment, a process that may take longer than what a two-week diary study is capable of examining. Helping employees to be resilient to the potentially draining effects of exercise before it is habituated may also be necessary to facilitate the development of healthy habits. Nonetheless, the above results provide evidence for the impact of workplace policies, practices, and procedures on employee health and wellness inside and outside of the job.

Unexpected Findings in Work and Non-Work Domains

Because not all of the proposed hypotheses were supported by the results, theoretical explanations are provided for some of the unexpected findings. First, while self-control was expected to be positively related to healthy workday recovery, it was found to be negatively related to healthy recovery during the workday (morning and afternoon). It could be that individuals high in self-control have a greater baseline resource pool and therefore experience less need for

recovery in general. This idea is supported by the positive between-person relationships between trait self-control and resources illustrated in Table 1. These results are consistent with ego depletion models of self-control (Baumeister, 2014; Muraven & Baumeister, 2000) in that individual differences in resource pools lead to between-person differences in depletion experiences and recovery needs.

Additionally, the relationships between destructive recovery activities and several outcome variables yielded unexpected results. While it was expected that destructive recovery activities would be positively related to well-being at bedtime and negatively related to next-morning resources, neither alcohol nor tobacco was related to next-morning variables. While care should be taken in drawing conclusions based on null results, there could be several reasons for the lack of a significant effect. First of all, there may be moderators of the effects of alcohol on resources the next morning. Sleep, for example, may ameliorate some of the potentially negative effects of alcohol on self-regulatory resources at work the next day. Further, although alcohol was not directly related to well-being, it was indirectly positively related to well-being through social time. Alcohol was found to be significantly positively related to social time spent with others after work. It is likely that the positive effect of alcohol on well-being is due to the social experience associated with drinking.

While NWRI and personal energy levels at the end of the work day interacted to predict subjective diet, the effect was unexpected: more recovery

interferences led to a stronger relationship between resources and subjective diet, contrary to the hypothesis. One possible explanation is that, on days with fewer NWRI, individuals are more likely to revert to habit (or baseline) eating behavior, whereas days with high NWRI throw off routines so that eating behavior becomes more resource dependent. On these days, individuals may be more likely to eat healthily when they have high resources leaving work and more likely to eat unhealthy foods when they have low resources leaving work.

Finally, although not part of the original hypotheses, one finding sheds considerable light on the impact of NWRI on the recovery process. Specifically, NWRI indirectly predicted the next day's start of workday energy and resource efficacy, through sleep quality. This suggests that NWRI reduces an employee's ability to recover from work, which in turn reduces their sleep quality and contributes to lower levels of resources the next morning at work. This indirect relationship it is important because most recovery research indicates that employees must psychologically detach from work after the workday in order to recover depleted resources (Sonnentag & Fritz, 2015). However, as is indicated by the above results, recovery interferences can impede the recovery process, preventing employees from regaining their lost energy and reducing their well-being. Employees who are expected to remain on task throughout the workday and save their recovery activities for non-work time, but experience a significant amount of NWRI, are unlikely to experience sufficient recovery during the work week. Over

time, the negative effects upon job performance (Swider & Zimmerman, 2010) and well-being (Bakker, Demerouti, & Sanz-Vergel, 2014) could be drastic for these individuals.

Limitations and Future Research

This study tracked participants' resource depletion and recovery behavior four times per day for two weeks in order to provide a more complete picture of the employee recovery process across both work and nonwork domains. Despite the strengths of this methodology, the study is not without its limitations. The data were collected from a single, self-report source. While the daily diary method reduces the method bias associated with single-source, cross-sectional designs (Sonnentag, Binnewies, & Ohly, 2013), future research on healthy and destructive recovery activities could benefit from including co-worker, supervisor, client, and/or family reports as well. Additionally, while the originally proposed sample size was 200 participants, attrition led to a smaller sample size of 145 individuals with useable data. It is possible that a diary study with a larger number of participants would yield more robust cross-level interaction results. However, as demonstrated by the present study, participant retention is difficult even when monetary incentives are provided. It is also possible that participants who dropped out of the study are different from those who stayed in the study. The participants to complete all of the assigned surveys may have higher trait self-control than those

who dropped out, for instance. Future research should review the diary study design and develop a set of best practices that maximize sample size and power while reducing cognitive fatigue and attrition.

Finally, as technology improves, future studies may reduce researcher's reliance on self-report measures and also reduce the burden on participants by relying more heavily on objective, physiological data. Wearable devices such as Fitbits provide researchers with the ability to objectively monitor physical activity, heart rate, and caloric expenditure (Diaz et al., 2015; Takacs et al., 2014). However, while there is evidence that they are valid and reliable, these devices are costly. Additionally, the most common objective measure of stress, cortisol testing, yields different results depending on the time of day and is costly to administer (Burke, Davis, Otte, & Mohr, 2005; Olivera-Figueroa, Juster, Morin-Major, Marin, & Lupien, 2015). Regardless, future research is likely to see an influx of technology-based data collection tools.

A large portion of the inconclusive results in this study surrounded the correlates of healthy and destructive recovery behavior during the workday. It is possible that healthy and destructive recovery behavior may need to be measured differently to see significant effects. For example, the MyFitnessPal application provided an opportunity for more objective collection of dietary data. However, few participants agreed to fill out the MyFitnessPal portion of the survey, and even fewer completed it enough times for adequate analysis. This is likely the reason for

nonsignificant relationships that were hypothesized between the MyFitnessPal score and other variables. There is, however, a significant positive relationship between the MyFitnessPal scores and subjective diet scores, indicating that future research should look into the utility of this application, especially in less demanding studies.

A lack of within-person variance in recovery behavior during the workday may also explain the inconclusive results associated with the recovery behavior variables. Because much of daily behavior is habitual (Jager, 2003), the effects of habits may have overridden any day-to-day variance in the hypothesized predictors of workday recovery behavior. Individuals experiencing poorer daily well-being due to their destructive recovery habits at work (or lack of healthy recovery habits) may require intensive interventions in order to override these tendencies.

While recovery research has ignored the extent to which engaging in recovery activities may be habitual and therefore require varying levels of self-regulatory resources, recent research on sleep hygiene has provided initial evidence that health habits impact self-regulatory resources and engagement at work (Barber, Grawitch, & Munz, 2013). However, the present research is the first study to examine multiple health behaviors and recovery experiences that occur during both the workday and after work. This study provides new evidence that healthy recovery behaviors are beneficial for the specific self-regulatory resources of personal energy and resource efficacy, whereas destructive recovery behaviors may

reduce these resources. However, as this study did not directly measure the extent to which healthy and destructive recovery behavior during the workday are habits for participants, it will take future research to fully determine whether organizational climate, individual habits, or an interaction between the two can best predict daily workplace recovery behavior.

Future research may record information about individuals' habits in order to control for the effects of habitual behavior when examining energetic resource states. While it may be tempting to argue that behavioral change on the part of individuals is the key to improving employee productivity, previous research has indicated that it is the social systems in which individuals operate that have the greatest impact on health (Bandura, 1998). It is possible that instead of recovery habits, daily variance in employee workload predicts recovery behavior, such that busier days may afford fewer opportunities for employees to take breaks and recover from episodes of job demands. If workload variance predicts workday recovery activities, the extent to which organizations support employee personal energy recovery across both busier and slower workdays is likely to be predictive of recovery behavior. Future research should therefore investigate personal energy recovery climate as a moderator of the relationship between daily workload and recovery behavior.

Despite the non-significant results regarding the impact of morning energy states on workplace recovery behavior before lunch, parsing out the domains of

energetic resources yielded significant findings in a one instance. Emotional energy before lunch was negatively related to healthy recovery behavior at the end of the workday. It makes sense that more resources may lead to fewer breaks during work; however, it is unclear why certain energetic resources (physical, emotional, cognitive) would be more predictive of recovery behavior at certain times of the day than others. It may therefore be worthwhile for future research to examine the domain specificity of resources and resource efficacy in predicting workplace recovery behavior. In an experimental laboratory study, it may be possible to manipulate various energetic resources and examine the effects of domain-specific energetic resource variability on domain-specific outcomes.

Future research should also examine job-related and personal life-related goals in conjunction with personal energy and resource efficacy. To allocate resources toward a certain behavior, individuals must intend to exhibit the behavior (Ajzen, 1991; Bandura, 2001). Nonsignificant relationships among self-regulatory resources and healthy vs. destructive recovery activities may be because individuals have no intention of striving toward healthy recovery. Similarly, the lack of strong relationships between healthy/destructive recovery and resources/resource efficacy may be due to differing opinions regarding what foods are healthy and what foods are unhealthy. Individuals may be consuming snacks or lunches that they believe to be healthful; however, these food items may not be very nutritious or may be highly processed. Future experimental studies should randomly assign individuals

to various healthy recovery goals (sleep eight hours a night; eat only nutritious snacks for the day; engage in 30 minutes of exercise a day) and examine the impact of resource states on goal striving success or failure.

From one day to the next, destructive recovery behaviors were unrelated to next morning resources or resource efficacy. It is likely as destructive recovery behavior becomes integrated in one's daily routine, it elicits less psychological strain or cognitive discomfort from being considered a "bad habit" (Jager, 2003). It is also likely that the effects of destructive recovery behaviors on well-being take longer to develop and are more appropriately measured with longitudinal designs over the course of weeks and months.

Individuals with higher trait self-control were more likely to engage in social activity after work when their resources were high, whereas individuals with lower trait self-control were more likely to engage in social activity after work when their resources were low. It's possible that individuals with high self-control who have been depleted choose to avoid social interactions as a socially adaptive response to feeling unable to control emotions around others. On the other hand, individuals with lower self-control may seek the support of others to help them replenish depleted resources, even if such social interactions may result in conflict. This interaction effect may also be explained by the relation of self-control to other dispositional characteristics. In particular, Zelenski et al. (2015) found that introverts predict that they will have to engage in more self-control in order to act

momentarily extraverted. If those who report higher self-control also happen to be more introverted (a relationship that to my knowledge has not been examined), it is possible that these individuals chose to avoid social activities in order to replenish depleted resources.

The extent to which self-regulation of energetic states is successful may also depend on differences in self-regulatory styles beyond trait self-control. Theory suggests that those who are more willing to risk resources are the ones more likely to gain resources (Hobfol, 1989). Action-state orientation (Kuhl, 1985) or self-regulatory focus theory (Lanaj, Chang, & Johnson, 2012), both of which examine between- and within-persons differences in self-regulatory resource-based behavior and goal striving, may provide a better lens for examining the relationships between self-regulatory resources and recovery behavior in the future. Since continued self-regulation during depletion can be considered an act of risking resources, individuals who are more willing to continually allocate resources toward goal pursuit are likely to most effectively manage resources during depletion. As a result, it is likely that individuals who are more action-oriented than state-oriented (Kuhl, 1985) or who are more promotion-focused than prevention-focused (Lanaj et al., 2012) will be able to effectively tap into their energies to maintain prolonged self-regulation during episodes of depletion.

Practical Implications

Because a personal energy recovery climate predicts employee resource levels throughout the workday, and such personal resources are predictive of recovery and well-being outside of work, organizations should consider adopting policies and procedures that promote the recovery of their employees' personal energetic resources. Because research suggests that there may be stark differences between official policy and actual workplace experiences (Schneider, Ehrhart, & Macey, 2013), if policies are in place that encourage recovery, but actual practices and pressures create norms that run contrary to such policies, more targeted change initiatives may be necessary. As research has recently suggested that supervisors serve as work-life boundary role-models (Koch & Binnewies, 2015), it is likely that they will also serve as work engagement vs. work break role models; thus, supervisors and leaders within the organization should be encouraged to engage in healthy recovery activities so that subordinates may emulate such behavior. In addition to serving as recovery role-models, supervisors should encourage employees to engage in healthy recovery when they feel depleted. However, because control over the nature of one's recovery activities is an important dimension of recovery experiences (Sonnentag & Fritz, 2007), supervisors should avoid setting mandated breaks or attempting to exert control over when and how employees engage in recovery. Instead of mandating breaks, for example, employers may consider implementing mindfulness training that can help

employees to identify when they are feeling depleted. This way, employees may proactively take breaks before the negative effects of depletion occur.

Although there was limited support for the impact of a personal energy recovery climate on workplace health behavior, social cognitive theory (Bandura, 2004) suggests that the environmental context is key in health promotion. Since the present study did find a positive relationship between healthy recovery after work and well-being, as well as a negative relationship between destructive recovery behavior and personal resources, there is support for the importance of choosing healthy recovery activities during the workday. Consequentially, organizations interested in promoting high energy levels during the workday as well as the well-being of their workforce should consider adopting health promotion initiatives in the workplace. Such initiatives would include ways to make healthy choices easier within the work environment. For example, organizations can provide (1) easy access to healthy snack and lunch options as opposed to standard vending machines and (2) safe areas to take a brief walk, with enough flexibility in lunch break schedules to allow for their use. When employees are depleted due to work demands, they may be more likely to engage in healthy recovery if such options are readily available. Well-developed and implemented health promotion interventions that effectively integrate wellness initiatives into the organization's culture, provide information regarding healthy behavior, promote the adoption of healthy lifestyle habits, and include stress management components (to cope with not only job

stressors but also the difficult process of behavioral change), are likely to help employees develop effective, healthy recovery habits within and outside of the workplace.

