Can We Recover at Work? Exploring On-the-Job Recovery

by

Danielle M. Durepos

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Approved:	Lori Francis, PhD Supervisor
Approved:	Kevin Kelloway, PhD Committee Member
Approved:	Debra Gilin Oore, PhD Committee Member
Approved:	Gail Hepburn, PhD Committee Member
Approved:	Janet Mantler, PhD External Examiner

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Abstract

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Research has extensively documented the negative consequences associated with the experience of stress. An expanding body of psychological research has focused on the concept of recovery, and suggests that individuals can help mitigate the impact of stress during the workday by engaging in recovery activities during leisure time. To date, research has almost exclusively focused on the benefits of recovery during off-work time. As such, the potential to pursue recovery while on-the-job has yet to be thoroughly investigated. The present study served three purposes. Study 1 consisted of the development of a measure of on-the-job recovery. Similar to research on off-job recovery, there is evidence for a four-factor model of on-the-job recovery consisting of mastery, control, relaxation and distraction activities. The goal of Study 2 was the validation of the newly developed On-the-Job Recovery scale (OTJR), and an analysis of the predictive ability of OTJR above and beyond a measure of off-job recovery. Results provided evidence that on-the-job recovery can be conceptualized as a distinct recovery experience, and offers unique prediction of important organizational and individual characteristics. Study 3 examined the daily relationships between on-the-job recovery activities and measures of need for recovery and situational well-being through the administration of a daily diary survey. Although multilevel analyses assessing the impact of time indicate that the time-varying effects of the OTJR subscales are small, there was evidence that OTJR does play an important role in situational well-being and the need for recovery dependent upon the workday. Taken together, the results suggest that on-the-job recovery represents an important expansion of the recovery literature and may represent a cost-effective strategy that can be implemented by organizations to support employee health and well-being.

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Introduction

Purpose

Regardless of the occupation, the process of working, particularly in the presence of stressors, can cause strain reactions (Fuller et al., 2003; Zohar, Tzischinski, & Epstein, 2003). However, research suggests that individuals can respond to a stressful workday with specific recovery efforts during their leisure time that help alleviate the negative impact of stress experienced at work (Sonnentag, Binnewies, & Mojzo, 2008; Repetti, 1989). Recovery is conceptualized as the ability of an individual to return to their normal or pre-stressor levels of functioning after experiencing stressors (Meijman & Mulder, 1998; Craig & Copper, 1992). Recovery following exposure to stressors can help mitigate or avoid the effects of strain (Sonnentag, Binnewies, & Mojza, 2008; Fritz & Sonnentag, 2005; de Croon, Sluiter, Blonk, Broersen, & Frings-Dresen, 2004). The importance of recovery in the preservation of health is theoretically based (e.g., the effort-recovery model (Meijman & Mulder, 1998) and the conservation of resources theory (Hobfoll, 1998)) and empirically supported. For example, successful recovery restores impaired mood and decreases physiological strain indicators (Sonnentag & Fritz, 2007), improves employee well-being off-hours (Strauss-Blasche, Ekmekcioglu, & Marktl, 2000; Westman & Eden, 1997), and prevents the accumulation of fatigue (Zijlstra & Sonnentag, 2006).

While the concept of recovery represents an expanding body of psychological research, the idea of on-the-job recovery has yet to be thoroughly investigated. The burgeoning literature on recovery has, almost exclusively, assumed that recovery has to occur outside of the work environment. For example, previous research has focused on

the concept of recovery from the following perspectives: evenings spent in a hotel due to work (Sonnentag & Natter, 2004), psychological detachment from work during off-job time (Sonnentag & Kruel, 2006; Sonnentag & Bayer, 2005), effects of weekend activities (Fritz & Sonnentag, 2005), and the role of vacation experiences (Fritz & Sonnentag, 2006).

In contrast, the purpose of this dissertation was to examine the possibility that one can recover from stress within the work environment. To date, only one study has specifically examined on-the-job recovery activities. Trougakos and colleagues (2008) examined the relationship between workday break activities, emotional experiences and positive affective displays. They found that employees who engage in more respite activities during their work breaks experienced higher levels of positive emotions and lower levels of negative emotions during those breaks, and higher levels of positive affective displays after the breaks (Trougakos, Beal, Green, & Weiss, 2008). The results from this study appear to be the first to suggest that employees who have the opportunity to engage in respite activities during on-the-job work breaks will have the capacity to replenish necessary resources. Given that research has shown that the beneficial effects of weekend and vacation experiences are subject to fade out effects (de Bloom et al., 2010; Fritz, Sonnentag, Spector, & McInroe, 2010; de Bloom et al., 2009; Westman & Eden, 1997), and that recovery outside of work is insufficient (van Hooff, Geurts, Kompier, & Taris, 2007; Zijlstra & Sonnentag, 2006), there is a need to capitalize on recovery opportunities during the course of the actual workday (Ivarsson & Larsson, 2012.

Early Research

The importance of breaks or respites from work is not a new concept. Prior to the industrial revolution, a common working day ranged from 10 to 16 hours, six days a week. By 1810, a 10 hour workday was demanded, and by 1817 the notion of an eight-hour day using the slogan: *Eight hours' labour, Eight hours' recreation, Eight hours' rest* was introduced. Even though a reduction in working hours was seen as vitally important to workers' health (Marx, 1867), employees would have to wait until the early and mid-twentieth century before legislative action would ensure it was widely accepted within the industrialized world. Granted, it could be argued that while increased structure resulted in the advent of shorter working days, employees were then faced with work days characterized by a higher intensity. Although there are still countries where the notion of rest is not universally accepted, within North America and Europe, labour laws offer numerous protections for workers.

Contributing to the increased focus on the worker, the theory of scientific management was introduced in the 1880s and focused on the analysis of workflows. Even though the main objectives were to improve economic efficiency and employee productivity within manufacturing industries, Taylor also advocated for the importance of frequent rest breaks for employees (Taylor, 1911). Stemming from this work, Henry Ford implemented a 40-hour week at Ford Motor Company in 1926 (Crowther, 1926). Research undertaken in the early 1940s examined the impact of altering working conditions by providing rest periods, shorter working days, shorter working weeks, and the provision of food during the morning break. The results provided evidence that the

output for employees increased, and employees indicated they felt less fatigued (Mayo, 1945). This finding was further supported by early research that showed work-rest schedules influenced the productivity and output of individuals (McFarland, 1971; Barnes, 1968).

Despite the fact that the early focus of workplace research was on productivity improvements, the outcomes of these studies suggested that performance declines can be improved through the adjustment of the job itself and through the implementation of work-rest policies (Bechtold, Janaro, & Sumners, 1984). The first work-rest model was developed by Eilon (1964), and focused on identifying both the optimal length and placement of rest breaks. Additional research conducted during the same time period provided evidence that regardless of the task under investigation, individuals who experience fatigue will have performance decrements (Murrell, 1965). These studies can be viewed as representing early models of recovery.

On-the-job recovery may represent a viable way for organizations to reduce the impact of stressors experienced at work. Technological advancements have dramatically changed where we live and work. Employees are no longer always required to commute long distances to the workplace, but instead are able to telecommute, meet online and work in virtual teams (Burke & Ng, 2006). Employees are also able to be connected to the workplace continuously, and the advent of new technologies and flexible work arrangements has arguably come at the cost of work-life balance. For example, research has shown that work pressure experienced during the day results in an increase of work-family conflict and exhaustion at bedtime (Sanz-Vergel, Demerouti, Moreno-Jiménez, &

Mayo, 2010). In addition to the changing work environment, current demographic changes have resulted in a markedly diverse workforce, with an increased number of women entering the workforce, including those from dual-career families and single parent homes.

An implicit assumption of the existing off-job recovery literature is that home life represents a less structured avenue through which recovery can occur. However, a growing number of employees are tasked with work-life arrangements that make it difficult for recovery activities to occur during off-work hours (e.g., child care, elder care, household demands, additional work-related tasks) (Taris et al., 2006) and as a result need for recovery increases (Demerouti, Taris, & Bakker, 2007). Therefore, on-the-job hours may represent an additional avenue through which employees can recover and replenish their resources. Opportunities may exist during official work hours to complete or participate in activities that have beneficial effects. More specifically, employees may have the opportunity during their short breaks and lunch periods to engage in activities that offer a brief respite from the demands of their jobs, allowing for resources to be replenished and recovery to occur. As research has shown that rest breaks during the workday are effective at reducing fatigue and maintaining performance (e.g., Kuhnel, Sonnentag, & Westman, 2009; Trougakos et al., 2008; Tucker, 2003), it is important that we further elucidate the characteristics of work breaks that will support the recovery process.

The present research study served three purposes. The first was the development of an on-the-job recovery scale that examined specific on-the-job recovery activities.

The second was the validation of the newly developed on-the-job recovery scale with a sample of working individuals. Lastly, a longitudinal, survey based, diary study administered over five continuous days during a one week period investigated the daily relationships between on-the-job recovery experiences, situational well-being and need for recovery. The investigation of on-the-job recovery activities expands the existing literature and determines if the opportunity to engage in recovery activities during the workday can represent an additional strategy by which internal resources are gained and protected by the individual. Gaining knowledge regarding how on-the-job recovery is related to organizational outcomes and employee health and well-being is relevant from both a theory and practice perspective.

Work Stress

No concept in the modern psychological, sociological, or psychiatric literature is more extensively studied than stress (Hobfoll, 1998). Stress is a damaging, costly and pervasive health problem and can be defined as the process by which environmental events called stressors provoke an aversive reaction within the individual (Cropanzano, Goldman, & Benson, 2005). Researchers have acknowledged the severity of the problems that can occur as a result of experiencing stress (Barling, Kelloway, & Frone, 2005). Stress can affect the individual through manifestations of depression, increased alcohol use and heart disease (Quick, Quick, Nelson, & Hurrell, 1997), the employing organization through increased sick time and decreased job performance (Jex & Crossley, 2005), and society by increasing health care costs (Kahn & Byosiere, 1992). As stress has become such a widespread problem, it is important to thoroughly study and

understand what precipitates the onset of stress. By understanding how stress occurs it may become possible to prevent its onset or at least ameliorate its effects.

Studies of stress have delineated three main concepts: stressors, stress, and strain (Pratt & Barling, 1988). Stressors are external, objective events that occur outside the individual. Pratt and Barling (1988) suggest that individuals experience stressors along several dimensions including frequency of occurrence, predictability, duration and intensity. Further, they believe stressors can be further classified into four main categories; acute, chronic, daily and catastrophic. *Acute* stressors have a specific time onset, a short duration, are of low frequency, and are of high intensity. *Chronic* stressors lack a specific time onset, might be short or long in duration and high or low intensity, and may occur frequently. Examples of chronic stressors pertinent to organizational psychology include role conflict and ambiguity, and job insecurity. *Daily* stressors have a specific onset and occur infrequently, are short in duration and are low in intensity. Examples of daily stressors are getting caught in traffic, and being called into a meeting last minute. Lastly, *catastrophic* stressors occur rarely but tend to be extremely high in intensity, have a specific onset and can be of short or long duration.

Sonnentag and Frese (2003) have grouped organizational stressors into eight main categories: physical stressors, task-related job stressors, role stressors, social stressors, work schedule-related stressors, career-related stressors, traumatic events, and stressful change processes. Regardless of the classification system used, if stressors, or load reactions, accumulate they can result in the onset of chronic health problems like prolonged levels of fatigue and problems sleeping (Geurts & Sonnentag, 2006). However,

distinguishing between different types of stressors is important as the experience of each can result in different outcomes and can necessitate different coping strategies (Payne, Jick, & Burke, 1982).

The onset of stress occurs when the individual experiences an internal response to persistent stressors and this internal response causes a condition of arousal that results in physical, cognitive, and emotional displeasure for the individual (Kristensen, 1996). When encountering a stressful experience, the human body experiences a physiological response by releasing neurotransmitters such as adrenaline and hormones like cortisol. Essentially, the body responds to the stressful experience by redistributing energy, and these chemicals prepare the body to engage in the fight or flight response. This process is viewed as essential for survival (McEwen, 1998; Selye, 1956; Cannon, 1929). However, in those instances where fight or flight are inadequate methods for coping with stress, the same bodily responses that are designed to protect the individual can lead to health problems and the onset of strain (Lundberg, 2006). More specifically, continued activation of the fight or flight response results in an accumulation of the allostatic load (McEwen, 1998). Strain then occurs as a result of the prolonged experience of stress with evidence of its effects being manifested in physical, psychological, organizational, and behavioural outcomes (Pratt & Barling, 1988).

Extensive research illustrates the debilitating effects that occur as a result of experiencing the stressor, stress, strain progression. Psychological strain responses include depression and anxiety (Tepper 2001; Zohar, 1995; Billings & Moos, 1982). Physical strain includes cardiovascular and gastrointestinal problems (Quick, Quick,

Nelson, & Hurrell, 1997; Kristensen, 1996). Behavioural strain may manifest in negative actions such as increased alcohol use (Frone, 1999). Lastly, an expanding body of evidence shows that stress can lead to problems affecting organizations such as increased work absenteeism, decreased productivity (Manning & Osland, 1989), a higher occurrence of workplace accidents (Cartwright & Cooper, 1997), and is one of the top ten leading causes of work-related death (Sauter et al., 1990). Perhaps one of the greatest incentives for organizations to prevent or reduce stress and strain is that work stress is very costly. Estimates suggest that stress and its related outcomes cost US companies $300 billion annually (American Institute of Stress, 2002) with Canadian figures estimated at $12 billion annually (Duxbury, Higgins, & Johnson, 1999). As stress is such a pervasive problem, it becomes imperative to provide effective solutions that will offset its effects.

Lazarus and Folkman (1984) proposed a transactional model of stress that emphasizes the importance of cognitive appraisals as the key to understanding the stress process. They suggest that the experience of daily stressors will not have the same effect on each individual, that is, individual differences play an important role in how stressors are interpreted. Their transactional model states that when events which could be construed as stressors are encountered the individual makes a primary appraisal. The primary appraisal determines whether the event is relevant and has the potential to cause stress; or more specifically the degree to which events were judged to be threatening or challenging. Once a primary appraisal has been made the individual must make a secondary appraisal which will determine whether the individual has the coping resources available to respond and handle the stressor successfully. If the individual determines

that resources are not available to handle the stressor, stress is experienced. The importance of the transactional model is that the incurrence of a stressor does not imply that stress is inevitable, rather, that a cognitive appraisal of available resources is conducted.

Given the expansive body of research documenting the deliberating effects associated with experiencing stress, it is important that the activation of the stress response is down-regulated at the end of the work day to allow the body to repair prior to the next working day (Winwood & Lushington, 2006). The inability of the body to down-regulate can result in the negative health outcomes mentioned above (Goldstein & McEwen, 2002). Recovery, both on and off the job, can be viewed as a mechanism through which down-regulation can occur.

Recovery

Dealing with job demands and completing work tasks requires individuals to invest both physical and mental resources (Meijman & Mulder, 1998). At the end of a defined work period, be it a work day or a work week, an individual's resources may be depleted, resulting in a greater need for recovery to return resources to their baseline levels. As mentioned previously, recovery is conceptualized as the period after a stressor is removed during which an individual has the opportunity to return to their normal or pre-stressor levels of functioning after experiencing the potentially negative consequences associated with job demands (Meijman & Mulder, 1998; Craig & Copper, 1992). Recovery can be viewed in direct opposition of the strain process, as the psychophysiological unwinding that occurs is opposite to the activation of

psychophysiological systems that are activated during stressful conditions (Sonnentag & Geurts, 2009). As such, the negative effects of experiencing stressful situations should be alleviated. If recovery does not occur or is incomplete, psychophysiological systems will remain activated even after the demands on the individual have ceased (Sonnentag & Fritz, 2007). Stress-related physiological reactions are normally adaptive and short-lived, and do not necessarily pose any risk for the individual. However, should the physiological responses occur repeatedly, or over a prolonged period of time, without the opportunity to return to baseline levels, they can become harmful as they will disturb the homeostatic equilibrium of the individual (Sonnentag & Geurts, 2009). Given that the stress response is viewed as a highly individualized process (Lazarus & Folkman, 1984) it stands to reason that recovery can be viewed in this light as well. Further, if recovery is not successful, the health and performance of the individual will be negatively affected and they will likely begin the next working day in a suboptimal state (de Jonge, Spoor, Sonnentag, Dormann, & van den Tooren, 2012).

Accordingly, the concept of recovery attempts to incorporate both the removal of the stressor as well as the process by which pre-stressor levels of functioning are obtained. Recovery is also linked to activation states. Positive activation is viewed as a state of high positive affect and arousal and is characterized by feeling active, strong, and happy. Conversely, negative activation is a state of high negative affect and arousal and is reflected by feelings of distress and anger. Successful recovery will allow the individual to reduce or eliminate the strain reactions associated with negative activation states (Sonnentag, Binnewies, & Mojza, 2008).

The recovery process is supported theoretically by both the Effort-Recovery Model and the Conservation of Resources Theory, which are viewed as two complementary processes through which recovery occurs. The Effort-Recovery Model (ERM) (Meijman & Mulder, 1998) posits that effort expenditure at work leads to load reactions such as fatigue or physiological activation. Under normal circumstances, once the individual is no longer exposed to the work demands, load reactions will be reversed and recovery will occur. Therefore, if an individual is not confronted with job demands during the evening or weekends, which are viewed as reset periods, successful recovery should occur. However, engaging in activities that draw upon the same resources already used on the job (i.e., those activities that result in load reactions) may impede the recovery process.

The Conservation of Resources Theory (COR) (Hobfoll, 1998) is viewed as further explaining the recovery process and assumes that people strive to obtain, retain, and protect those resources that they value. Resources are defined as "those objects, personal characteristics, conditions, or energies that are valued by the individual or that serve as a means for attainment of these objects, personal characteristics, conditions, or energies" (Hobfoll, 1989, p. 516). Resources can be external, such as finances, or internal, like individual protective factors. Individuals will therefore work to obtain resources they do not have, and seek to protect resources when they are threatened, by placing themselves in a position whereby resources can be optimized.

Two major principles follow from the basic tenet of the COR theory. Identified as the first principle, and potentially the most important, is the notion that resource loss is

disproportionately more salient than is resource gain. More simply, this principle rests on the assumption that when an equal amount of loss and gain is present, losses will have a more profound impact on the individual. Resource gain is intertwined with loss, in the sense that although loss has a greater impact it can be prevented, offset, or forestalled by resource gain. Resource gain develops a greater importance after resource loss has occurred due to the fact that it draws attention to the severe consequences that may ensue if loss continues or more pervasive loss occurs. The second principle of the COR theory postulates that people must invest resources in order to protect against resource loss, recover from losses, and gain resources. More simply, people rely on the resources they possess or that are available to them to help limit resource loss and to gain additional resources. As resource loss increases the likelihood that the individual will experience a stressful response, individuals will strive to protect and build their resource reserve (Hobfoll, 1998). Replenishing and conserving resources is also viewed as integral to maintain or increase performance both during the day and from day to day (Beal, Weiss, Barros, & MacDermid, 2005).