Contribution

The present study contributes to research and practice within occupational health psychology in a number of ways. First, by drawing from several theories in diverse research areas, the present manuscript provides an integrated theoretical model of employee resource recovery and well-being that expands and adds new ideas to existing theoretical approaches. Second, the empirical study tested hypotheses stemming from this new theoretical approach and contributes to workplace health literature by grounding it in theories of self-regulation. As a result, the study contributes to both the workplace health literature and the self-regulation literature. Specifically, the impact of personal energetic resources on the self-regulation of health behavior was examined, grounded in the strength model of self-control (Muraven & Baumeister, 2000) and the effort-recovery model of workload (Meijman & Mulder, 1998). There has been a long debate on the validity of the strength model or ego depletion model (Evans et al., 2015), and this study has provided a rigorous methodology for testing several of the processes proposed in those models.

Third, this research is directly aligned with the emerging government initiative, Total Worker Health, which uses theory and research to influence the development of public health policy related to workplace wellness. The NIOSH Total Worker Health initiative aims to "advance the overall health and well-being of workers" by considering "the joint effects of work and non-work factors...that integrate health protection and health promotion" (Total Worker Health Goals 1 and 2, NIOSH, 2013). In particular, this project has provided a deeper understanding of the mechanisms involved in vital employee recovery processes than have been investigated in previous studies of health promotion and worker well-being. This is the first study to examine depletion and recovery that occurs both in and outside of the workplace and find evidence for the impact of employee energetic resources on subsequent health-related behaviors and well-being.

With an emphasis on the prevention of recovery interferences and the promotion of well-being through full resource recovery, this study has helped organizations by identifying the importance of resource recovery activities throughout the day that directly impact general health and well-being. The workplace has the potential to be a significant health resource for individuals, providing opportunities to engage in healthy behaviors as well as an environment that promotes the attainment of personal resources and psychological capital (Day & Randell, 2015). However, in order to be successful in creating positive, healthy, work environments, worksite health promotion must stand on the foundations of

evidence-based principles and occupational health psychology research (Goetzel et al., 2014). This study has addressed gaps in the employee health literature in a way that provides direct recommendations for both theory and practice in the employee recovery and occupational health psychology domains.

Conclusion

This study has contributed theoretically to the occupational health psychology and self-regulation literatures as well as practically to organizations who are interested in the well-being and performance of their employees. Although few of the results regarding the relationships between employee resource states and recovery behavior yielded robust findings, the overall pattern of results suggests that it is truly important to consider the nature of recovery behaviors as either healthy or unhealthy when studying the role of recovery from work in performance and well-being. This study also clearly demonstrates the importance of the environmental context in employee recovery, suggesting that the extent to which employees are able to recovery from the demands of their job is impacted by the policies, practices, and pressures of their workplace and obligations in their non-work lives. In general, individuals with higher trait self-control seem better able to adapt to resource depletion and recovery processes at work and are able to manage their resource states during stressful workplace experiences. Organizations should consider their climate for personal energy recovery and make changes to their

explicit policies as well as the aspects of their organizational culture that influence how and to what extent employees may replenish the personal self-regulatory resources that have been depleted on the job. Organizations should also understand that when employees are off the clock, they may experience interferences with recovery that make it more difficult to be energized and engaged at work the next day. Flexible work arrangements and other work arrangements may help employees to better manage their non-work obligations so that they can more effectively recover. Because the ability to recover from the demands of the job is an important predictor of employee workplace outcomes and well-being, both researchers and practitioners should continue to investigate the predictors and outcomes of recovery, as well as the conditions under and the mechanisms through which it functions.

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Table 1. Resource Types

Type		Example
Internal: Residing within the individual		
	Traits	**Self-control or Willpower** (Crescioni et al., 2011; Muraven & Baumeister, 2000)
	Psychological Capital	**Self-efficacy, optimism** (Bakker & Sanz-Vergel, 2013; Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2008) **Hope, efficacy, resilience, and optimism** (Avey et al., 2011) **Resilience, optimism** (Nägel & Sonnentag, 2013) **Mastery/perceived control** (Ross & Mirowsky, 1989)
	Skill/Ability	**Cognitive processing** (Beal, Trougakos, Weiss, & Green, 2006; Kanfer & Ackerman, 1989) **Concentration** (Hunter & Wu, 2015)
	Energy States	**Emotion, Motivation, and Psychophysiological state** (Meijman & Mulder, 1998) **Physical, emotional, and cognitive vitality, Vigor, or Engagement** (Ten Brummelhuis & Bakker, 2012; Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2007) **Physical energy and energy activation** (Hunter & Wu, 2015)
External: Existing outside of the individual		
	Social/ Environmental	**Social support** (Wethington & Kessler, 1986) **Job control** (Llorens, Schaudeli, Bakker, & Salanova, 2007)
	Abstract	**Money and time** (Aspinwall & Taylor, 1997; Westman, Hobfoll, Chen, Davidson, & Laski, 2005; Salanova, Schaufeli, Xanthopoulou, & Bakker, 2010)

Table 2. Daily Measures Administered

Measures	Morning (7AM)	Middle of Workday (11AM)	End of Workday (3PM)	Before Bed (7PM)
Sleep	X			
Diet				X
Exercise				X
Destructive Recovery Behavior		X	X	X
Healthy Recovery Behavior		X	X	
Personal Energy	X	X	X	X
Resource Efficacy	X	X	X	X
Recovery Activity Questionnaire				X
Non-Work Recovery Interference				X
Physical Symptoms	X			X
Mood	X	X	X	X
Composite well-being				X

Table 3. Correlations Among Studied Variables

Variables	M	SD	ICC	1	2	3	4	5	6	7	8	9	10
1. Sleep quality	6.98	1.30	0.32	***.83***	.65**	.63**	.65**	.44**	-.17	-.23**	-.25**	.48**	.52**
2. Morning mood	3.94	0.62	0.44	0.07	**-**	.70**	.75**	.78**	-.15	-.30**	-.29**	.63**	.70**
3. AM resource efficacy	11.84	1.71	0.51	-0.04	0.86	***.82***	.90**	.53**	-.08	-.16	-.33**	.84**	.73**
4. AM energy	23.54	4.08	0.58	0.58	-0.23	-0.38	***.84***	.58**	-.08	-.25**	-.33**	.76**	.88**
5. Mood before lunch	3.94	0.61	0.40	0.31	-0.15	-0.30	0.51	**-**	.005	-.26**	-.39**	.62**	.72**
6. Healthy recovery before lunch	2.29	1.07	0.49	-0.11	-0.02	0.02	-0.06	0.01	***.29***	.209*	.010	.030	.025
7. Destructive recovery before lunch	0.35	0.38	0.30	-0.06	-0.17	-0.06	-0.08	-0.10	-0.01	***.21***	.07	-.20*	-.29**
8. Stressors before lunch	3.37	2.48	0.49	-0.19	0.18	0.17	-0.30	-0.40	0.02	0.02	***.68***	-.41**	-.41**
9. Resource efficacy before lunch	11.91	1.63	0.49	0.39	-0.15	-0.22	0.66	0.58	0.03	-0.06	-0.39	***.82***	.90**
10. Energy before lunch	23.69	3.91	0.61	0.40	-0.24	-0.36	0.78	0.69	0.01	-0.12	-0.42	0.86	***.81***
11. End of day mood	3.86	0.64	0.42	0.18	0.06	-0.04	0.23	0.47	-0.05	0.00	-0.27	0.23	0.28
12. End of day healthy recovery	2.51	1.22	0.52	-0.07	0.43	0.46	-0.26	-0.07	0.10	0.05	0.05	-0.25	-0.26
13. End of day destructive recovery	0.51	0.46	0.31	-0.09	0.52	0.56	-0.34	-0.19	0.00	0.12	0.09	-0.32	-0.36
14. End of day stressors	3.74	2.66	0.54	-0.04	0.36	0.34	-0.20	-0.03	-0.03	0.05	0.04	-0.23	-0.23
15. End of day resource efficacy	11.36	1.82	0.54	0.08	0.34	0.26	0.00	0.14	-0.02	0.03	-0.10	0.03	0.02
16. End of day energy	22.49	4.11	0.59	0.36	-0.22	-0.32	0.69	0.58	0.01	-0.12	-0.38	0.69	0.79
17. NWRI	10.66	3.92	0.58	-0.08	-0.23	-0.27	0.00	0.04	0.00	0.01	0.12	-0.06	-0.01
18. Subjective diet	6.72	1.37	0.35	0.16	-0.10	-0.14	0.23	0.18	0.00	-0.04	-0.12	0.27	0.30
19. MFP diet score	13.04	2.85	0.37	0.15	-0.27	-0.34	0.32	0.21	0.06	-0.02	-0.22	0.24	0.29
20. Exercise intensity	2.82	0.61	0.41	0.21	-0.31	-0.38	0.31	0.20	-0.04	-0.04	-0.10	0.24	0.28
21. Social minutes	108.07	70.35	0.34	-0.02	-0.12	-0.13	0.08	0.10	0.12	0.07	-0.05	0.06	0.12
22. REQ	55.04	7.82	0.44	0.13	-0.44	-0.53	0.36	0.29	0.08	0.04	-0.23	0.29	0.35
23. Tobacco	0.33	0.88	0.87	-0.10	0.16	0.22	-0.28	-0.24	0.06	0.34	0.16	-0.25	-0.31
24. Alcohol	0.38	0.54	0.41	-0.07	-0.02	-0.05	-0.08	-0.06	0.00	0.15	0.08	-0.11	-0.09
25. Bedtime mood	3.90	0.58	0.38	0.22	-0.30	-0.44	0.49	0.56	-0.01	-0.11	-0.29	0.44	0.53
26. Bedtime well-being	36.49	11.28	0.57	0.25	-0.13	-0.24	0.47	0.51	-0.07	-0.11	-0.28	0.45	0.52
27. Bedtime physical symptoms	1.08	0.93	0.48	-0.22	0.16	0.21	-0.31	-0.27	0.16	0.14	0.23	-0.26	-0.31
28. PERC	45.63	11.06		.21*	.16	.19*	.28**	.11	.12	-.28**	.26**	.27**	.19*
29. Trait Self-Control	121.40	19.24		.28**	.45**	.40**	.22*	-.22*	-.06	-.36**	.38**	.34**	.30**
30. Age	2.06	0.73		.19*	.16	.17*	.12	.01	.02	-.08	.12	.16	.11
31. Sex	1.65	0.48		.07	-.01	-.01	.06	-.03	.11	-.14	.05	.05	-.16

Variables	11	12	13	14	15	16	17	18	19	20	21	22	23
1. Sleep quality	.34**	-.14	-.16	-.20*	.37**	.46**	-.20*	.31**	.23*	.27**	.07	.17*	-.12
2. Morning mood	.63**	-.07	-.38**	-.23**	.48**	.62**	-.12	.28**	.10	.12	-.03	.14	-.23**
3. AM resource efficacy	.460**	-.01	-.17*	-.26**	.71**	.69**	-.25**	.32**	.30**	.13	.08	.26**	-.22**
4. AM energy	.480**	-.02	-.22**	-.25**	.58**	.75**	-.23**	.31**	.26**	.13	.12	.23**	-.26**
5. Mood before lunch	.817**	.11	-.33**	-.32**	.53**	.70**	-.12	.25**	.10	.04	.01	.22**	-.29**
6. Healthy recovery before lunch	.03	.80**	.16	-.001	-.01	.01	-.04	.02	.13	-.19*	.24**	.18*	.08
7. Destructive recovery before lunch	-.15	.16	.64**	.13	-.13	-.24**	-.043	-.03	.05	-.18	.18*	.04	.57**
8. Stressors before lunch	-.48**	-.08	.11	.86**	-.42**	-.43**	.28**	-.12	-.30**	-.01	.03	-.22*	.17*
9. Resource efficacy before lunch	.59**	.10	-.24**	-.36**	.85**	.82**	-.28**	.40**	.29**	.08	.11	.33**	-.24**
10. Energy before lunch	.63**	.09	-.30**	-.34**	.73**	.88**	-.21*	.37**	.25*	.09	.11	.31**	-.29**
11. End of day mood	**-**	.17*	-.30**	-.47**	.63**	.76**	-.12	.26**	.11	-.01	.10	.21*	-.26**
12. End of day healthy recovery	0.57	***.40***	.111	-.11	.13	.13	.03	.04	.16	-.17	.17	.18*	.08
13. End of day destructive recovery	0.45	0.91	***.16***	.22**	-.27**	-.34**	-.07	-.24**	-.08	-.13	.15	.03	.53**
14. End of day stressors	0.60	0.96	0.91	***.66***	-.47**	-.43**	.23**	-.17*	-.24*	-.01	-.09	-.20*	.17*
15. End of day resource efficacy	0.67	0.83	0.77	0.91	***.83***	.87**	-.25**	.38**	.30**	.10	.13	.32**	-.22**
16. End of day energy	0.43	-0.22	-0.34	0.77	0.89	***.93***	-.20*	.40**	.26**	.11	.12	.31**	-.29**
17. NWRI	-0.04	-0.09	-0.14	-0.34	-0.20	0.11	***.94***	-.11	-.02	-.20*	-.10	-.46**	.06
18. Subjective diet	0.16	-0.02	-0.11	-0.14	-0.07	-0.10	-0.05	***.93***	.49**	.35**	.18	.12	.06
19. MFP diet score	0.13	-0.09	-0.19	-0.11	-0.02	0.07	0.32	0.00	***64***	.22*	.20	.14	-.09
20. Exercise intensity	0.04	-0.22	-0.28	-0.19	-0.07	0.03	0.29	0.11	0.45	**-**	.04	.23*	.03
21. Social minutes	0.07	-0.04	-0.06	-0.28	-0.17	-0.08	0.29	0.03	0.32	0.31	**-**	.31**	.16
22. REQ	0.16	-0.21	-0.28	-0.06	-0.05	-0.01	0.14	-0.06	0.07	0.07	0.25	***.89***	-.03
23. Tobacco	0.03	0.27	0.36	-0.28	-0.17	-0.06	0.37	-0.18	0.15	0.22	0.08	-0.11	**-**
24. Alcohol	-0.03	-0.02	0.05	0.36	0.22	0.07	-0.29	-0.03	0.03	-0.12	0.23	0.05	0.21
25. Bedtime mood	0.34	-0.28	-0.37	0.05	0.00	-0.02	-0.10	0.02	-0.08	-0.07	0.19	0.46	-0.29
26. Bedtime well-being	0.38	-0.13	-0.22	-0.37	-0.24	-0.06	0.58	-0.02	0.18	0.23	0.15	0.38	-0.20
27. Bedtime physical symptoms	0.02	0.38	0.41	-0.22	-0.11	0.08	0.59	-0.09	0.21	0.23	-0.02	-0.17	0.21
28. PERC	.27**	.12	.04	-.22**	.26**	.31**	-.13	.39**	.16	.18	.15	.13	.13
29. Trait Self-Control	.27**	-.07	-.19*	-.34**	.42**	.37**	-.28**	.3**	.18	.21*	.07	.178*	-.14
30. Age	.21*	.04	.05	-.13	.11	.18*	.07	-.01	-.002	-.16	.06	.10	-.12
31. Sex	.11	.08	.01	-.13	.03	.02	-.01	-.04	-.20*	-.12	-.08	-.07	-.01