Major life stressors and minor hassles are likely to exert a significant impact on the acquisition and protection of valued resources. Therefore it is important to remove work demands and to refrain from pursuing activities that utilize the same resources as those required by work demands. Secondly, it is also important to pursue new resources so that depleted and threatened resources may be restored (Sonnentag & Fritz, 2007).

Recovery Domains

Recovery is aided when individuals make use of their off-work time to engage in leisure activities. Sonnentag (2001) made the distinction between activities that are classified as having a high-duty profile versus those that do not. More specifically, activities with a high-duty profile consist of job or task-related activities such as job demands or completing household and child-care activities. Activities without a high duty profile require minimal effort to complete and include low-effort activities (e.g., watching TV, reading a magazine), social activities (e.g., meeting with family members or friends), and physical activities (e.g., exercise and participation in sports) (Sonnentag, 2001). According to the Effort-Recovery Model (Meijman & Mulder, 1998), engaging in activities that draw on the same resources that are already called upon during the work-day will prevent recovery from occurring. However, activities that require little effort or that impose very little demand on the individual will aid in the recovery process. Therefore, low-effort, social, and physical activities are viewed as being more conducive to the recovery process. For example, research has shown that engaging in physical activities and being outdoors during off-job time are viewed as the most effective strategies when recovering from work stress (Korpela & Kinnunen, 2011). Such use of leisure time allows people to experience *psychological detachment* from their work (Sonnentag & Fritz, 2007; Sonnentag & Bayer, 2005), engage cognitively in the pursuit of new skills or *mastery experiences* (Fritz & Sonnentag, 2006; Ruderman, Ohlott, Panzer, & King, 2002), and bolster social networks though *community experiences* – all of which contribute to successful recovery (Sonnentag & Fritz, 2007).

However, given that individuals may be different with respect to the specific activities they view as representing recovery, it is important that research examines recovery beyond specific activities and examines the underlying experiences that may provide pertinent information into the psychological processes leading to recovery (Sonnentag & Fritz, 2007). Expanding upon earlier work, research conducted by Sonnentag and Fritz (2007) designed to assess how individuals unwind and recuperate from work, determined that four distinct recovery experiences can be differentiated: relaxation, mastery, control, and psychological detachment. *Relaxation* is viewed as a state characterized by decreased activation and a sense of feeling calm (Smith, 2005) and increased positive affect (Feldt et al., 2013). Relaxation aids in the further decrease of resource depletion as it is associated with a decrease in physical and psychological activation (Smith, 2005). Relaxation may be the result of deliberately chosen strategies aimed at relaxing the body and mind, like meditation, or relaxation may be achieved less deliberately by performing activities such as listening to music or going for a walk (Siltaloppi, Kinnunen, & Feldt, 2009). Experiences that are relaxing in nature are viewed as useful for recovery as no further demands are made on the functional systems called upon during the work day. Relaxation experiences have the ability to reduce health problems, emotional exhaustion, need for recovery, and sleep problems (Sonnentag & Fritz, 2007).

Mastery reflects those activities and experiences that are challenging for the individual and provide an opportunity for learning new skills (Sonnentag & Fritz, 2007; Fritz & Sonnentag, 2006). Although mastery experiences require some level of resource

investment, they are thought to aid in the recovery process as they provide the opportunity for the individual to gain new resources as they experience challenging and novel tasks. The important component of mastery experiences is that they should be challenging without overtaxing the individual. For example, research has shown a positive relationship between time spent volunteering during off-work time and mastery experiences. More specifically, volunteer activities aided in the development of new resources, as they provided the opportunity to learn, master new challenges and develop positive relationships (Mojza, Lorenz, Sonnentag, & Binnewies, 2010). Mastery experiences are negatively related to emotional exhaustion, depressive symptoms, and need for recovery (Sonnentag & Fritz, 2007).

Control can be described as the ability to choose between two or more options. In relation to recovery, control represents the ability to decide which activities to pursue during leisure time (Sonnentag & Fritz, 2007) as well as determining the manner in which the activity will be pursued (Feldt et al., 2013). Control experiences aid in the recovery process by satisfying an individual's innate desire for control and by increasing feelings of competence, and are negatively related to health complaints, emotional exhaustion, depressive symptoms, need for recovery, and sleep problems (Sonnentag & Fritz, 2007).

The fourth recovery experiences category defined by Sonnentag and Fritz (2007) has received the greatest amount of research attention to date. *Psychological detachment* is the ability to disengage mentally from work during off-job time (Sonnentag & Fritz, 2007) and is associated with positive mood and reduced fatigue at bedtime (Sonnentag &

Bayer, 2005). When confronted with high workload, individuals are less successful at disengaging psychologically from work. As a result, need for recovery will increase, however individuals may be less equipped to successfully engage in effective recovery practices (Sonnentag & Bayer, 2005).

Research has shown that there is a negative relationship between workload and psychological detachment. Employees with high job involvement and low recovery-related self-efficacy were less likely to psychologically detach from work once the work day was completed. Further, engagement at work and the ability to disengage from work during off work hours jointly predicted employees' affective states when assessed at the end of the work week (Sonnentag, Mojza, Binnewies, & Scholl, 2008). In a longitudinal study, lack of psychological detachment from work during off-job time predicted emotional exhaustion one year later. Psychological detachment also moderated the relationship between job demands and an increase in psychosomatic complaints as well as a decrease in work engagement. These findings suggest that the inability to detach from work during off-job time results in additional resource depletion and contributes to the onset of burnout. It also suggests that the impact of job demands is less harmful when employees are able to mentally disengage during off-job time (Sonnentag, Binnewies, & Mojza, 2010). When considering specific recovery activities, Mojza, Sonnentag, and Bornemann (2011) found that the amount of time spent on volunteer activities in the evening was positively related to psychological detachment and in turn, psychological detachment was positively related to active listening at work during the following day.

In a review of the psychological detachment literature that has been conducted thus far, four insights have been gained (Sonnentag, 2012). First, employees who successfully detach from work during their off-work hours report greater well-being than those employees who cannot detach from their work. Second, the positive effects of psychological detachment from work are apparent on a day-to-day basis, with employees indicating more positive affective states on days with greater psychological detachment. Third, psychological detachment plays an important role in job-related situations that are highly stressful, as it helps mitigate the onset of psychological strain symptoms. Lastly, psychological detachment is related to many aspects of job performance, including task performance and proactive work behaviour.

When considering the four distinct recovery experiences proposed by Sonnentag and Fritz (2007; psychological detachment, relaxation, mastery, and control), the benefits of psychological detachment and relaxation are supported by the Effort-Recovery model (Meijman & Mulder, 1998), while mastery and control are supported by the Conservation of Resources Theory (Hobfoll, 1998). Psychological detachment and relaxation are beneficial as they exert no further work-related demands on the individual, whereas mastery and control related experiences provide the potential to gain new resources or replenish lost ones.

It is important to acknowledge that the experience of physical or psychological stressors can have very different effects on the individual, and as such the recovery activity required to address specific types of stressors may be different. For example, if an employee experiences physical strain, they will likely benefit from recovery activities

that allow for relaxation or rest. However, Winwood & Lushington (2006) indicate that recovery from psychological strain is relatively more complex and has a higher likelihood of transferring into off-work time. Further, they provided evidence that the experience of psychological strain was more likely to affect sleep, to limit recovery, and increase the likelihood of experiencing negative health and well-being (Winwood & Lushington, 2006).

A vast array of studies has examined the behaviour of specific recovery activity categories. In a study conducted by Sonnentag and Fritz (2007), all four recovery processes (psychological detachment, relaxation, mastery and control) were negatively related to emotional exhaustion and need for recovery. Poor psychological detachment from work also predicted job exhaustion one year later (Sonnentag, Binnewies, & Mojza, 2010), whereas employees with high levels of all recovery experiences reported less burnout related to their job and fewer sleep problems during one year (Siltaloppi, Kinnunen, Feldt, & Tolvanen, 2011). Psychological detachment is also negatively related to fatigue at work, while mastery experiences are positively related to engagement at work (Kinnunen, Feldt, Siltaloppi, & Sonnentag, 2011). Psychological detachment, relaxation, mastery, and control in off-job times are prerequisites for psychological recovery to occur, if recovery does not occur then need for recovery, job exhaustion, and reduced work engagement will ensue (Siltaloppi, Kinnunen, & Feldt, 2009). Feeling recovered during leisure time predicted an increase in task performance after six months, and employees felt more capable of successfully completing their work-related tasks (Binnewies, Sonnentag, & Mojza, 2009b).

High job demands, classified by time pressures, decision-making and long working hours, are linked to poor psychological detachment from work, which in turn is related to fatigue. However, job control, social support from colleagues, and positive justice perceptions of the supervisor, are linked to mastery experiences, and positive work engagement (Kinnunen, Feldt, Siltaloppi, & Sonnentag, 2011). Sonnentag, Unger and Nagel (2013) provided evidence that psychological detachment from work was positively related to employee well-being. Further, those employees who were able to successfully detach from work reported fewer conflicts at work. Psychological detachment also buffered the negative effects of relationship conflicts on employee well-being.

In a longitudinal study, high job demands predicted poor detachment, relaxation and control during off-job time, while high job resources predicted high mastery experiences in off-job time. Job demands had the greatest impact on recovery experiences in the long term; however this was not reflected in self-reported well-being after one year. Job resources only had a positive effect on mastery experiences when measured after one year (Kinnunen & Feldt, 2013). Recovery experiences have also been examined in relation to effort-reward imbalance and job over-commitment (Feldt et al., 2013). Those employees characterized as high in effort-reward imbalance and high over-commitment report poor recovery experiences during their off-job time. More specifically, they report lower levels of detachment, relaxation, and control. Those in the high-risk pattern also report less control, indicating that they were unable to choose which activities to pursue during off-job time. Employees with low effort-reward

imbalance and low over-commitment reported the most successful recovery experiences including increased psychological detachment, relaxation and control.

Recovery Activities versus Recovery Experiences

More recent conceptualizations of the recovery process have sought to separate specific recovery activities from the underlying recovery experiences themselves. Sonnentag and Fritz (2007) posit that it is likely not a specific activity per se that helps an individual to recover from the experience of stress, rather it is the psychological attributes attached to these activities that is relevant to the recovery process. In fact, Blasche and Marktl (2011) have suggested that previous attempts to assess the impact of specific recovery activities such as physical, low effort, or social activities have led to inconclusive results (i.e., Winwood et al., 2007; Rook & Zijlstra, 2006; Sonnentag, 2001) as specific activities are likely only helpful to a subset of individuals. They further suggest that individuals will differ in the extent to which they utilize available recovery opportunities or seek to create new recovery opportunities, and these differences affect well-being. By focusing more specifically on recovery experiences and the underlying recovery process, researchers are able to not only identify specific activities that are important for recovery, but are also able to account for individual differences (Fritz, Ellis, Demsky, Lin, & Guros, 2013). For example, an activity that one individual may find relaxing may be stress-inducing for others, as such it is important to account for these differences.

The term recovery experiences is used to characterize attributes associated with off-job activities that contribute to recovery. Although the concept of recovery consists

of both recovery activities (Sonnentag, 2001) and the more subjective underlying recovery experiences (Sonnentag & Fritz, 2007), the emphasis on the recovery experience itself allows for a more direct focus on the effect of breaks (Demerouti, Bakker, Sonnentag, & Fullagar, 2012). In a related vein Sonnentag and Geurts (2009) have suggested that there are various facets of recovery that can be assessed. *Recovery settings* assess the temporal and situational settings in which recovery is thought to occur. A focus on the *recovery process* seeks to assess the mechanisms thought to underlie the recovery phenomenon, as well as the attributes associated with each of those activities. Recovery conceptualized as an *outcome* focuses on the results associated with a successful, or unsuccessful, recovery process.

Ragsdale and colleagues (2011) proposed that the activities one engages in should logically be associated with subjective experiences of recovery. Given that the selection and pursuit of activities designed to facilitate recovery is likely a highly individualized process, there may be little gains associated with establishing long lists of activities that may or may not be reflective of desired activities for all individuals. A study conducted by Siltaloppi and colleagues (2011) focused on the psychological outcomes of job burnout, work engagement, and sleep problems, and identified five patterns of recovery experiences. The majority (72%) of participants belonged to a pattern that consisted of reasonably high levels of all four recovery experiences during the one year study period. These employees appear to have more resources available that allow them to engage in a multitude of recovery experiences during off-job time. This in turn was related to positive outcomes such as not experiencing job burnout and sleep problems, and

psychological well-being. Results also suggest that specific experiences may be more important, as higher control and mastery experiences compared to detachment and relaxation during off-job time were required to promote higher levels of work engagement.

The second pattern consisted of individuals engaging in a greater number of control and mastery experiences, the greatest number of weekly working hours and the highest level of work engagement. The worst situation in terms of long-term recovery was the third pattern. These employees had high levels of relaxation and mastery and increased levels of control experiences over time. However, although they had high levels of relaxation, mastery, and control, these employees suffered from sleep problems, had the lowest levels of work engagement, and the highest burnout scores. This suggests that the type of experiences they engaged in where not sufficient enough for recovery to occur (Siltaloppi, Kinnunen, Feldt & Tolvanen, 2011).

The fourth pattern consisted of employees who were characterized by decreasing recovery experiences over time, resulting in increased levels of job exhaustion. Lastly, the final pattern of employees was characterized by low levels of all recovery experiences, however they showed average levels of psychological well-being compared to the other patterns. This group also experienced low levels of control during off-job time, however they engaged in a greater number of detachment experiences (Siltaloppi, Kinnunen, Feldt & Tolvanen, 2011). Taken together, these findings suggest that patterns of recovery experiences play an important role in maintaining long-term well-being.

Although there may be individual differences regarding the preference for certain recovery activities, the underlying physiological and psychological effects are likely uniform across individuals (Fritz, Sonnentag, Spector, & McInroe, 2010). The potential benefits of recovery during respites from work are achieved through the cessation of work demands and the opportunity to engage in activities and experiences that will aid in the replenishment and gain of resources (Drach-Zahavy & Marzuq, 2012). For example, Sonnentag and Niessen (2008) provided evidence that vigour at the end of the work day is predicted by both on and off job experiences. Previous research has focused on recovery experiences that can be separated based on the length of the recovery period under investigation; however they share the common goal of providing the individual with the opportunity to replenish their resources.

Time-Specific Research

A respite from work can be a day off, a weekend, a scheduled vacation, or some other form of absence from the workplace that allows the job demands of the role to be eliminated. The modern age saw the advent of the two-day weekend, implementation of legal or statutory holidays and paid vacation as institutionalized respites offered by employers (Westman & Eden, 1997). An underlying assumption of the regulations on work time is that time spent working can have negative consequences on individual well-being (Totterdell, Spelten, Smith, Barton, & Folkard, 1995).

It is important that we understand the contribution of how these recovery opportunities impact work-related health in order to advance our knowledge of the

recovery process (van Veldhoven & Sluiter, 2009). Recovery opportunities can be viewed as situational characteristics, both on and off the job, that allow employees to recuperate from the demands they experience while at work. Recovery opportunities can be viewed within two different contexts; external and internal opportunities. External opportunities are focused on activities that occur off the job, for example weekends and vacation time. Internal opportunities are related to job design, and focus on the ability of the employee to control when they take their rest breaks and to limit interruptions during task performance. Not surprisingly, the inability to engage in recovery opportunities is positively related to need for recovery (van Veldhoven & Sluiter (2009). Previous research has also shown that emotional job demands, psychological detachment, and physical detachment from work are important predictors of emotional exhaustion, suggesting that both emotional and physical detachment from work are important recovery experiences that prevent the onset of burnout. Additionally, high physical demands, lack of job resources, and inability to physically detach from work were all associated with physical health complaints. These findings suggest that employees need job resources and detachment from work to ensure health and successful performance (de jonge et al., 2012).

Resources can be restored during work breaks or respites by removing the demands placed on the individual. Individuals who are recovered will ultimately have more resources available to them and will not necessarily feel as though they have to withdraw from work demands in order to protect their resources. For example, psychological detachment during a short respite significantly predicted work engagement,

such that those individuals who experienced more psychological detachment showed higher work engagement (Kuhnel, Sonnentag, & Westman, 2009), providing further evidence that recovery experiences have positive effects on work outcomes. Additionally, increased opportunity for recovery increases social satisfaction on subsequent workdays (Totterdell, Spelten, Smith, Barton, & Folkard, 1995). Previous research evaluating the impact of recovery experiences have focused on the temporal opportunities associated with vacations, weekends and evening experiences. Each of these will be reviewed in turn.

Vacation Experiences

Vacations are those respites that reflect longer uninterrupted absences from work, and provide a greater opportunity for individuals to replenish their resources and recover from job demands (Fritz & Sonnentag, 2006). As job demands are normally removed during the vacation period, resource regeneration should occur (Meijman & Mulder, 1998). In support of this, Fritz and Sonnentag (2006) provided evidence that positive experiences during vacation were associated with improvements in well-being and performance related outcomes once the employee returned to work. More specifically, health complaints and self-reported exhaustion significantly decreased during vacation suggesting that resource replenishment occurred.

Similar findings were also found by de Bloom and colleagues (2010) as a vacation led to improvements of health and well-being, with workers reporting feeling more satisfied, more positive mood and less tension during the vacation period. Employees also indicated they felt more energized and healthier during the vacation in

comparison to the time period prior to the vacation. Unfortunately, the positive gains associated with health status, mood, tension, energy level, and satisfaction diminished within the first week of returning to work. Immediately after returning home and resuming work, health and well-being indicators returned to their pre-vacation baseline levels (de Bloom et al., 2010). However, their results provided evidence that vacation opportunities allow individuals the ability to psychologically and physiologically recover from work, even if the benefits are short lived.

Taking a vacation has also been shown to reduce perceived job stressors and perceptions of burnout. Although there was a decline in burnout levels during the vacation, the return to work resulted in a gradual return of pre-vacation levels as soon as 3 days post vacation, with pre-vacation levels returning completely after 3 weeks (Westman & Eden, 1997). A meta-analysis of studies assessing the impact of vacations on the recovery process provided additional evidence that while health and well-being does improve following a vacation, the positive effects generally disappear within 2 to 4 weeks post vacation (de Bloom et al., 2009).