Variables	24	25	26	27	28	29	30	31
1. Sleep quality	-.19*	.31**	.76**	-.27**	.19*	.30**	.11	-.16
2. Morning mood	-.16	.63**	.60**	-.28**	.21*	.28**	.19*	.07
3. AM resource efficacy	-.24**	.46**	.48**	-.18*	.16	.45**	.16	-.01
4. AM energy	-.23**	.49**	.48**	-.22*	.19*	.40**	.17*	-.01
5. Mood before lunch	-.16	.75**	.65**	-.25**	.28**	.23*	.12	.06
6. Healthy recovery before lunch	.02	-.01	-.06	.29**	.11	-.23*	.01	-.03
7. Destructive recovery before lunch	.23*	-.25**	-.18*	.32**	.12	-.06	.03	.11
8. Stressors before lunch	.14	-.38**	-.31**	.30**	-.28**	-.36**	-.08	-.14
9. Resource efficacy before lunch	-.24**	.54**	.55**	-.19*	.26**	.38**	.12	.05
10. Energy before lunch	-.23**	.58**	.58**	-.22**	.27**	.34**	.16	.05
11. End of day mood	-.11	.80**	.69**	-.31**	.27**	.27**	.21*	.11
12. End of day healthy recovery	-.02	.08	.04	.23**	.12	-.07	.04	.08
13. End of day destructive recovery	.23**	-.36**	-.27**	.31**	.04	-.19*	.05	.01
14. End of day stressors	.11	-.41**	-.32**	.35**	-.22**	-.34**	-.13	-.13
15. End of day resource efficacy	-.22**	.59**	.61**	-.25**	.26**	.42**	.11	.03
16. End of day energy	-.21*	.69**	.70**	-.29**	.31**	.37**	.18*	.02
17. NWRI	.05	-.19*	-.22*	.08	-.13	-.28**	.07	-.01
18. Subjective diet	-.11	.22*	.27**	-.23**	.39**	.37**	-.01	-.04
19. MFP diet score	-.07	.10	.10	-.16	.16	.18	-.002	-.20*
20. Exercise intensity	.10	.02	.13	-.24**	.18	.21*	-.16	-.12
21. Social minutes	.23*	.12	.06	.031	.15	.07	.06	-.08
22. REQ	-.03	.30**	.31**	-.03	.13	.18*	.09	-.07
23. Tobacco	.34**	-.27**	-.19*	.15	.13	-.14	-.12	-.01
24. Alcohol	**-**	-.17*	-.18*	.06	.21*	-.18*	-.13	.06
25. Bedtime mood	-0.03	**-**	.81**	-.34**	.16	.21*	.17*	.05
26. Bedtime well-being	-0.06	0.77	***.84***	-.34**	.19*	.31**	.23**	.01
27. Bedtime physical symptoms	0.05	-0.39	-0.38	***.45***	-.04	-.26**	.11	.09
28. PERC					***.91***	.22**	-.02	-.01
29. Trait Self-Control						***.91***	.07	.08
30. Age							**-**	.03
31. Sex								**-**

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

Note: Correlations above the diagonal are between-person correlations, and correlations below the diagonal are within-person correlations. Reliabilities are reported in bold in the diagonal. Reliability estimates are not calculated for one-item measures.

Table 4. Personal Energy and Resource Efficacy Predicting Recovery Behavior

Hypoth	Predictor	Outcome	Estimate
H1A	SoW energy	BFL healthy recovery	-.004(.01)
H1A	SoW resource efficacy	BFL healthy recovery	.01(.02)
H1B	SoW energy	BFL destructive recovery	.01(.01)
H1B	SoW resource efficacy	BFL destructive recovery	02(.01)*
H1A	BFL energy	EoW healthy recovery	-.002(.02)
H1A	BFL resource efficacy	EoW healthy recovery	.01(.03)*
H1B	BFL energy	EoW destructive recovery	-.01(.01)*
H1B	BFL resource efficacy	EoW destructive recovery	-.02(.01)
Explor.	BFL physical energy	EoW healthy recovery	-.002(.04)
Explor.	BFL emotional energy	EoW healthy recovery	-.11(.04)*
Explor.	BFL cognitive energy	EoW healthy recovery	.0001(.10)

*$p < .05$

Note. Variables were group-mean centered. Standard error estimates are presented in the parentheses. SoW = Start of Workday. BFL = Before lunch. EoW = End of Workday.

Table 5. Workday Recovery Behavior Between Predicting Energy & Efficacy

Hypothesis	Predictor	Outcome	Controls	Estimate
H2	Before lunch healthy recovery	Before lunch energy	Energy and Stressors	.14(.10)
H2	Before lunch healthy recovery	Before lunch resource efficacy	Resource efficacy & Stressors	.12(.05)*
H3A	Before lunch destructive recovery	Before lunch energy	Energy and Stressors	.01(.15)
H3A	Before lunch destructive recovery	Before lunch resource efficacy	Resource efficacy & Stressors	.13(.08)
H2	End of workday healthy recovery	End of workday energy	Energy and Stressors	.09(.10)
H2	End of workday healthy recovery	End of workday resource efficacy	Resource efficacy & Stressors	.05(.05)
H3A	End of workday destructive recovery	End of workday energy	Energy and Stressors	-.41(.20)*
H3A	End of workday destructive recovery	End of workday lunch resource efficacy	Resource efficacy & Stressors	-.13(.08)
H3B	End of workday destructive recovery	Composite bedtime well-being		-1.30(.54)*
H3B	End of workday destructive recovery	Bedtime Mood		.01(.03)
H3B	End of workday destructive recovery	Bedtime physical symptoms		.05(.05)

*$p < .05$

Note. For control variables, energy and resource efficacy were measured one time point previous to the predictor (therefore controlling for previous resource states), while stressors were measured at the time of the outcome variable. Predictors were group-mean centered. Standard error estimates are presented in the parentheses.

Table 6. Resources at the End of the Workday and Recovery Activities After Work

Hypothesis	Predictor	Outcome	Estimate
H9A	Energy	REQ	.19(.01)*
H9A	Resource Efficacy	REQ	.52(.18)**
H9A	Energy	Exercise intensity	.03(.01)**
H9A	Resource Efficacy	Exercise intensity	.05(.02)*
H9A	Energy	Social Time	2.10(1.02)*
H9A	Resource Efficacy	Social Time	.73(2.29)
H9A	Energy	Sleep Quality	-.01(.02)
H9A	Resource Efficacy	Sleep Quality	.01(.05)
H9A	Energy	Subjective Diet	.07(.02)**
H9A	Resource Efficacy	Subjective Diet	.08(.04)
H9B	Energy	Alcohol	.01(.01)
H9B	Resource Efficacy	Alcohol	.0001(.02)
H9B	Energy	Tobacco	.001(.002)
H9B	Resource Efficacy	Tobacco	.01(.01)

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

Note. Variables were group-mean centered. Standard error estimates are presented in the parentheses. Sleep quality was measured the next morning.

Table 7. After Work Recovery Activities and Well-Being

Hypoth.	Variables	Estimate
H10	Subjective Diet → Bedtime mood	.02(.01)
H10	Subjective Diet → Bedtime physical symptoms	-.05(.02)*
H10	Subjective Diet → Bedtime well-being composite	.41(.19)*
H10	Exercise Intensity → Bedtime mood	.06(.05)
H10	Exercise Intensity → Bedtime physical symptoms	-.05(.07)
H10	Exercise intensity → Bedtime well-being composite	.97(.85)
H10	Social Time → Bedtime mood	.001(.0004)**
H10	Social Time → Bedtime physical symptoms	-.001(.0003)*
H10	Social Time → Bedtime well-being composite	.02(.01)**
H10	REQ → Bedtime mood	.02(.003)**
H10	REQ → Bedtime physical symptoms	-.01(.005)*
H10	REQ → Bedtime well-being composite	.37(.04)**
H11A	Alcohol → Bedtime mood	.05(.04)
H11A	Alcohol → Bedtime physical symptoms	-.01(.06)
H11A	Alcohol → Bedtime well-being composite	1.16(.54)*
H11B	Alcohol →next morning energy	-.15(.25)
H11B	Alcohol → next morning resource efficacy	-.13(.11)
H11A	Tobacco → Bedtime mood	-.15(.08)
H11A	Tobacco → Bedtime physical symptoms	.15(.07)*
H11A	Tobacco → Bedtime well-being composite	-2.91(1.23)*
H11B	Tobacco → next morning energy	.46(.40)
H11B	Tobacco → next morning resource efficacy	.23(.22)

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

Note. Standard error estimates are presented in the parentheses.

Table 8. NWRI, Recovery, and Well-being

Hypothesis	Outcome/Relationship	Controls	Estimate
H13A	REQ		-.60(.10)**
H13A	Subjective Diet	Work diet	-.003(.01)
H13A	Exercise intensity	Work exercise	-.03(.01)**
H13A	Social Time		-4.36(1.22)**
H13B	Alcohol	Work alcohol, social minutes	.004(.01)
H13B	Tobacco	Work tobacco, social minutes	-.001(.003)
H14A	Moderating: End of workday energy → Subjective Diet		.02(.01)**
H14A	Moderating: End of workday resource efficacy → Subjective Diet		.02(.01)
H14A	Moderating: End of workday energy → REQ		.03(.03)
H14A	Moderating: End of workday resource efficacy → REQ		-.06(.07)
H14A	Moderating: End of workday energy → Exercise intensity		.005(.003)
H14A	Moderating: End of workday resource efficacy → Exercise intensity		.0002(.004)
H14B	Moderating: End of workday energy → Alcohol		.0001(.002)
H14B	Moderating: End of workday resource efficacy → Alcohol		-.0002(.004)
H14B	Moderating: End of workday energy → Tobacco		-.001(.001)
H14B	Moderating: End of workday resource efficacy → Tobacco		-.0002(.002)
Exploratory	Bedtime mood		-.03(.01)**
Exploratory	Bedtime physical symptoms		.02(.01)*
Exploratory	Bedtime well-being		-.53(.12)**
Exploratory	Next day sleep		-.04(.02)*
Exploratory	Next Day healthy recovery before lunch		.03(.01)*
Exploratory	Next Day destructive recovery before lunch		-.01(.01)

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

Note. Standard error estimates are presented in the parentheses.

Table 9. Workday Mediational Analysis Results

Hypoth.	Variables	Estimate	95% CI
H4A	Start of workday energy → Before lunch healthy recovery → Before lunch energy	-.001(.001)	-.003 to .002
H4A	Start of workday resource efficacy → Before lunch healthy recovery → Before lunch resource efficacy	-.001(.002)	-.01 to .002
H4A	Before lunch energy → End of workday healthy recovery → End of workday energy	.001(.003)	-.004 to .01
H4A	Before lunch resource efficacy → End of workday healthy recovery → End of workday resource efficacy	.004(.004)	-.004 to .01
H4B	Start of workday energy → Before lunch destructive recovery → Before lunch energy	0.00(.001)	-.002 to .001
H4B	Start of workday resource efficacy → Before lunch destructive recovery → Before lunch resource efficacy	0.00 (.002)	-.003 to .003
H4B	Before lunch energy → End of workday destructive recovery → End of workday energy	.01(.003)	-.001 to .01
H4B	Before lunch resource efficacy → End of workday destructive recovery → End of workday resource efficacy	.003(.003)	-.002 to .01

$^{*}p < .05$

Note. Standard error estimates are presented in the parentheses.