As the beneficial effects of vacations fade out relatively quickly, it is apparent that individuals require additional opportunities for recovery (Rook & Zijlstra, 2006) and therefore it is important that additional recovery opportunities are investigated. Also, given that vacations represent a relatively infrequent opportunity to engage in recovery activities, it is imperative that more frequent opportunities are capitalized upon. One such opportunity is weekend experiences.

Weekend Experiences

Employees use their weekend as an opportunity to recover from the stress they experience during the work week (Fritz & Sonnentag, 2005). The weekend offers the opportunity to replenish and generate new resources as daily job demands are removed (Meijman & Mulder, 1998) and experiences that foster health and performance after the weekend are engaged in (Sonnentag, 2001). On the basis of the COR model, individuals who use the weekend to rebuild resources should have improved health, well-being, and performance when they return to work. Social experiences can be viewed as one method through which individuals can recover from work demands (Sonnentag, 2001). As mentioned previously, social activities consist of opportunities such as meeting people, and pursing activities in the presence of others. The weekend respite may give the individual the opportunity to connect with and draw support from one's social network resulting in the accumulation of new resources (Fritz & Sonnentag, 2005). In support of this, social activity during the weekend was negatively associated with disengagement, decreased burnout, and improved general well-being. Participating in social activities was also associated with task performance after the weekend. This suggests that spending time engaging with others during the weekend results in the regeneration of resources that have a positive influence when returning to work (Fritz & Sonnentag, 2005).

Binnewies, Sonnentag, and Mojza (2010) examined recovery experiences during the weekend as predictors of recovery after the weekend, and job performance. Psychological detachment, relaxation, and mastery experiences during the weekend were

positively related to feeling recovered at the start of the work week. In turn, feeling recovered was positively related to task performance, personal initiative, and organizational citizenship behaviour in the coming week. Employees also perceived their tasks as requiring less effort and strain in those weeks were they felt highly recovered. These results indicate that by mentally switching off from work, reducing a state of prolonged activation and pursuing challenging activities contribute to the accumulation of resources and therefore recovery. Further, when individuals feel recovered, they have more resources available that can be allocated to work tasks.

The timing of the respite, whether it occurs midweek or during the weekend, has also been shown to have an impact on exhaustion and vigour. Although emotional exhaustion significantly decreased and vigour significantly increased in both time periods, the decrease in emotional exhaustion and increase in vigour experienced after the weekend were noticeably higher than reported levels after a 2 day midweek respite (Drach-Zahavy & Marzuq, 2012). This suggests that resource attainment might be more challenging during weekdays in comparison to the weekend, indicating that recovery may be more challenging for shift workers. Results also indicate that the activities that individuals pursue during their respites is also relevant as relaxation activities during a respite had a beneficial effect on vigour, and control activities lowered emotional exhaustion and increased vigour levels. Specific respite activities can potentially compensate for inadequate recovery that may take place for those employees who are required to work weekends and take their respites during the week (Drach-Zahavy & Marzuq, 2012).

Weekend experiences also explain variance in both positive and negative affective states after the weekend, and to a lesser extent, during the ensuing work week. Engaging in mastery, detachment, or relaxing recovery activities during the weekend increases positive affect while subsequently decreasing negative affect. However, as stronger effects were found at the end of the weekend in comparison to at the end of the following work week, it appears as though the effects of weekend recovery activities are subject to fade out during the work week (Fritz, Sonnentag, Spector, & McInroe, 2010).

Although mentally disengaging from work and engaging in relaxation and mastery experiences can aid in the recovery process and can prevent exhaustion, negative mood and performance deficits (Fritz, Ellis, Demsky, Lin & Guros, 2013), employees who are unable to completely recover during the weekend are more susceptible to an increased risk of depressive symptoms, fatigue, energy loss, and cardiovascular disease. In fact, employees who indicated that they rarely feel recovered from work after the weekend had an elevated risk of cardiovascular death in industrial employees who had no history of cardiovascular illness or disease. This finding remained even after controlling for age, sex, and traditional cardiovascular risk factors. Thus incomplete recovery can be viewed as a risk factor associated with cardiovascular disease mortality (Kivimaki et al., 2006).

Although recovery processes during the weekend can be viewed as a frequently accessible and inexpensive solution to address the experience of work stress (Ragsdale et al., 2011) they too are subject to fade out effects. In a review of previous studies focused on recovery, Rook and Zijlstra (2006) indicate that the beneficial effects of recovery

appear to fade out by Sunday evening. Waiting for the weekend also requires the individual to complete a full work week before they have the opportunity to engage in recovery activities, which is likely not sufficient to prevent the onset of strain. As such, it has been suggested that individuals benefit from shorter rest periods that occur in the evenings of a normal work week (Sonnentag, 2003).

Evening Experiences

During work periods, employees are required to exert effort in order to meet demands which can result in the onset of strain. However, during rest periods the opportunity to recover from the strain associated with physiological and psychological systems can occur. This cycle of work and recovery implies that recovery levels during the course of the workday fluctuate, with high recovery levels available at the start of the workday and low recovery levels anticipated at the end of the workday (Sonnentag, Mojza, Demerouti, & Bakker, 2012). Relatedly, morning level recovery is a predictor of work engagement during the workday, and work engagement in turn predicts recovery levels at the end of the workday. Unwinding from work on a day-to-day basis is critical and is associated with employee well-being, increased vigour, positive mood, and less fatigue at bedtime. Opportunities to psychologically detach and engage in mastery experiences are also associated with positive mood the following morning (Fritz, Ellis, Demsky, Lin, & Guros, 2013). Evening recovery experiences and sleep quality also predict affect in the morning before going to work while low psychological detachment from work during the evening is related to fatigue and high negative activation in the morning (Sonnentag & Fritz, 2007).

Research has shown that the long-term adverse health effects associated with stress are preceded by short-term effects such as fatigue (Sluiter et al., 1999). Further, these short-term effects are experienced most frequently during or immediately following the completion of the work day and can manifest as feelings of overload, and need for recovery. The impact of these short-term effects only becomes problematic if the individual does not have the opportunity to engage in recovery activities, and research has repeatedly shown that if recovery is successful, well-being will improve, and resources that were previously drawn upon will be restored. As such, recovery can be viewed as an essential process required to reduce the experience of strain and improve job performance when returning to work the next day. As mentioned previously, if recovery is not successful, the individual will start the next working day in a sub-optimal state with detrimental impacts on health and performance (Sonnentag & Natter, 2004).

Research conducted by Binnewies, Sonnentag and Mojza (2009a) found that feeling recovered in the morning was positively related to daily job performance and was negatively related to daily effort at work. Job control was also positively related to job performance and feeling recovered in the morning. Feeling highly recovered in the morning was associated with an increased availability of resources to approach the next work day resulting in greater task and contextual performance. Employees also indicated that they required less effort to complete tasks during the day. Job control also appeared to play an important role, as it allowed employees to determine the level of performance that they are capable of producing, matching effort according to how recovered they felt at the start of each day (Binnewies, Sonnentag, & Mojza, 2009a).

Evening activities and experiences also predicted well-being at bedtime, even after controlling for well-being when returning home from work. More specifically, time spent on physical activities was associated with lower depression ratings and higher vigour at bedtime. Interestingly, time spent on physical activities was found to have a positive impact on well-being even when only small amounts of time were dedicated to the pursuit of physical activities. Not surprisingly, engaging in work-related activities was associated with lower levels of vigour and higher levels of fatigue at bedtime, indicating that engaging in these activities resulted in further resource depletion (Sonnentag & Natter, 2004). However, under certain circumstances the recovery process may be insufficient to counteract work-related load reactions resulting in adverse or chronic health problems (van Hooff, Geurts, Kompier, & Taris, 2007). Further, recovery opportunities that take place in the evening are likely inadequate in terms of the quality of activity or quantity of time available to dedicate to those activities. After the work day ends additional demands, such as household and family responsibilities, may be placed on the individual inhibiting the recovery process. This is compounded by technological advancements that allow employees to work wherever (and whenever) they want. The extension of the work day prohibits the recovery process and reduces the opportunities available to engage in recovery activities. As a result, mental health complaints such as burnout, depressive feelings, and stress-related complaints are the fastest growing reason for work absenteeism (Zijlstra & Sonnentag, 2006). Given the aforementioned complications, it is apparent that all available opportunities for engagement in recovery

activities and experiences should be examined. A relatively untapped area of research is the availability of recovery opportunities on the job.

Daily Experiences

The traditional work-rest cycle characterized by eight hours of work, eight hours of personal time, and eight hours of sleep is contingent upon the notion that the time between two work periods is sufficient enough for recovery to occur (Bakker, Demerouti, Oerlemans, & Sonnentag, 2012). At work employee behaviour can range from performance-related outcomes to lunch or rest breaks that are important for maintaining employee health and well-being. These breaks can vary in both length and structure; however the limited research that has been conducted suggests that lunch breaks by themselves do not universally increase employee well-being. It appears that the experiences that are engaged in during the break play a more important role as well. Employees who engage in higher levels of relaxation and mastery experiences report higher attentiveness and less fatigue. Additionally, employees who socialized felt more positive emotions after their breaks, and not surprisingly, employees who engaged in work activities during their breaks reported more negative emotions (Fritz, Ellis, Demsky, Lin, & Guros, 2013).

Longer working hours and the amount of time spent on work-related activities during off-work time results in a limited amount of time available for other activities. This also results in individuals having less ability to psychological disengage which can impact in performance related behaviours. However, the ability to distance oneself from work is associated with lower levels of emotional exhaustion (Fritz, Yankelevich,

Zarubin, & Barger, 2010). During the course of the workday employees are confronted with various demands ranging from physical and cognitive to emotional (Zijlstra & Sonnentag, 2006). Responding to these demands requires that the individual exert a certain level of physical and mental energy, which can result in the experience of fatigue. In response to the onset of fatigue, employees will be required to engage in rest periods in order to recuperate from the demands experienced at work.

Despite the limited number of studies designed to specifically assess the impact of activities that can be completed during the work day, previous recovery research indicates that daily work engagement does vary as a result of an individuals' day-specific state of recovery each month. This finding was present over and above daily characteristics of the job, including time pressure, job control, and psychological climate (Kuhnel, Sonnentag, & Bledow, 2012). The state of being recovered prior to going to work represents the accumulation of the previous recovery period. However, it also represents the baseline for that day's performance (Binnewies, Sonnentag, Mojza, 2009a). Research has also shown that work pressure was positively related to work-family conflict and exhaustion at bedtime, while recovery after breaks was positively related to work-family facilitation and vigour at bedtime. Stated differently, work pressure reported in the afternoon is associated with negative outcomes at night, whereas the ability to recover during breaks is associated with positive outcomes at night (Sanz-Vergel, Demerouti, Moreno-Jimenez, & Mayo, 2010). Pratt and Barling (1988) suggest that the timing of the consequences associated with stressors may be contingent on the type of stressor present. Further, daily stressors have immediate same-day effects on

mood, but do not affect mood the following day (Eckenrode, 1984). This suggests that daily recovery activities would help mitigate the impact of daily stressors and prevent the accumulation of stressors, inhibiting the onset of stress and strain.

Work breaks can include anything from having a cup of coffee, going out for lunch, checking email, or exercising (Demerouti, Bakker, Sonnentag, & Fullagar, 2012). However, relatively little is known about the potential benefits of short breaks that occur during the working day on the recovery process, or how regulatory resources fluctuate throughout the workday as they engage in work tasks (Trougakos, Beal, Green, & Weiss, 2008). One exception is the study conducted by Trougakos and colleagues (2008), which determined that employees who engaged in more respite activities during their work breaks experienced higher levels of positive emotions and lower levels of negative emotions after their breaks. When employees did not feel recovered after their breaks, they reported less work enjoyment and energy, however when they felt recovered they felt more vigorous and less exhausted at the end of the work day, provided they were able to psychologically detach from work during their off-work time. These results provide initial evidence that it is important that employees have the opportunity to preserve their resources by having sufficient recovery opportunities during their workday and that employers should encourage this important practice.

Given the paucity of research that has been conducted on the potential benefits of on-the-job recovery and previous research that clearly indicates that recovery is effective at mitigating the effects of stressors, the present study sought to expand the existing daily recovery literature. The first goal was the development of an on-the-job recovery scale

designed to examine specific on-the-job recovery activities as they relate to the previously conceptualized recovery domains (Sonnentag & Fritz, 2007). The newly developed scale was then validated on a sample of working employees. Lastly, a daily diary study was conducted over a period of 5 days to investigate the relationship between on-the-job recovery experiences, situational well-being, and need for recovery.

Study 1

Study 1 not only focused on recovery that takes place during scheduled breaks, but also explored the potential for on-the-job recovery activities that can take place during the entirety of the work day. Research has shown that individuals respond to stressful workdays by engaging in recovery activities during their leisure time designed to alleviate the impact of stress experienced at work (i.e., Sonnentag, Binnewies & Mojzo, 2008; Repetti, 1989). Previous research has also determined that breaks from work (i.e. vacations, evenings, and weekends) decrease physiological strain indicators (Sonnentag & Fritz, 2007), improve well-being (Strauss-Blasche, Ekmekcioglu & Marktl, 2000; Westman & Eden, 1997) and prevent fatigue (Zijlstra & Sonnentag, 2006). Further, engaging in recovery activities following the exposure to stress can help mitigate the onset of strain (Sonnentag, Binnewies, & Mojza, 2008; Fritz & Sonnentag, 2005; deCroon, et al., 2004).

Despite the expanding body of literature investigating the impact of recovery activities, the concept of on-the-job recovery, or the opportunity to engage in recovery-type activities during the work day, has yet to be thoroughly investigated. As on-the-job recovery is a relatively new concept, the primary goal of Study 1 was the development of

an on-the-job-recovery scale. Although recent conceptualizations of the recovery process now focus more heavily on the underlying recovery experiences themselves (Fritz et al., 2013; Sonnentag & Fritz, 2007), as opposed to specific recovery activities, a primary step in understanding on-the-job recovery is to determine if engaging in recovery activities will in fact have similar positive effects as recovery activities that take place after work. Further, although it has been suggested that there are individual differences in preference for types of specific activities, the underlying physiological and psychological effects of such activities are likely uniform across all individuals (Sonnentag et al., 2010). As such, I predicted that the factor structure of the newly developed on-the-job-recovery scale will reflect previous research and will replicate a four-factor model of recovery (i.e., psychological detachment, relaxation, mastery, and control) supported by the subscales of the REQ (Sonnentag & Fritz, 2007).

Hypothesis 1: the factor structure of the newly developed On-the-Job Recovery scale will reflect previous research and replicate a four-factor model of recovery.

The development of the On-the-Job Recovery scale began with a review of existing recovery questionnaires and items, consultations with subject matter experts conducting research on the concept of recovery, and an extensive review of the recovery literature. The Recovery Experiences Questionnaire (REQ) (Sonnentag & Fritz, 2007) was examined in detail to determine if the domains of the theoretically validated scale could be modified to reflect activities that could be performed during the work day. As many of the items on the REQ were adapted and maintained for the On-the-Job Recovery scale, I hypothesized that the newly developed On-the-Job Recovery scale would be

related to the REQ (Sonnentag & Fritz, 2007), as the same factors that contribute to off-job recovery should be relevant to on-job recovery as well.

However, although I anticipated that the On-the-Job Recovery scale would replicate a factor structure similar to that of the REQ, I hold that on-the-job recovery should explain unique variability in study outcomes and represent a distinct conceptualization from off-job recovery. That is, although on-the-job recovery should tap into similar underlying concepts as off-job recovery, the ability to engage in recovery activities while at work would be subject to different constraints and decision-making capabilities. It could also be argued that the workplace presents an additional environment through which recovery can be pursued. Previous research has shown that weekend and evening recovery experiences are subject to fade out effects (e.g., Rook & Zijlstra, 2006; Fritz, Sonnentag, Spector, & McInroe, 2010) suggesting that the work day can have a profound impact on the depletion of resources, and signifying that current opportunities may be insufficient for all individuals.

Hypothesis 2: the On-the-Job Recovery subscales will have low to moderate positive correlations with the corresponding Recovery Experiences Questionnaire subscales (Sonnentag & Fritz, 2007).

Given my hypothesis that the factor structure of the proposed On-the-Job Recovery scale should reflect that of existing recovery scales, I also anticipated that the concept of on-the-job recovery will be theoretically related to other relevant constructs as well. As stated previously, prior research has outlined the positive outcomes associated with engaging in recovery activities during leisure time. I hypothesized that engaging in

recovery activities while at work will have similar positive effects as engaging in recovery activities during leisure time. More specifically,

Hypothesis 3a: the On-the-Job Recovery scale will be positively related to a general measure of health (e.g., General Health Questionnaire (Banks et al., 1980)).

Hypothesis 3b: the On-the-Job Recovery scale will be positively related to overall job satisfaction.

The ability to perform recovery activities during the work day is likely influenced by the characteristics of the work environment. Factors like workload (e.g., having too much work to do), control over decision-making (e.g., having a say in how you complete your work), and job control (e.g., having control over your work schedule) will likely determine whether or not you have the opportunity to engage in recovery activities during the work day. For example, an employee that is faced with an overwhelming amount of work to accomplish in a given day may be unable or unwilling to take a break away from their desk or perform activities that would provide a respite from their job demands. However, an employee who has control over the structure of their workday will likely have a greater opportunity to pursue activities while at work that support the recovery process.

Hypothesis 4a: Participants' scores on the On-the-Job Recovery subscales will be negatively related to participants' workload scores.

Hypothesis 4b: Participants' scores on the On-the-Job Recovery subscales will be positively related to participants' control over decision-making scores.

Hypothesis 4c: Participants' scores on the On-the-Job Recovery subscales will be positively related to participants' job control scores.

Study 1 Method

Test Development & Item Design

The steps used in the test construction process were those outlined by Crocker and Algina (1986). An examination of the literature, including existing recovery measures, was undertaken to provide a list of existing recovery items that could be modified to assess on-the-job recovery. This resulted in an initial scale consisting of 28 items which are presented in Table 1. The initial scale was then presented to 13 subject matter experts (SMEs) for feedback. The SMEs consisted of graduate students in I/O Psychology and working professionals from a variety of occupations. The instructions presented to the SMEs indicated that they would find a list of activities that they may engage in while they are at work. Further, that the activities presented should reflect activities that they find relaxing or that would allow them to take a break from their work activities. They were instructed not to include those activities that would be considered part of their required work tasks.

As a first step, SMEs were asked to indicate whether or not they engaged in each recovery activity while on the job by placing a checkmark in each column that was applicable to them. Table 1 represents the initial 28 on-the-job recovery activities, as well as frequency counts that indicate how many times each activity was selected by the SMEs. A total of two activities were not selected by any of the SMEs (meditate, smoke breaks), however it was determined that the inclusion of these items was warranted given

that they likely represent activities that are performed by the broader working population. The selection of the other activities, with a range of 1-13 SMEs selecting each one, suggests potential activities that people may engage in while at work.