Table 10. After Work Recovery Activity Mediation

Hypothesis	Variables	Controls	Estimate	95% CI
H12A	End of workday energy → Exercise → Bed well-being	Work exercise	.02(.02)	-.03 to .06
H12A	End of workday resource efficacy → Exercise → Bed well-being	Work exercise	.03(.04)	-.05 to .12
H12A	End of workday energy → Subjective diet → Bed well-being	Work diet	.03(.02)*	.001 to .06
H12A	End of workday resource efficacy → Subjective diet → Bed well-being	Work diet	.05(.03)	-.002 to .11
H12A	End of workday energy → MFP diet → Bed well-being	Work diet	-.01(.01)	-.02 to .01
H12A	End of workday resource efficacy → MFP diet → Bed well-being	Work diet	.004(.02)	-.03 to .04
H12A	End of workday energy → REQ → Bed well-being		.10(.04)**	.03 to .17
H12A	End of workday resource efficacy → REQ → Bed well-being		.17(.07)*	.03 to .31
H12B	End of workday energy → Alcohol → Bed well-being	Work drink	.002(.01)	-.02 to .02
H12B	End of workday resource efficacy → Alcohol → Bed well-being	Work drink	.002(.02)	-.03 to .03
H12B	End of workday energy → Tobacco → Bed well-being	Work smoke	-.01(.01)	-.02 to .02
H12B	End of workday resource efficacy → Tobacco → Bed well-being	Work smoke	-.02(.02)	-.06 to .01
Exploratory	NWRI → Sleep quality → Next morning start of workday energy		-.06(.03)*	-.11 to -.002
Exploratory	REQ → Sleep quality → Next morning start of workday energy		.02(.01)*	.003 to .04
Exploratory	Before lunch stress → End of workday energy → NWRI		.02(.01)*	.001 to .05
Exploratory	End of workday energy → NWRI → REQ		.07(.03)*	.02 to .12

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

Note. Standard error estimates are presented in the parentheses. Control variables are the occurrences of the mediating variable that were measured during work, when appropriate.

Table 11. Workday Cross-Level Analyses

Hypothesis	Variables	Estimate
H5A	Self-Control → Before lunch healthy recovery	-.01(.004)**
H5B	Self-Control → Before lunch destructive recovery	-.002(.002)
H5A	Self-Control →End of workday healthy recovery	-.01(.01)
H5B	Self-Control → End of workday destructive recovery	-.01(.002)*
H6A	Self-Control moderating: Morning energy → Healthy recovery before lunch	.00(.00)
H6A	Self-Control moderating: Morning resource efficacy → Healthy recovery before lunch	.00(.00)
H6A	Self-Control moderating: Before lunch Energy → End of workday healthy recovery	-.002(.001)*
H6A	Self-Control moderating: Before lunch resource efficacy → End of workday healthy recovery	-.002(.001)
H6B	Self-Control moderating: Morning energy → Before lunch destructive recovery	.00(.00)
H6B	Self-Control moderating: Morning resource efficacy → Before lunch destructive recovery	.00(.00)
H6B	Self-Control moderating: Before lunch energy → End of workday destructive recovery	.00(.00)
H6B	Self-Control moderating: Before lunch resource efficacy → End of workday destructive recovery	.00(.00)
H7A	PERC → Before lunch healthy recovery	.02(.01)*
H7B	PERC → Before lunch destructive recovery	.004(.003)
H7A	PERC → End of workday healthy recovery	.01(.01)
H7B	PERC → End of workday destructive recovery	.01(.004)
H8A	PERC moderating: Morning energy → Before lunch healthy recovery	-.001(.001)
H8A	PERC moderating: Morning resource efficacy → Before lunch healthy recovery	-.01(.002)*
H8A	PERC moderating: Before lunch energy → End of workday healthy recovery	.00(.001)
H8A	PERC moderating: Before lunch resource efficacy → End of workday healthy recovery	.001(.00)
H8B	PERC moderating: Morning energy → Before lunch destructive recovery	.00(.00)
H8B	PERC moderating: Morning resource efficacy → Before lunch estructive recovery	.00(.001)
H8B	PERC moderating: Before lunch energy → End of workday destructive recovery	.00(.00)
H8B	PERC moderating: Before lunch resource efficacy → End of workday destructive recovery	.001(.001)

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

Note. Standard error estimates are presented in the parentheses.

Table 12. Workday Cross-Level Exploratory Analyses

Hypothesis	Variables	Estimate
Exploratory	PERC → Before lunch stress	-.05(.01)**
Exploratory	PERC → End of workday stress	-.04(.02)*
Exploratory	PERC → Start of workday energy	.07(.03)*
Exploratory	PERC → Start of workday resource efficacy	.02(.01)
Exploratory	PERC → Before lunch energy	.10(.03)**
Exploratory	PERC → Before lunch resource efficacy	.04(.01)**
Exploratory	PERC → End of workday energy	.00(.03)**
Exploratory	PERC → End of workday resource efficacy	.04(.01)**

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

Note. Standard error estimates are presented in the parentheses.

Table 13. After Work Cross-Level Analysis Results

Hypoth.	Variables	Estimate
H15A	Self-Control → Subjective diet	03(.01)**
H15A	Self-Control → Exercise intensity	01(.003)
H15A	Self-Control → Social minutes	.48(.34)
H15A	Self-Control → REQ	.03(.01)*
H15B	Self-Control → Alcohol	004(.002)
H15B	Self-Control → Tobacco	.01(.004)
H16A	Self-Control moderating: Energy → Subjective diet	00(.001)
H16A	Self-Control moderating: Resource Efficacy → Subjective diet	)02(.002)
H16A	Self-Control moderating: Energy → Exercise intensity	.00(.00)
H16A	Self-Control moderating: Resource Efficacy → Exercise intensity	001(.001)
H16A	Self-Control moderating: Energy → Social minutes	15(.05)**
H16A	Self-Control moderating: Resource Efficacy → Social minutes	32(.11)**
H16A	Self-Control moderating: Energy → REQ	001(.004)
H16A	Self-Control moderating: Resource Efficacy → REQ	.003(.01)
H16B	Self-Control moderating: Energy → Alcohol	.00(.00)
H16B	Self-Control moderating: Resource Efficacy → Alcohol	.00(.00)
H16B	Self-Control moderating: Energy → Tobacco	.00(.00)
H16B	Self-Control moderating: Resource Efficacy → Tobacco	.00(.00)

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

Note. Standard error estimates are presented in the parentheses.

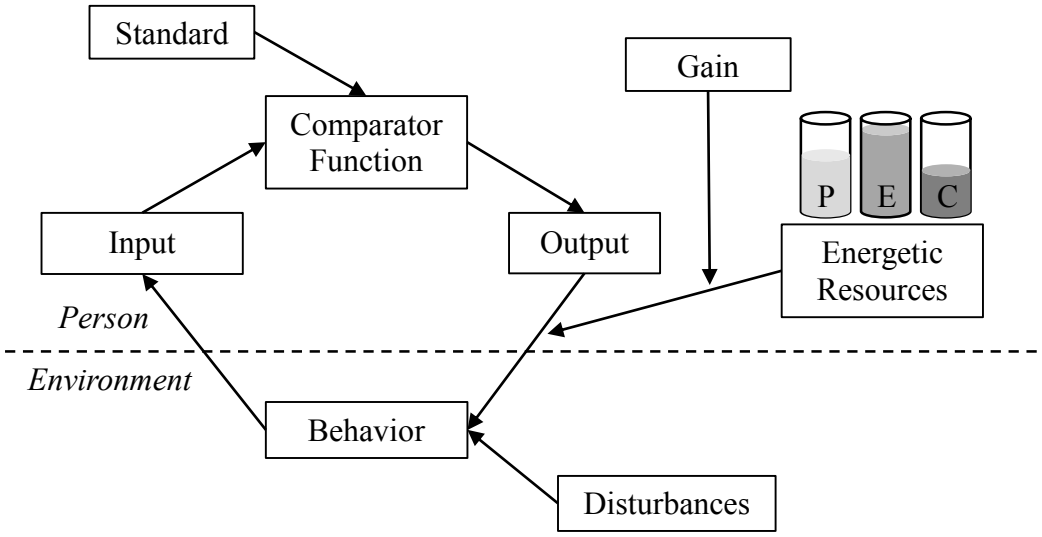

Figure 1. Control Theory and PECS Model

Note: While previous theory suggests that the importance of a goal (gain) impacts the amount of effort allocated toward reducing a state-goal gap (discrepancy), the present model proposes that energetic resource availability interacts with *gain* to drive the strength of the relationship between the perceived discrepancy (output) and actual behavior. Specifically, *gain* effects effortful behavior by weakening the proposed effect of energetic resource states on effortful behavior. When a goal is important, individuals will continue to allocate limited resources toward reducing the perceived discrepancy; when a goal is low in the hierarchy, individuals may conserve resources instead of allocating them toward reducing the perceived discrepancy.

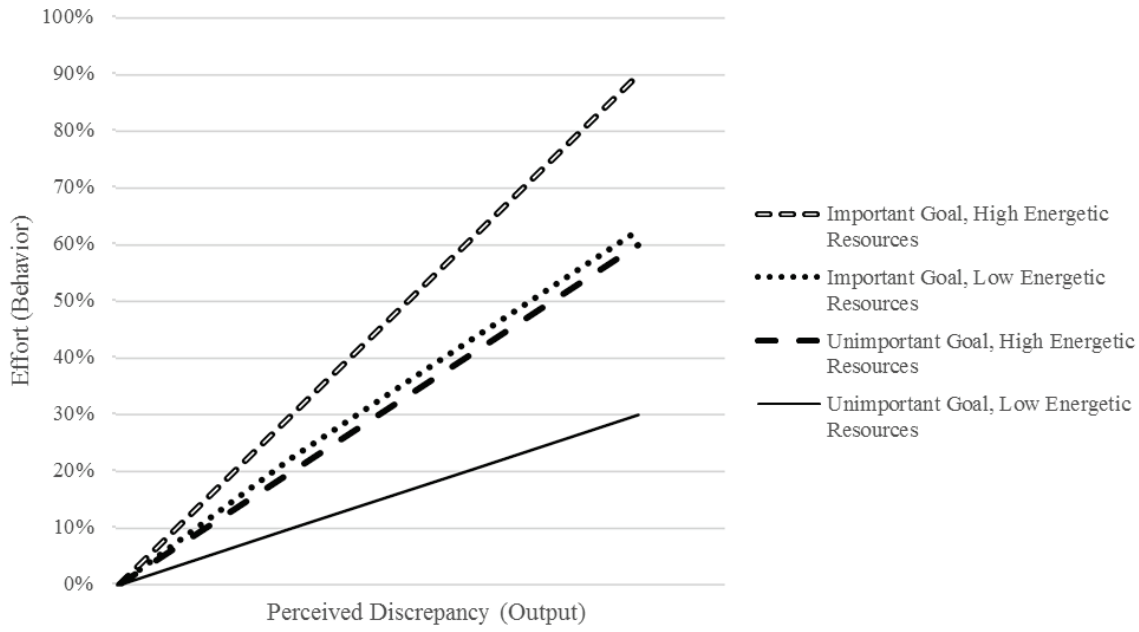

Figure 2. Proposed Interaction of Gain, Resources, and Output on Effort

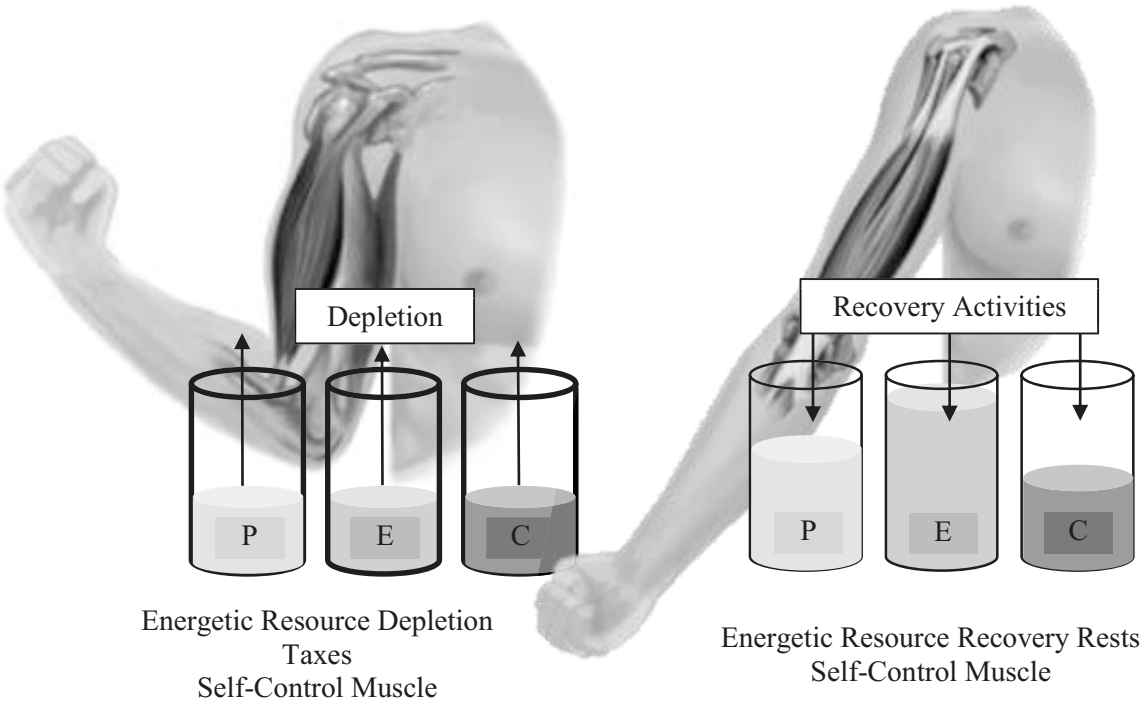

Figure 3. Proposed PECS Model

Note: P = Physical energy, E = Emotional energy, C = Cognitive energy. During depletion, demands tax personal energies and draw from the self-control strength. During recovery, recovery activities replenish energetic resources, allowing the self-control muscle to rest, which will replenish self-control strength. Image adapted from trainelite.com.

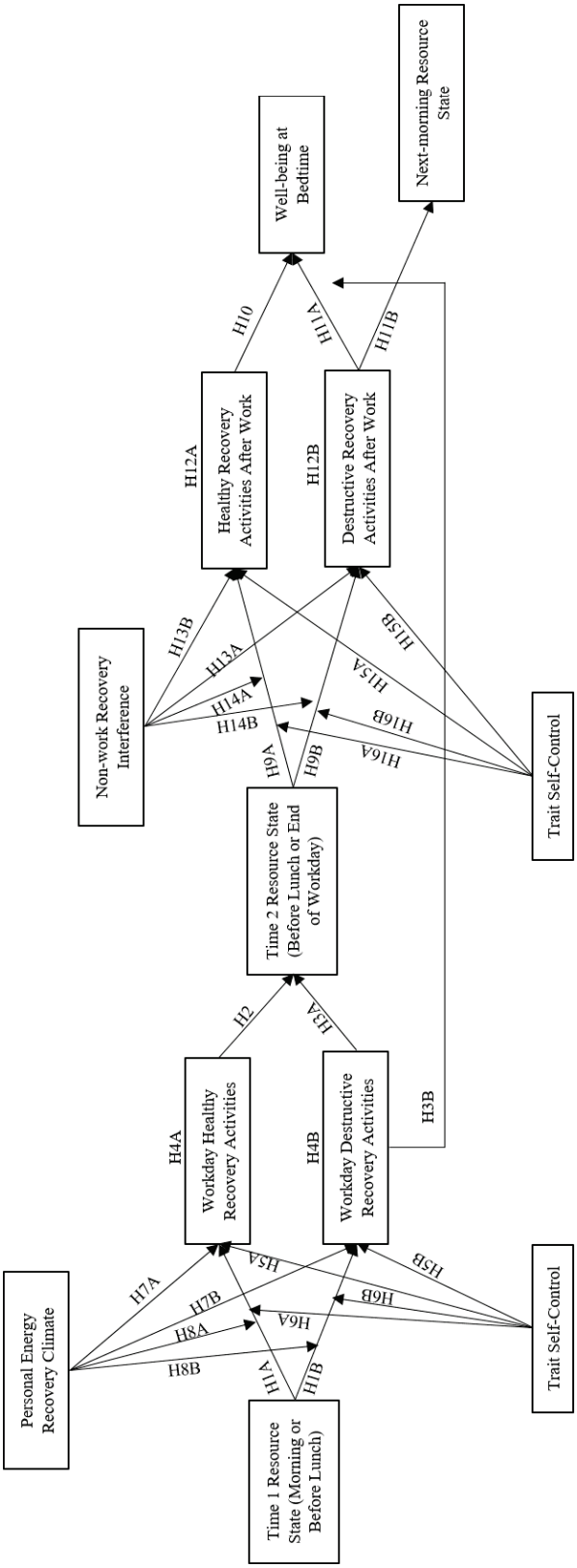

Figure 4. Hypothesized Multilevel Model

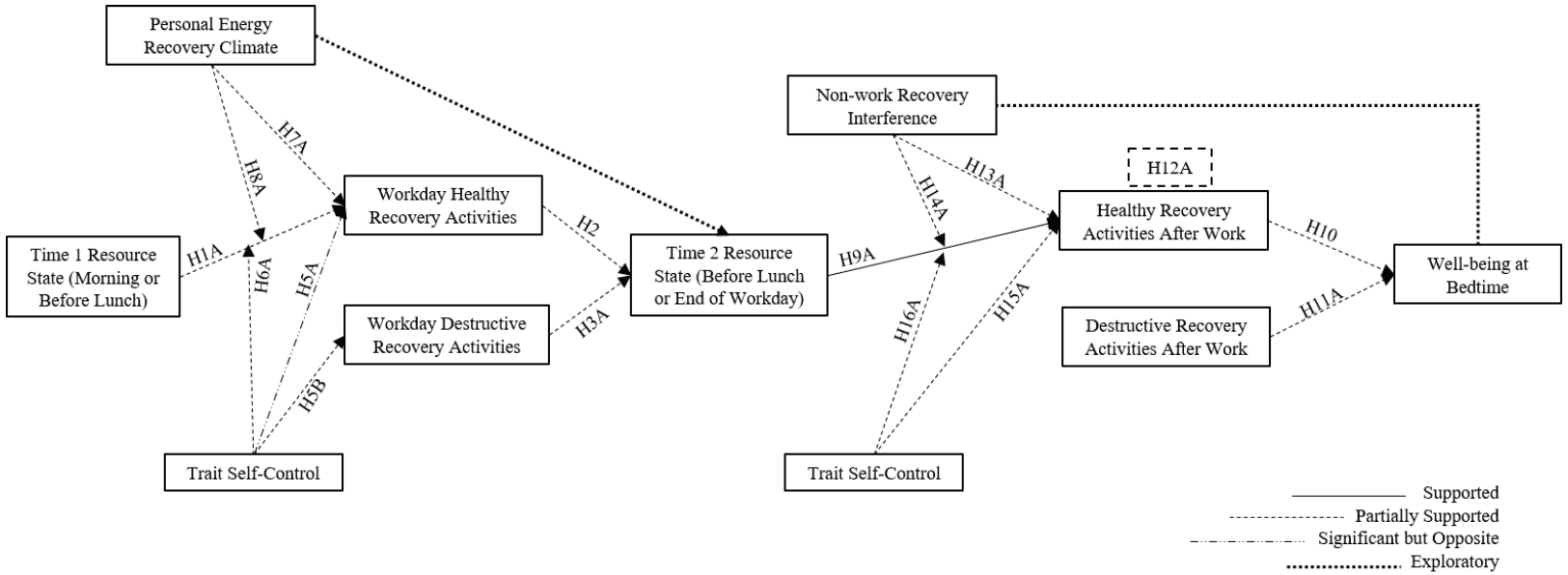

Figure 12. Model of Supported Hypotheses

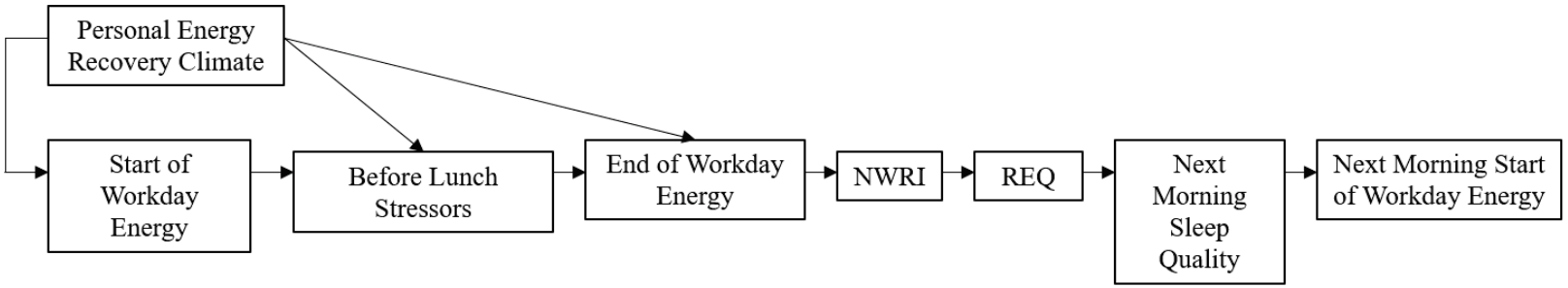

Figure 13. Model of Supported Exploratory Mediation Analyses

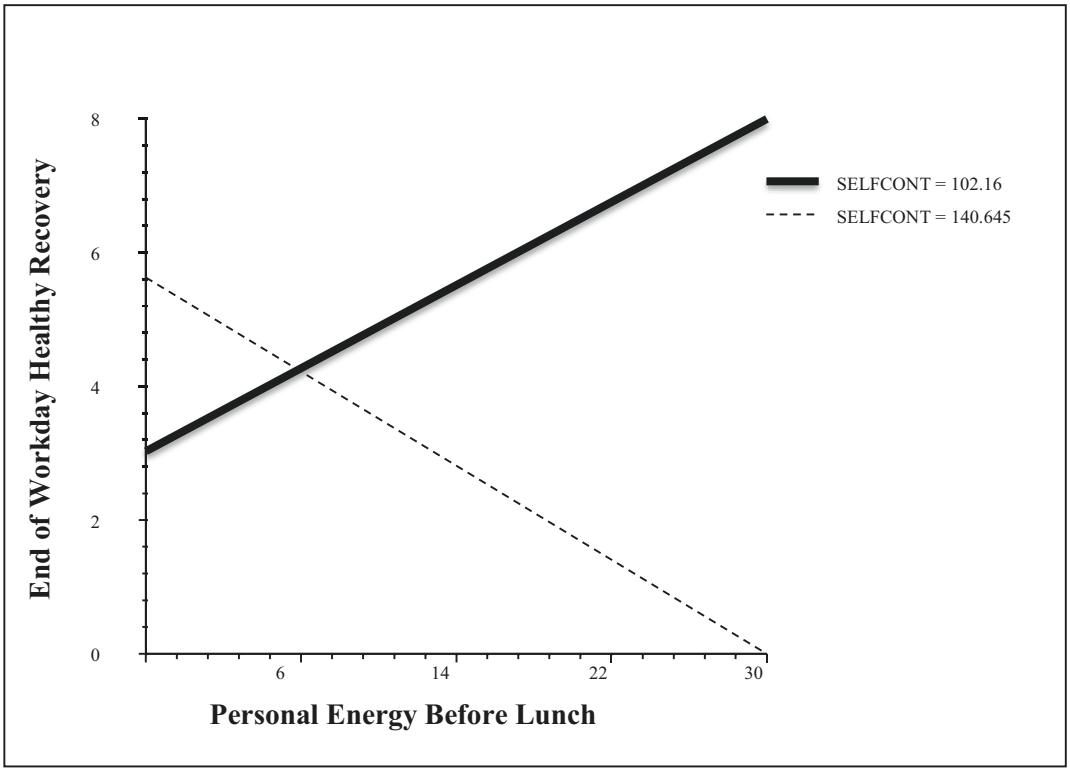

Figure 5. Self-Control Moderating the Relationship Between Energy Before Lunch and Healthy Recovery Behavior at the End of the Workday

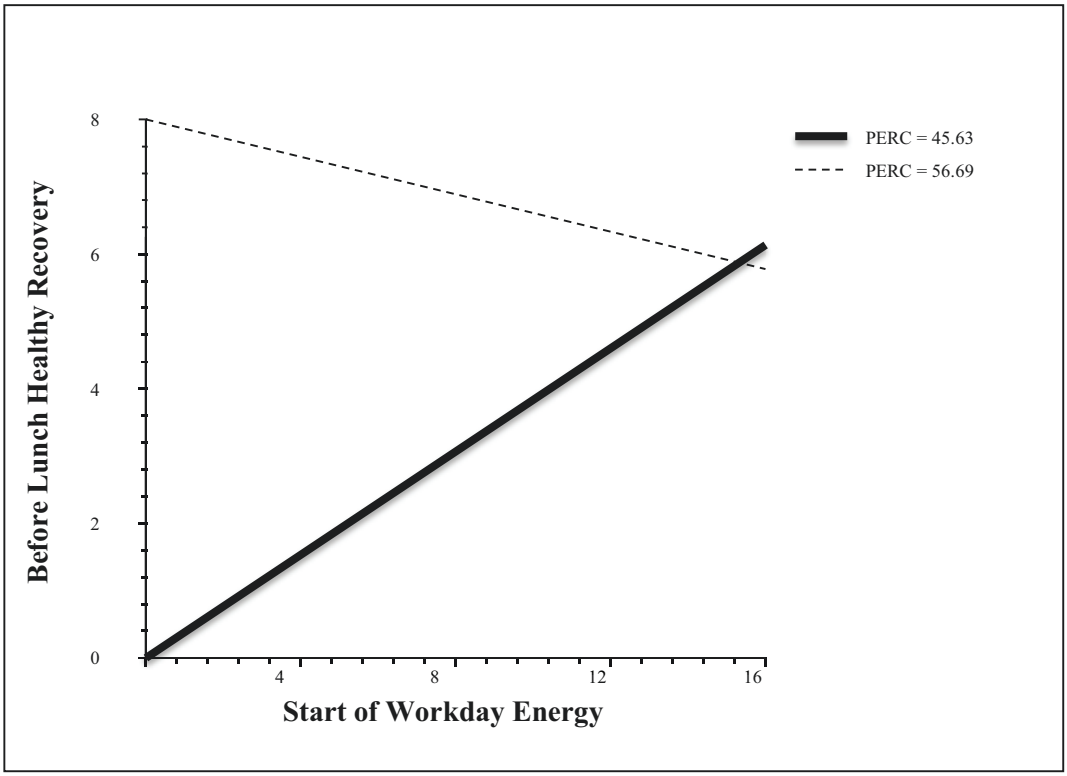

Figure 6. Personal Energy Recovery Climate Moderating the Relationship Between Morning Energy and Healthy Recovery Behavior Before Lunch