Table 1
Number of SMEs who indicated they performed each activity (N=13).

Item	# selected	Item	# selected
Talk socially	13	Decide my own schedule*	9
Make phone calls just to chat	4	Determine how I will spend time*	11
Physical activities	7	Take care of things the way I want*	11
Use internet for personal use	10	Smoke	0
Read a magazine or book	3	Take time to relax*	6
Make to do lists	11	Seek out intellectual challenges*	9
Watch TV/Internet	2	Do things that challenge me*	9
Meditate	0	Broaden my horizons*	9
Kick back and relax*	2	Get a break from demands*	9
Go out for lunch	8	Cup of coffee	8
Play games	2	Nap	1
Listen to music	8	Participate in team sport	2
Decide for myself what to do*	13	Use break time for leisure*	6
Do relaxing things*	4	Learn new things*	8

Note: The asterisk denotes items that were adapted from the Recovery Experiences Questionnaire (Sonnentag & Fritz, 2007).

Next, participants were provided with a list of existing recovery categories: work-related activities (e.g., make to-do lists), household and child-care activities (e.g., pay bills), low-effort activities (e.g., using the Internet for social purposes), social activities (e.g., spending time with friends), and physical activities (e.g., going for a run) based on categories suggested by Sonnentag, (2001) and asked to indicate which category they felt best reflected each activity presented. Additionally, participants were provided with definitions representing existing recovery constructs (psychological detachment: to disengage oneself mentally from work; relaxation: engaging in pleasurable activities;

mastery: engaging in experiences that are challenging and provide learning opportunities; and control: perceiving that one has the ability to choose between two or more options) (Sonnentag & Fritz, 2007) and asked to indicate which category they felt best reflected each activity. Overall, there was general agreement between all SMEs in regards to which activity category and recovery construct represented each item. However, some SMEs chose to select multiple categories suggesting that they felt activities could represent multiple domains. Lastly, participants were encouraged to provide any additional comments they had about the activities that were presented (e.g. wording problems, items that should be added or deleted, additional activities that should be considered). Please see Appendix A for the SME task.

Based on SME comments a number of changes were made. The item "use the Internet for personal use" was separated into two items "use the Internet for personal use (e.g. pay bills, online shopping)" and "use the Internet for social activities (e.g. Facebook)". The item "make to do lists" was separated into two items "make work-related to do lists" and "make household-related to do lists". SME's felt that the three items related to relaxing at work (take time to kick back and relax, take time while at work to do relaxing things, and take time while at work to relax) were redundant items, so they were collapsed into one item "take time while at work to relax, or do relaxing things". Lastly, three items were added "make plans to meet with friends/family after work/weekend", "use time to take care of household activities (e.g. make doctor's appointments, provide support to loved ones)", and "clean, organize your desk or work space". This resulted in an initial bank of 31 items reflecting on-the-job recovery

activities. The items selected are representative of a range of activities reflecting both traditional (e.g., reading a magazine or book) and modern (e.g., using the Internet) tasks that may be completed during the workday.

A review of the recovery literature also provided support for the inclusion of a number of items. For example, previous research has shown the positive effects associated with participation in social and physical activities (e.g., Korpela & Kinnunen, 2011; Sonnentag & Zijlstra, 2006; Fritz & Sonnentag, 2005; Sonnentag & Natter, 2004). Engaging in computer games during the workday has been associated with higher levels of recovery experience, and a higher level of work-related fatigue was associated with a higher tendency to play games (Reinecke, 2009). There has also been a shift within organizations to allow employees to use the Internet for personal use such as email, news and sports sites, and online shopping (Ivarsson & Larsson, 2012) and this is likely due to the blurring of boundaries between work and private life.

Procedure

Participants

Participants were a large sample (N = 600) of working Nova Scotians who had previously taken part in a longitudinal work stress research project and who agreed to participate in a follow-up study. Potential participants were contacted either by a letter in the mail or by email and invited to participate in the online survey. As an incentive to participate, participants were entered into a draw for one of two cash prizes of $100. The total sample size for the study was 146 participants (80 females, 60 males, 6 did not identify) with a response rate of 24%. The mean age was 50 (*SD* = 9.55). Participants

indicated they worked in a variety of occupations including public administration, construction, healthcare, educational services, and retail. Participants were asked to indicate if they held a management position, with 42 (28.8%) of participants reporting yes, and 94 (64.4%) of participants reporting that they did not.

Measures

Job Stressors: Job stressors were measured using a 34-item Job Stressor measure (Kelloway & Barling, 1994). The Job Stressor scale consists of the following subscales: workload (4 items; $\alpha = .92$), skill use (3 items; $\alpha = .74$), control over decision-making (3 items; $\alpha = .86$), job control (3 items; $\alpha = .85$), work schedule (4 items; $\alpha = .73$), role conflict (3 items; $\alpha = .82$), role ambiguity (4 items; $\alpha = .74$), routine (3 items; $\alpha = .78$), work-family conflict (4 items; $\alpha = .88$), and recognition (3 items; $\alpha = .85$). Responses were rated on a seven-point scale with anchors ranging from "Strongly Disagree" (1) to "Strongly Agree" (7), with higher scores reflecting higher values on each dimension (e.g. high work-family conflict, high job control).

General Health: General health was measured using a 12-item General Health Questionnaire (GHQ) (Banks et al., 1980). Responses were rated on a seven-point scale with anchors ranging from "Not at All" (1) to "All of the Time" (7), with higher scores reflecting better general health. An analysis of internal consistency produced a standardized item alpha of $\alpha = .89$.

Off-the-Job Recovery: Off-the-Job Recovery represents the traditional conceptualization of recovery (occurring after work, weekends, vacation) and was

measured using a 16-item Recovery Experiences Questionnaire (REQ) (Sonnentag & Fritz, 2007). The REQ consists of the following subscales: psychological detachment (4 items; $\alpha = .81$), relaxation (4 items; $\alpha = .85$), mastery (4 items; $\alpha = .85$), and control (4 items; $\alpha = .87$). Responses were rated on a seven-point scale with anchors ranging from "Strongly Disagree" (1) to "Strongly Agree" (7), with higher scores indicating greater recovery.

On-the-Job-Recovery: On-the-Job Recovery was measured using 31-items developed by the researcher. Participants were asked to rate the extent to which they engaged in each activity on a five-point scale with anchors ranging from "Never" (1) to "Extremely often or Always" (5), with higher scores indicating a greater participation in on-the-job recovery activities. Participants were also provided with a comment box where they could list any additional activities that they engaged in on the job to help them relax. A total of 39 participants provided additional comments, however a review of the comments suggested they were adequately captured by existing items.

Study 1 Results

Prior to testing the hypotheses, the data were examined for violations of the assumptions of normality, linerarity, homoskedasticity, and multicollinearity using SPSS version 22; no violations were detected.

Factor Analysis

Prior to conducting the factor analysis, a frequency analysis of each activity was undertaken. Those items that had greater than 50% of participants indicating that they "Never" engaged in the behaviour were removed. This threshold was implemented as the goal is develop a scale that reflects the most commonly utilized activities that aid in on-the-job recovery. The following six items, with the percentage of respondents who never performed these activities noted in parentheses, were deleted as a result: take a nap (91.7%), participate in a team sport (85.2%), take smoke breaks (86%), use the internet for social purposes (70.8%), watch something on TV/internet (57.7%) and play games (70.8%), resulting in a reduced 25-item scale.

As a first step, a principal components extraction was used to estimate the number of components, presence of outliers, and factorability of the correlation matrices. As the initial goal was to reduce the number of variables down to a smaller number of components, and to determine the number of factors, a principal components extraction was used (Tabachnick & Fidell, 2007). The inter-item correlations suggested reasonable factorability as all of the items correlated with at least one other item. The Kaiser-Meyer-Olkin measure of sampling adequacy was .80, above the recommended value of .6, and Bartlett's test of sphericity was significant (χ^2 (300) = 1039.31, $p < .001$). The communalities were all above .500 further confirming that each item shared common variance with the other items. Based on these findings it was deemed that the On-the-Job Recovery scale was suitable for factor analysis.

A principal components extraction using varimax[1] rotation was then conducted on the 25-item scale. Varimax rotation was selected as it is the most commonly used rotation method, and maximizes the variance of factor loadings by making high loadings higher and low loadings lower for each factor (Tabachnick & Fidell, 2007). A review of the factor loadings resulted in the removal of two items as they loaded as single item factors: "have a cup of coffee" and "clean or organize my desk", and the removal of 3 items as they were heavily cross-loaded: "make work related to-do lists", "go out for lunch with family or friends", and "listen to music".

A principal components extraction using varimax rotation was then conducted on the 20-item scale. A review of the factor loadings resulted in the removal of three additional items as they were heavily cross-loaded: "make household related to-do lists", "take time while at work to relax, or do relaxing things", and "learn new things not related to my job". The deletion of the latter two items was also deemed to be warranted given the possible ambiguity of the item wording.

A principal components extraction using varimax rotation was then conducted on the 17-item scale. A review of the factor loadings resulted in the removal of one additional item as it was heavily cross-loaded: "take time to talk with co-workers socially".