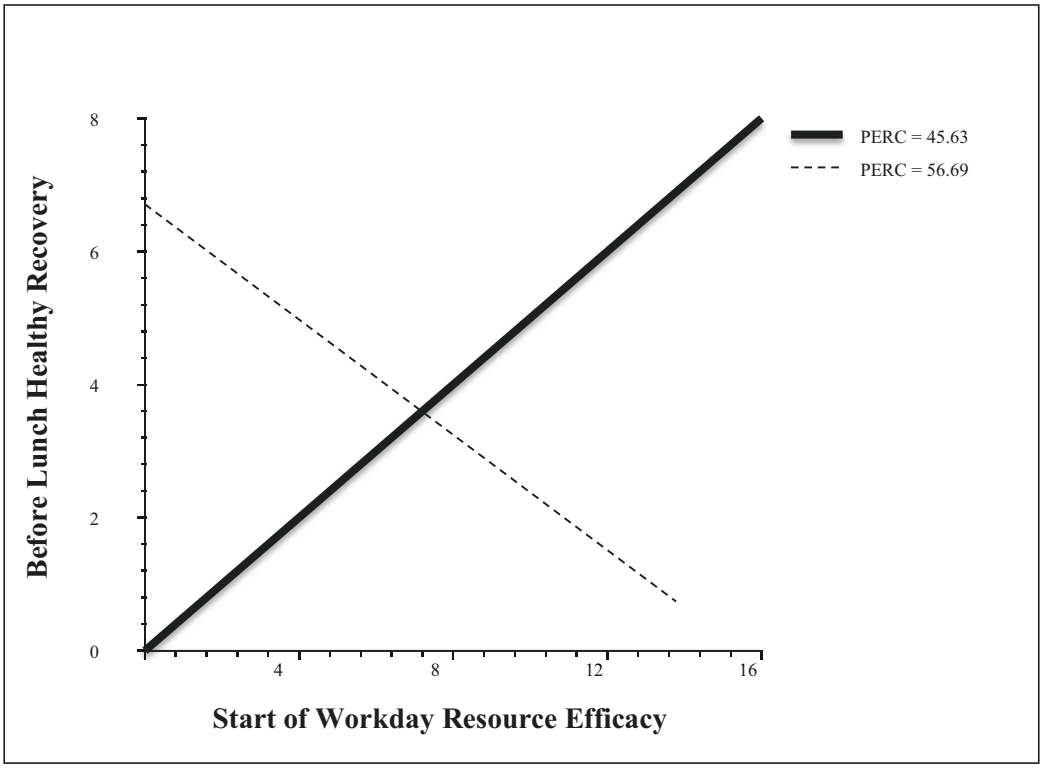

Figure 7. Personal Energy Recovery Climate Moderating the Relationship Between Morning Resource Efficacy and Healthy Recovery Behavior Before Lunch

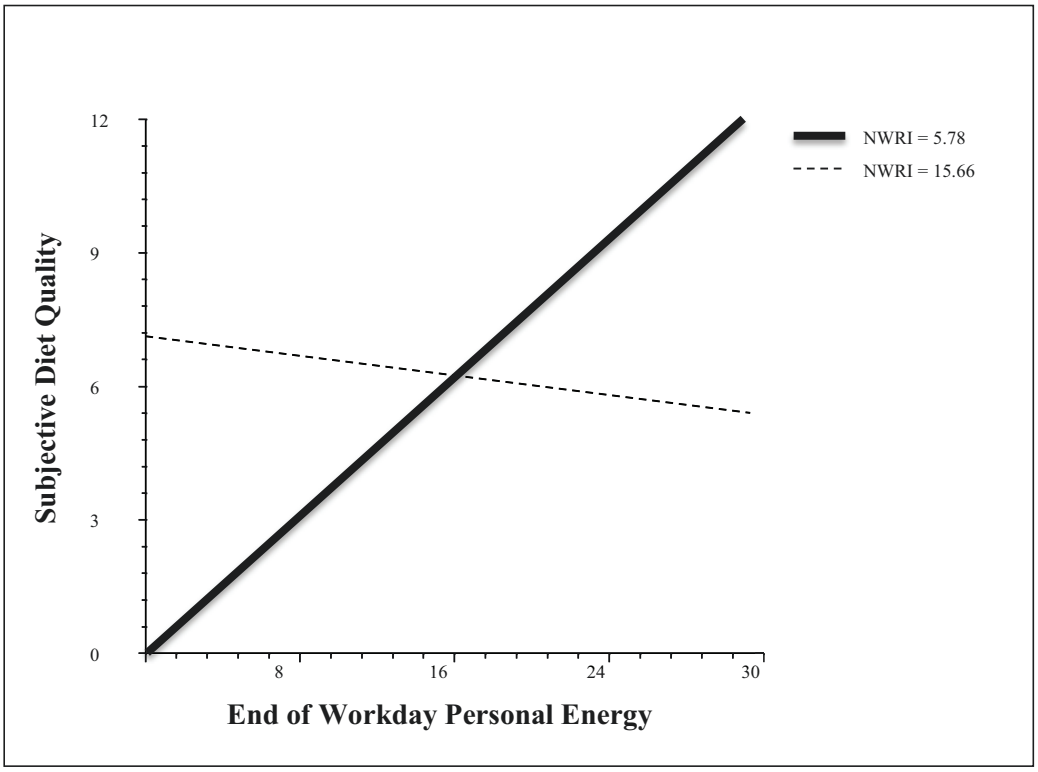

Figure 8. Non-work Recovery Interferences Moderating the Relationship Between Energy at the End of the Day and Subjective Diet (Controlling for Workday Diet)

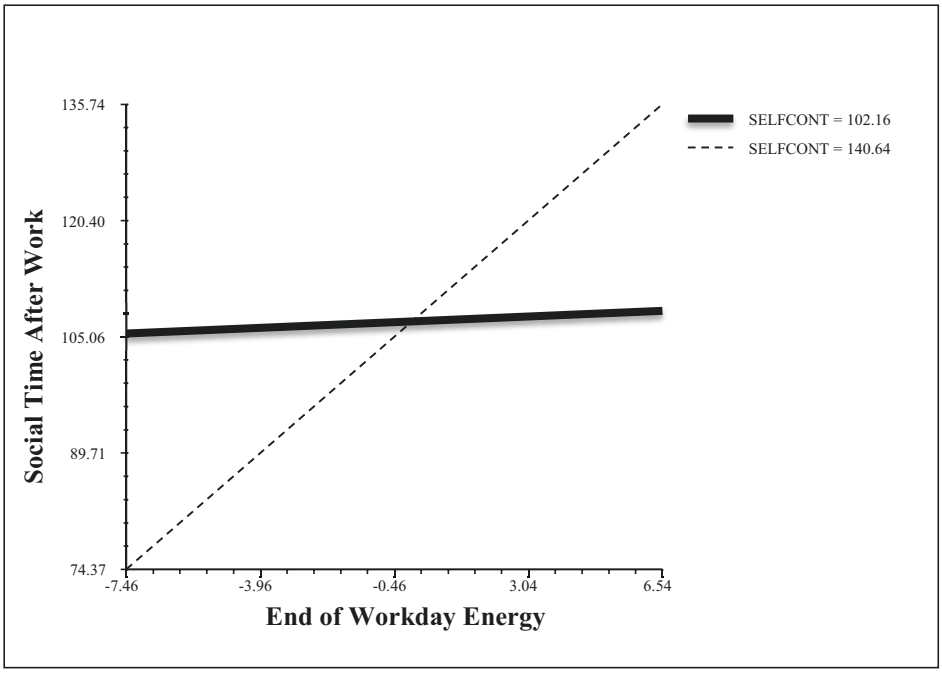

Figure 9. Self-control Moderating the Relationship Between Energy at the End of the Workday and Social Minutes After Work

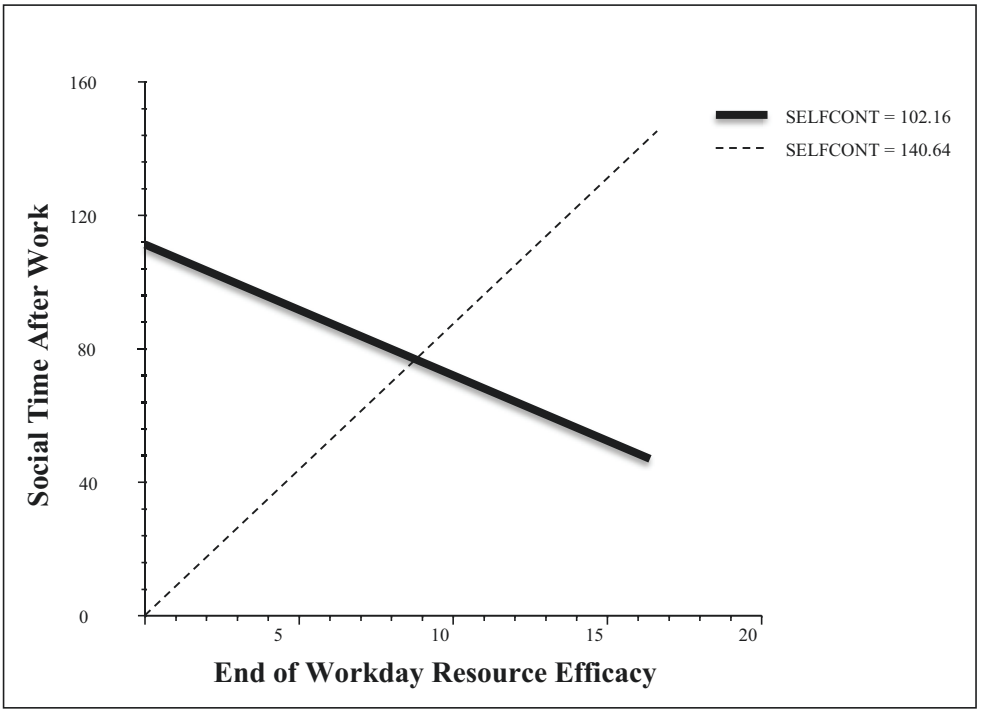

Figure 10 Self-control Moderating the Relationship Between Resource Efficacy at the End of the Workday and Social Minutes After Work

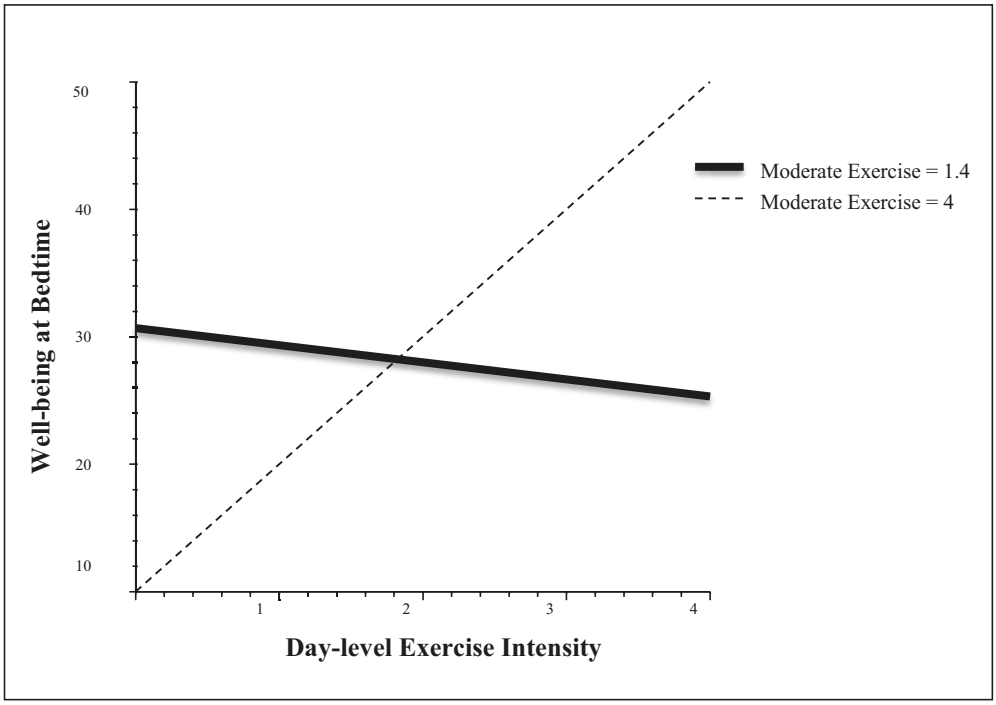

Figure 11. Between-persons Frequency of Moderate Exercise Moderating the Relationship Between Daily Exercise Intensity and Well-Being at Bedtime

Appendix A
Informed Consent

You are invited to participate in a survey-based study about the relationship between employee experiences at work and well-being.

You will be asked to provide an email address to which daily online surveys will be sent to you at multiple points during the day over a three-week period. Each survey will provide clear directions for completion. Your initial survey will include a demographic questionnaire and a few other one-time measures. Shorter daily surveys will then be completed four times each day for 15 workdays for a total of 61 surveys. For thorough and appropriate data collection and analysis, it is highly encouraged that you complete all of the surveys provided to you.

You will be asked to use the application, MyFitnessPal, in order to track your food and exercise over the course of the study. This is a free application that can be downloaded on your smartphone or accessed online. You may visit myfitnesspal.com in order to learn how to use the application or email the researcher at clenoble2012@my.fit.edu with any additional questions. The application will ask personal information such as your age, weight, and weight goals in order to provide dietary recommendations to you. For the purposes of this study, you will only be asked to report dietary information and exercise that you engage in each day. While we will not record the recommended macronutrients, dietary calories, or calories expended through exercise, we are interested in the extent to which you are meeting the recommended amounts. All of your diet and exercise information will remain strictly confidential. The researchers will not have access to your MyFitnessPal account, nor will the researchers have any access or ever see your personal weight, dietary recommendations, etc. You will only be asked to report whether or not you met recommendations for that day.

If you are unable or do not want to use MyFitnessPal to track your diet, you may still participate in the study. However, to encourage participation in this aspect of the study, there will be an additional $100.00 drawing each week for individuals who complete at least 3 consecutive MyFitnessPal entries for that week. So, completing the MyFitnessPal questions in the surveys will provide you with three chances to win $100.00 (one drawing each week of the study).

You will also be provided with monetary compensation for each survey that you complete. $5.00 is to be awarded for the completion of the initial survey. $0.50 is to

be awarded for the completion of each of the four daily surveys, per day ($30.00 total). Finally, for completing the initial survey and at least 80% of the daily surveys, you will receive a bonus $10.00. As a result, the total amount of compensation you may receive is $45.00. Individuals who complete the initial survey and 80% or more of the daily surveys each week will be entered in a drawing to receive a $100.00 Amazon gift card (one drawing each week of the study). All compensation will be provided at the conclusion of the 15-day data collection period.

Your survey responses will be strictly confidential and will be recorded in a secure electronic database. Only the researchers will have access to the data. You are entitled to receive overall results of the study once data has been collected and analyzed. We expect this study to yield interesting information regarding the relationship between experiences at work and health and well-being.

Participation in this study warrants no foreseeable risks or discomforts. Any physical activity you participate in is completely voluntary and not in any way imposed by the nature of this study.

Participation is voluntary. Refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled. If you have questions at any time about the survey or the procedures, you may contact Chelsea LeNoble at clenoble2012@my.fit.edu or Dr. Erin Richard at erichard@fit.edu.

This study was approved by Florida Institute of Technology's IRB. Please contact the current chair, Dr. Lisa Steelman (lsteema@fit.edu), for questions about the rights of people who take part in research. For information about the rights of people who take part in research, you may also contact Florida Tech's Institutional Review Board at (321) 674-8104.

By selecting the box below, you indicate that you are at least 18 years old and have read and understand the information presented above. You must provide informed consent in order to participate in the study.

Appendix B
Baseline Questionnaire

Please enter your email address, which will only be used for identification purposes and will remain confidential.

Social Activity
How often do you generally engage in social activities with friends or family that last fifteen minutes or more? Social activities can involve any form of interaction with at least one other person.
Scale:
Less than Once a Month (1)
Once a Month (2)
2-3 Times a Month (3)
Once a Week (4)
2-3 Times a Week (5)
2-3 Times a Day (6)
More than 3 Times a Day (7)

Personal Energy Climate (PERC) Scale
Personal energy recovery climate refers to your perceptions of your organization's support for employee recovery from work demands.

Recovery activities include both health related behaviors and leisure activities that allow for you to mentally detach, relax, and overall do what you'd like to do with your non-work time. Example health behaviors: healthy diet, physical activity (running, yoga, weightlifting), and quality sleep

Example leisure activities: viewing media (television, film, music), creating media (creative writing, visual art, playing instruments), engaging with media (playing video games, board games, web surfing), or other forms of play (outdoor exploration, activities with children or pets, events with friends or family)

Please indicate the extent to which the following statements reflect your perceptions of your current place of work.
Scale:
Strongly Disagree (1)
Disagree (2)
Neither Agree nor Disagree (3)
Agree (4)
Strongly Agree (5)

1. At my organization, there are safe outdoor areas at which I can be physically active during breaks.
2. If I am feeling exhausted or overwhelmed at work, I am able to take a break.
3. I am able to take time off of work in order to adequately recover.
4. Use of sick days for recovery is supported and encouraged.
5. My organization allots specific time during the workday for employees to take breaks.
6. My organization cares about employee recovery from work demands.
7. My supervisor cares about my recovery from work demands.
8. My organization provides information about how recovery activities are beneficial.
9. My organization provides information regarding the importance of physical activity.
10. My organization provides me with opportunities and resources to recover from work demands.
11. My organization actively promotes employee recovery from work demands.
12. When my organization learns that something about our work or the workplace is preventing employee recovery from work demands, something is done about it.
13. My organization takes reports of burnout and fatigue seriously.
14. My organization takes reports of employee illness seriously.
15. My organization promotes health related behavior.
16. My supervisor encourages participation in organizational programs that promote employee recovery from work demands.
17. My supervisor encourages recovery activities in my workgroup.
18. Supervisors in my organization seem to really value employee engagement in recovery activities.
19. My organization encourages us to speak up about issues and proprieties regarding employee recovery from work demands.
20. My organization has adequate policies and procedures for mental and physical recovery.
21. My organization truly cares about helping individuals recover from work demands.
22. My work schedule allows me to take time to engage in recovery activities.
23. My organization's policies make it easier for me to engage in recovery activities.
24. My organization provides ample on-site healthy dietary choices.
25. My supervisor limits my tasks when not at work so that I am able to get adequate sleep each night.
26. My organization has policies in place allowing employees to take time to relax and recover from job demands.

27. My supervisor allows me to engage in leisure activities during work breaks.
28. My organization promotes recovery activities.
29. If work demands became unbearable, my co-workers would take steps to support my recovery.
30. Most of my coworkers are actively trying to maintain healthy recovery activities.

Baseline Physical Activity Questionnaire

Please think about the past month. During that time, approximately how many days per week did you engage in each of the following types of physical activity for at least 20 consecutive minutes?

Example 1. If you walk to work and it takes you 10 minutes each way, that would NOT count because the minutes were not consecutive.

Example 2. If you walk to work and it takes you 20 minutes each way, then that would count as performing light physical activity that day. You walked for at least 20 consecutive minutes that day.

Scale: Physically unable/not medically allowed to do this (0) Chose not to do this (1) 1 day per week or less (2) 2-3 days per week (3) 4-5 days per week (4) 6-7 days per week (5)

1. Light aerobic activity (Ex: Shopping, housework, leisurely walking)
2. Moderate aerobic activity (Ex: Brisk walking, bicycling, tennis)
3. Vigorous aerobic activity (Ex: Jogging/running, swimming laps, jumping rope)
4. Muscle-strengthening activity (Ex: Lifting weights, pilates, yoga)

Baseline Diet Quality

How would you rate your overall diet over the past month?

Scale:

Very Unhealthy (1)
Bad (2)
Poor (3)
Neither Healthy nor Unhealthy (4)
Fair (5)
Good (6)
Very Healthy (7)

Tobacco and Alcohol Use

Please indicate the frequency with which you engaged in the following behaviors in the past month.

1 serving of alcohol = 12 oz. beer, 4 oz. wine, or 1 oz. spirits

1 serving tobacco = 1/2 pack of cigarettes, 1 e-cigarette cartridge, 1 cigar, 1 pipe bowl, or 1 can of snuff

Using one serving = using one serving of an alcohol or tobacco product 1 time (for the purposes of this question) Reminder: your answers will remain completely confidential.

Scale: Never (0) Once (1) 2-3 Times (2) Once a Week (3) 2-3 Times a Week (4) 1-3 Times a Day (5) More than 3 Times a Day (6)

1. Tobacco Use
2. Alcohol Use

Sleep Quality

How would you rate your overall sleep quality over the past month?

Scale:

Very Bad (1)
Bad (2)
Poor (3)
Neither Good nor Bad (4)
Fair (5)
Good (6)
Very Good (7)

Self-Control Scale

The following statements are meant to describe thoughts and behavior. Please rate the extent to which the following statements describe you.

Scale:

Strongly Disagree (1)
Disagree (2)
Neither Agree nor Disagree (3)
Agree (4)
Strongly Agree (5)

1. I am good at resisting temptation.
2. *I have a hard time breaking bad habits.*
3. *I am lazy.*
4. *I say inappropriate things.*
5. I never allow myself to lose control.
6. *I do certain things that are bad for me, if they are fun.*
7. People can count on me to keep on schedule.
8. *Getting up in the morning is hard for me.*
9. *I have trouble saying no.*
10. *I change my mind fairly often.*
11. *I blurt out whatever is on my mind*
12. *People would describe me as impulsive.*
13. I refuse things that are bad for me.
14. *I spend too much money.*
15. I keep everything neat.
16. *I am self-indulgent at times.*
17. *I wish I had more self-discipline*
18. I am reliable.

19. I get carried away by my feelings.
20. I do many things on the spur of the moment.
21. I don't keep secrets very well.
22. People would say that I have iron self- discipline.
23. I have worked or studied all night at the last minute.
24. I'm not easily discouraged.
25. I'd be better off if I stopped to think before acting.
26. I engage in healthy practices.
27. I eat healthy foods.
28. Pleasure and fun sometimes keep me from getting work done.
29. I have trouble concentrating.
30. I am able to work effectively toward long-term goals.
31. Sometimes I can't stop myself from doing something, even if I know it is wrong
32. I often act without thinking through all the alternatives.
33. I lose my temper too easily.
34. I often interrupt people.
35. I sometimes drink or use drugs to excess.
36. I am always on time.
*Note: Italicized items are to be reverse coded

Physical Symptoms Baseline
Over the past month, how often have you experienced each of the following symptoms?
Scale:
Not at all (1) Once or Twice (2) Once or Twice per week (3) Most days (4) Every day (5)

1. An upset stomach or nausea
2. A backache
3. Trouble sleeping
4. A Headache
5. Acid indigestion or heartburn
6. Eye strain
7. Diarrhea
8. Stomach cramps (Not menstrual)
9. Constipation
10. Ringing in the ears
11. Loss of appetite
12. Dizziness
13. Tiredness or fatigue

Physical Well-being Baseline
Overall, how would you rate your physical well-being over the past month?
Very Bad (1)
Bad (2)
Poor (3)
Neither Good nor Bad (4)
Fair (5)
Good (6)
Very Good (7)

Mood Baseline

Please indicate your mood, in general, over the past month.

Very Unhappy (1)
Unhappy (2)
Neither Happy nor Unhappy (3)
Happy (4)
Very Happy (5)

Mental Well-being Baseline

Overall, how would you rate your average mental well-being over the past month?

Very Bad (1)
Bad (2)
Poor (3)
Neither Good nor Bad (4)
Fair (5)
Good (6)
Very Good (7)

If you are experiencing severe mental or physical distress, please contact your healthcare provider as soon as possible. If you are experiencing a medical emergency, please call 911.

MyFitnessPal Introduction

In order to standardize responses across participants, you will be asked to use the application, MyFitnessPal, to track your diet and exercise. This is a free application that can be downloaded from your smartphone or accessed from the internet at myfitnesspal.com.

The application will ask personal information such as your age, weight, and weight goals in order to provide dietary recommendations to you. For the purposes of this study, you will only be asked to report dietary information and exercise that you engage in each day. While we will not record the recommended macronutrients, dietary calories, or calories expended through exercise, we are interested in the extent to which you are meeting the recommended amounts.

Your diet and exercise will remain strictly confidential. Your personal nutrition recommendations, BMI, weight, and other personal information within the application will not be collected for the purposes of this study.

Do you know how to use the MyFitnessPal application?

Yes, and I currently use it (1)
Yes, but I do not currently use it (3)
No (4)

Answer If Do you know how to use the MyFitnessPal application? No Is Selected

Q33 When you complete this survey, please go to myfitnesspal.com and watch the tutorial video. If you have further questions regarding the application, please contact the researcher at clenoble2012@my.fit.edu to receive a PowerPoint instruction guide created for this study.

Demographic Information

The following information is being collected to ensure that our results represent the general population. No personally identifiable information will be shared at any time, and all responses will remain strictly confidential.

Age

25 or under
26-40
41-55
56 or older

Sex

Male
Female
Other

Race

Black or African American
White/Caucasian
American Indian or Alaskan Native
Asian
Native Hawaiian or other Pacific Islander
Other
Choose not to respond

Hispanic

Do you identify as Hispanic or Latino?
Yes
No
Choose not to respond

Education

What is the highest level of education you have completed?
Grammar School to 8th grade
High school or equivalent
Vocational/technical school (2-year)
Some college
Bachelor's degree
Master's degree
Doctoral degree
Professional degree (MD, JD, etc.)
Other

Job Industry

In which job industry are you currently employed?

Job Role

Which of the following best described your role in the industry you selected?

Upper management	Student	Researcher
Middle management	Trained professional	Self-employed
Junior management	Skilled laborer	Intern
Administrative staff	Consultant	Other
Support staff	Temporary employee	

Tenure Questions

1. How many years have you worked in this industry?
2. How many years have you worked in your current position?

Work Schedule

1. How many hours per week do you USUALLY work at your job?
2. How many hours per day do you USUALLY work at your job?

Job Type

Which best describes your job?

Full-time	Temporary
Part-time	Intern
Seasonal	Other_____

Thank you for your time!

You will receive four surveys each day for the duration of this 15-day study. If you have any questions, please contact the researcher at clenoble2012@my.fit.edu.

Please open this link in a new tab to create your MyFitnessPal account: http://myfitnesspal.com

Appendix C
Morning Survey

This survey is to be completed in the morning when you arrive at work, before you start the workday. Please complete each of the following items to the best of your ability.

1. Please enter your email address

For which day of the study are you completing this survey?

1: Monday, February 8
2: Tuesday, February 9
3: Wednesday, February 10
4: Thursday, February 11
5: Friday, February 12
6: Monday, February 15
7: Tuesday, February 16
8: Wednesday, February 17
9: Thursday, February 18
10: Friday, February 19
11: Monday, February 22
12: Tuesday, February 23
13: Wednesday, February 24
14: Thursday, February 25
15: Friday, February 26

Sleep

How many hours did you sleep last night?

Please indicate the extent to which the following statements apply to how you slept last night.

Scale:

Strongly Disagree (1) Disagree (2) Neither Agree nor Disagree (3) Agree (4) Strongly Agree (5)

My sleep last night was restful

I woke up this morning feeling refreshed

Resource States

Currently, to what extent do you feel...

Scale:

Very Much (5) Mostly (4) Somewhat (3) Very Little (2) Not at All (1)

1. Physically energetic
2. Capably of handling physical demands
3. Mentally energetic
4. Capable of thinking and concentrating
5. Emotionally healthy
6. Capable of appropriately managing emotions

Energetic Resource Levels

Using the sliding scale below, please indicate how energized you currently feel physically, mentally, and emotionally. 0 would indicate feeling fully exhausted, while 100 would indicate that you are fully energized.

_____ Physical Energy (1)
_____ Mental Energy (2)
_____ Emotional Energy (3)

Mood

Please use the slider to select the face that best reflects how you feel right now.

Very Unhappy (1)
Unhappy (2)
Neither Happy nor Unhappy (3)
Happy (4)
Very Happy (5)

Mood Intensity

How strongly do you feel this way right now? (How intense are your feelings?)

Scale:

0
1
2
3
4
5
6
7
8
9
10

Physical Well-being

Right now, how do you feel physically?

Scale:

Very Bad (1)
Bad (2)
Poor (3)
Neither Good nor Bad (4)
Fair (5)
Good (6)
Very Good (7)

Mental Well-being

Right now, how do you feel psychologically?

Scale:

Very Bad (1)
Bad (2)
Poor (3)
Neither Good nor Bad (4)
Fair (5)
Good (6)
Very Good (7)

If you are experiencing severe mental or physical distress, please contact your healthcare provider as soon as possible. If you are experiencing a medical emergency, please call 911.

Physical Symptoms

Which of the following symptoms are you experiencing right now?

1. An upset stomach or nausea
2. A backache
3. Trouble sleeping
4. A Headache
5. Acid indigestion or heartburn
6. Eye strain
7. Diarrhea
8. Stomach cramps (Not menstrual)
9. Constipation
10. Ringing in the ears
11. Loss of appetite
12. Dizziness
13. Tiredness or fatigue

Thank you for your time!

Appendix D
Afternoon and End of Day Survey

Please complete each of the following items to the best of your ability.

Please enter your email address

For which day of the study are you completing this survey?

1: Monday, February 8
2: Tuesday, February 9
3: Wednesday, February 10
4: Thursday, February 11
5: Friday, February 12
6: Monday, February 15
7: Tuesday, February 16
8: Wednesday, February 17
9: Thursday, February 18
10: Friday, February 19
11: Monday, February 22
12: Tuesday, February 23
13: Wednesday, February 24
14: Thursday, February 25
15: Friday, February 26

Which option best describes when you are taking this survey?
In the afternoon after my lunch break
At the end of my workday
Other _____

Job Stressors

Which of the following best describes the experiences you had since the last survey? For each experience that you had, please rate how much it bothered you on a scale of 1 (did not bother me at all) to 4 (bothered me a very great deal)

Scale:

0 - Did not happen (0) 1 - Did not bother me at all (1) 2 - Bothered me only slightly (2) 3 - Bothered me quite a bit (3) 4 - Bothered me a very great deal (4)

1. Work overload
2. Uninteresting work task
3. Uncertainty about work role
4. Negative interaction with another person
5. Symptoms of a health condition
6. Received bad news

Recovery Behavior Checklist

Please select the following activities that apply to your experience at work since completing the last survey.

1. Ate a healthy snack
2. Ate a healthy lunch
3. Had caffeine
4. Engaged in physical activity
5. Took a nap
6. Used social media apps/websites
7. Browsed the web
8. Listened to music
9. Watched or read something interesting
10. Spent time relaxing
11. Ate an unhealthy snack
12. Ate an unhealthy lunch
13. Skipped lunch
14. Consumed alcohol
15. Consumed controlled substances
16. Gave up a break to do more work
17. Took a smoke break

Resource States

Currently, to what extent do you feel...

Scale: Very Much (5) Mostly (4) Somewhat (3) Very Little (2) Not at All (1)

1. Physically energetic
2. Capably of handling physical demands
3. Mentally energetic
4. Capable of thinking and concentrating
5. Emotionally healthy
6. Capable of appropriately managing emotions

Energetic Resource Levels

Using the sliding scale below, please indicate how energized you currently feel physically, mentally, and emotionally. 0 would indicate feeling fully exhausted, while 100 would indicate that you are fully energized.

Physical Energy Mental Energy Emotional Energy

Mood

Please use the slider to select the face that best reflects how you feel right now.

Very Unhappy (1)
Unhappy (2)
Neither Happy nor Unhappy (3)
Happy (4)
Very Happy (5)

Mood Intensity

How strongly do you feel this way right now? (How intense are your feelings?)

Scale:

0	4	8
1	5	9
2	6	10
3	7	

Thank you for your time!

Appendix E
Before Bed Survey

This survey is to be completed in the evening before bed. Please complete each of the following items to the best of your ability.

Please enter your email address

For which day of the study are you completing this survey?

1: Monday, February 8
2: Tuesday, February 9
3: Wednesday, February 10
4: Thursday, February 11
5: Friday, February 12
6: Monday, February 15
7: Tuesday, February 16
8: Wednesday, February 17
9: Thursday, February 18
10: Friday, February 19
11: Monday, February 22
12: Tuesday, February 23
13: Wednesday, February 24
14: Thursday, February 25
15: Friday, February 26

Work Today

Did you go in to work today?
Yes, for a full day
Yes, for a half day
No, but I teleworked from home
No

MyFitnessPal Diet Tracking

Did you complete your MyFitnessPal tracking today?
Yes
No
Thanks for the reminder; I will right now!

Macronutrients

Please review today's entry in your MyFitnessPal account to complete this item. For each of the options below, please indicate whether or not you attained the recommended amount listed in MyFitnessPal for today.

Met: No more than 15 grams over or under the recommendation
Exceeded: More than 15 grams over the recommendation
Less Than: More than 15 grams under the recommendation

Scale:
Met Recommendation (4)
Exceeded Recommendation (1)
Less Than Recommendation (2)

1. Protein
2. Carbohydrate
3. Fat

Calories
Please review today's entry in your MyFitnessPal account to complete this item. Please indicate whether or not you attained the recommended amount of calories listed in MyFitnessPal for today.

Met: No more than 100 calories over or under the recommendation
Exceeded: More than 100 calories over the recommendation
Less Than: More than 100 calories under the recommendation

Scale:
Met Recommendation (4)
Exceeded Recommendation (1)
Less Than Recommendation (2)

1. Total Calories

Sugar
Please review your entry in MyFitnessPal to complete this item. For your sugar intake, please indicate whether you consumed your recommended amount for today.
Met or Below
Exceeded

Fiber
Please review your entry in MyFitnessPal to complete this item. For your fiber intake, please indicate whether you consumed your recommended amount for today.
Met or Exceeded
Below

Subjective Diet Quality
Please indicate the extent to which you agree with the following statements.
Scale:
Strongly Disagree (1) Disagree (2) Neither Agree nor Disagree (3) Agree (4) Strongly Agree (5)

1. Overall, my diet today was healthy.
2. I made food choices that were in line with my health goals.

Social Activities
For approximately how long were you engaged in social activities outside of work today?
1. Hours
2. Minutes

Physical Activity
Did you engage in physical activity or exercise today?
Yes (1)
No (2)
If No Is Selected, Then Skip To Since you woke up this morning, pleas...

Please indicate the type of physical activity or exercise you engaged in today.

Exercise Intensity
How intense was your workout?
High Intensity
Average Intensity
Low Intensity
Leisurely

Caloric Expenditure - MyFitnessPal
Please review your entry in MyFitnessPal to complete this item.
Approximately how many calories did you expend today from physical activity or exercise, in total?

Tobacco and Alcohol Use
Since you woke up this morning, please indicate the frequency with which you engaged in the following behaviors.
1 serving of alcohol = 12 oz. beer, 4 oz. wine, or 1 oz. spirits
1 serving tobacco = 1/2 pack of cigarettes, 1 cigar, 1 pipe bowl, or 1 can of snuff

Using one serving = using one serving of an alcohol or tobacco product 1 time (for the purposes of this question)
Reminder: your answers will remain completely confidential.

Did not use at all (0) Used once (1) Used two or three times/servings (2)
Used four or five times/servings (3) Used more than six times/servings (4)

1. Tobacco Use
2. Alcohol Use

Resource States
Currently, to what extent do you feel...
Scale: Very Much (5) Mostly (5) Somewhat (3) Very Little (2) Not at All (1)

1. Physically energetic
2. Capably of handling physical demands
3. Mentally energetic
4. Capable of thinking and
5. Emotionally healthy
6. Capable of appropriately managing emotions

Energetic Resource Levels
Using the sliding scale below, please indicate how energized you currently feel physically, mentally, and emotionally. 0 would indicate feeling fully exhausted, while 100 would indicate that you are fully energized.
_____ Physical Energy (1)
_____ Mental Energy (2)
_____ Emotional Energy (3)

Recovery Experience Questionnaire
Please indicate the extent to which the following items accurately represent your experience after leaving the workplace today.
Scale: Strongly Disagree (1) Disagree (2) Neither Agree nor Disagree (3)
Agree (4) Strongly Agree (5)

1. I forgot about work.
2. I didn't think about work at all.
3. I distanced myself from my work.
4. I got a break from the demands of work.
5. I kicked back and relaxed.
6. I did relaxing things.
7. I used the time to relax.
8. I took time for leisure.

9. I learned new things.
10. I sought out intellectual challenges.
11. I did things that challenged me.
12. I did something to broaden my horizons.
13. I felt like I could decide for myself what to do.
14. I decided my own schedule.
15. I determined for myself how I spent my time.
16. I took care of things the way that I want them done.

Non-Work Recovery Interference Scale

Recovery activities include both health related behaviors and leisure activities that allow for you to mentally detach, relax, and overall do what you'd like to do with your non-work time.

Example health behaviors: healthy diet, physical activity (running, yoga, weightlifting), and quality sleep

Example leisure activities: viewing media (television, film, music), creating media (creative writing, visual art, playing instruments), engaging with media (playing video games, board games, web surfing), or other forms of play (outdoor exploration, activities with children or pets, events with friends or family)

Please indicate the extent to which the following statements accurately describe your experiences after the conclusion of the workday.

Scale: Strongly Disagree (1) Disagree (2) Neither Agree nor Disagree (3) Agree (4) Strongly Agree (5)

You were unable to spend time on recovery activities because your home obligations were demanding.

1. You had to cancel enjoyable activities due to family-related commitments.
2. Your home schedule made it difficult for you to engage in recovery activities.
3. Your home obligations left you with no time for your hobbies. □
4. You felt you had to be constantly ready to respond to family needs while away from home.
5. Your home obligations took up time that you would have liked to spend recovering from work.

Mood

Please use the slider to select the face that best reflects how you feel right now.

Very Unhappy (1)
Unhappy (2)
Neither Happy nor Unhappy (3)
Happy (4)
Very Happy (5)

Mood Intensity

How strongly do you feel this way right now? (How intense are your feelings?)

Scale:

0	4	8
1	5	9
2	6	10
3	7	

Physical Well-being

Right now, how do you feel physically?

Scale:

Very Bad (1)	Neither Good nor Bad	Good (6)
Bad (2)	(4)	Very Good (7)
Poor (3)	Fair (5)	

Mental Well-being

Right now, how do you feel psychologically?

Scale:

Very Bad (1)	Neither Good nor Bad	Good (6)
Bad (2)	(4)	Very Good (7)
Poor (3)	Fair (5)	

If you are experiencing severe mental or physical distress, please contact your healthcare provider as soon as possible. If you are experiencing a medical emergency, please call 911.

Physical Symptoms

Which of the following symptoms are you experiencing right now?

1. An upset stomach or nausea
2. A backache
3. Trouble sleeping
4. A Headache
5. Acid indigestion or heartburn
6. Eye strain
7. Diarrhea
8. Stomach cramps (Not menstrual)
9. Constipation
10. Ringing in the ears
11. Loss of appetite
12. Dizziness
13. Tiredness or fatigue

Thank you for your time!