A principal components extraction using varimax rotation was then conducted on the 16-item scale. A review of the factor loadings resulted in the removal of one

[1] To determine if a different set of items would have been retained using a different reduction methodology, an Exploratory Factor Analysis (principal axis factoring) was conducted. The use of PAF with varimax rotation confirmed the existing item selection and factor structure. As an additional test, both extraction models (PCA & EFA) were tested using oblique rotation; the same patterns emerged regardless of rotation strategy used.

additional item as it was heavily cross-loaded: “use time to take care of my household activities”.

A principal components extraction using varimax rotation was then conducted on the remaining 15-items, resulting in the deletion of one additional item as it was not loading sufficiently on any of the factors: “make plans to meet with friends/family after work or on the weekend”.

A review of the 14-item scale indicated that the reduced number of items represented a stable factor structure suitable for the estimation of factor components using principal factors extraction. The use of principal factors extraction will maximize common variance without the contamination of unique and error variance (Tabachnick & Fidell, 2007). Given that an analysis of the principal components scree plot suggested the presence of either a four-factor or five-factor model, both a four-factor and five-factor model were conducted. As described in Hypothesis 1, I predicted that the On-the-Job Recovery Scale would replicate a four-factor structure.

The four-factor model explained 54.85% of variance, produced 12 communalities above .400, and a total of 10% of non-redundant residuals. The five-factor model explained 58.47% of the variance, produced 12 communalities above .400, and 5% non-redundant residuals. I chose to retain the four-factor model as the factor structure was more stable with a relatively equal distribution of items across each factor (one factor within the five-factor model consisted of only one item). Additionally, the four-factor model replicates more closely the factor structure of the existing off-the-job recovery scale, the REQ (Sonnentag & Fritz, 2007) and is thus supported by existing literature.

However, an examination of the factor loadings suggested that a four-factor model consisting of 3 items per factor may equally explain the data, and offer simplicity in future administration. As a result, two additional items were deleted; one item from Factor 1 "take care of things the way that I want them done while at work" (factor loading: .58, cross-loaded with factor 2 at .37 and factor 4 at .34) and "meditate/stretch" (factor loading: .40). Items were selected for deletion based on items that possessed cross-loadings or those that had the lowest factor loadings within each factor. The 12-item four-factor model explained 56.46% of the variance, produced 10 communalities above .400, and 7% non-redundant residuals.

Factor 1 "Mastery[2]" consists of three items: "seek out intellectual challenges", "do things that challenge me", "do something to broaden my horizons", standardized item alpha of $\alpha = .84$. Factor 2 "Control" consists of three items: "decide for myself what to do", "decide my own schedule", "determine for myself how I will spend my time while at work", standardized item alpha of $\alpha = .86$. Factor 3 "Distraction" consists of three items: "make phone calls just to chat", "use the internet for personal use", "read a magazine or book", standardized item alpha of $\alpha = .66$. Factor 4 "Relaxation" consists of three items: "get a break from the demands of work", "use break time for leisure", "take time to engage in physical activities during break", standardized item alpha of $\alpha = .58$. Factor loadings are presented in Table 2 and descriptive statistics for all study variables are presented in Table 4.

[2] I have chosen to use the factor labels utilized by (Sonnentag & Fritz, 2007) to maintain consistency across the recovery literature. However, the use of the detachment label did not fit the items under the factor 3 domain and it was deemed that the use of the "Distraction" label would be more representative.

Table 2

Factor loadings for On-the-Job Recovery Scale (using varimax rotation)

	Factor 1 "Mastery"	Factor 2 "Control"	Factor 3 "Distraction"	Factor 4 "Relaxation"
Seek out intellectual challenges	**.72**			
Do things that challenge me	**.80**			
Broaden my horizons	**.79**			
Make phone calls just to chat			**.67**	
Use the internet for personal use		.31	**.69**	
Read a magazine or book			**.56**	
Decide for myself what to do	.32	**.60**		
Decide my own schedule		**.86**		
Determine how I will spend time	.42	**.74**		
Get a break from demands	.33			**.54**
Use break time for leisure				**.70**
Physical activities				**.45**

Note. Factor loadings < .3 are suppressed

As a final test of the factor structure, a principal components extraction using promax rotation was conducted to determine which rotation method provided the best fit. The four-factor model with an oblique rotation explained 71.18% of variance, produced 12 communalities above .400, and a total of 43% non-redundant residuals. A comparison of the factor loadings to those reported for the four-factor, orthogonal model presented above indicated that all of the values increased with the exception of 3 items, and the number of cross-loadings decreased from four to two. Based on this information I chose to retain the model with oblique rotation. The use of oblique rotation is also warranted as the underlying processes are correlated. Factor loadings are presented in Table 3.

Table 3

Factor loadings for On-the-Job Recovery Scale (using promax rotation)

	Factor 1 "Mastery"	Factor 2 "Control"	Factor 3 "Distraction"	Factor 4 "Relaxation"
Seek out intellectual challenges	**.88**			
Do things that challenge me	**.76**			
Broaden my horizons	**.81**			
Make phone calls just to chat			**.72**	
Use the internet for personal use			**.66**	
Read a magazine or book			**.86**	
Decide for myself what to do		**.69**		
Decide my own schedule		**.92**		
Determine how I will spend time		**.74**		
Get a break from demands	.41			**.61**
Use break time for leisure				**.85**
Physical activities		.51		**.65**

Note. Factor loadings < .3 are suppressed

Note. The following factor inter-correlations were obtained: Mastery & Control: r (130) = .44, p < .001; Mastery & Distraction: r (130) = .17, p > .05; Mastery & Relaxation: r (130) = .27, p < .01; Control & Distraction; r (130) = .42, p < .001; Control & Relaxation: r (130) = .23, p < .01; Distraction & Relaxation: r (130) = .30, p < .01.

Additional Analyses

To determine if the survey correlated with theoretically related constructs, correlation coefficients were calculated with the GHQ (Banks et al.,), the subscales of the Job Stressors scale (Kelloway & Barling, 1994) and the subscales of OTJR scale. The correlation matrix is presented in Table 4.

Table 4

Correlations among Study 1 variables. Reliability coefficients for each of the measures are shown in parentheses along the diagonal[1].

	Variable	M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	OTJR: Mastery	2.80	.95	(.84)																	
2	OTJR: Control	3.12	1.23	.44[a]	(.86)																
3	OTJR: Distraction	2.09	.88	.12	.30[b]	(.66)															
4	OTJR: Relaxation	2.51	.88	.27[b]	.23[b]	.24[b]	(.58)														
5	REQ: Detachment	4.55	1.33	-.09	-.10	.17	.27[b]	(.81)													
6	REQ: Relaxation	5.34	1.04	.05	.07	.20[c]	.28[b]	.56[a]	(.85)												
7	REQ: Mastery	4.73	1.10	.21[c]	.01	.04	.21[c]	.39[a]	.44[a]	(.85)											
8	REQ: Control	5.56	1.05	.10	.19[c]	.09	.29[b]	.44[a]	.63[a]	.42[a]	(.87)										
9	Workload	4.49	1.55	.03	-.03	-.28[b]	-.35[c]	-.33[a]	-.32[a]	-.02	-.16	(.92)									
10	Schedule	3.58	1.62	.04	.07	-.12	-.18[c]	-.26[b]	-.19[c]	.03	-.15	.34[a]	(.73)								
11	Job Conflict	4.86	1.58	.14	.04	-.16	-.10	-.24[b]	-.22[c]	.03	-.13	.65[a]	.44[a]	(.82)							
12	Role Ambiguity	4.78	.87	.10	-.16	-.13	.19[c]	.02	-.03	-.01	-.02	.04	.05	-.01	(.74)						
13	Routine	3.81	1.60	-.51[a]	-.31[a]	.00	.01	.21[c]	.16	-.03	.05	-.10	-.14	-.05	.03	(.78)					
14	Skill Use	5.67	1.14	.46[a]	.28[b]	.05	.19[c]	.07	.09	.16	.17	.01	.08	.03	.25[b]	-.51[a]	(.74)				
15	Cont. Decision-Making	5.25	1.36	.29[b]	.40[a]	.11	.07	.09	.10	.03	.17	-.16	-.09	-.11	.12	-.17	.50[a]	(.86)			

Table 4
Cont'd.

	Variable	M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
16	Job Control	4.28	1.68	.24[b]	.66[a]	.15	.14	-.06	.01	-.06	.12	.01	-.03	.12	-.14	-.12	.32[a]	.59[a]	(.85)				
17	Work Fam. Con.	3.69	1.75	-.10	-.03	.03	-.36[a]	-.29[b]	-.24[b]	-.03	-.20[b]	.48[a]	.54[a]	.42[a]	-.12	-.03	-.06	-.12	-.06	(.88)			
18	Recognition	4.15	.90	-.19[c]	-.11	.03	-.12	-.07	-.15	-.03	-.09	.33[a]	.18[c]	.26[b]	-.06	.23[c]	-.22[c]	-.25[b]	-.03	.34[a]	(.85)		
19	Job Satisfaction	5.07	1.60	.20[c]	.10	-.03	.18[c]	.08	.11	.03	.14	-.26[b]	-.21[c]	-.25[b]	.17	-.20[c]	.51[a]	.49[a]	.26[b]	-.34[a]	-.48[a]	---	
20	GHQ	5.21	.96	.08	.16	-.06	.19[c]	.28[b]	.34[a]	.10	.26[b]	-.36[a]	-.33[a]	-.33[a]	.02	-.09	.29[b]	.30[a]	.23[b]	-.39[a]	-.35[a]	.52[a]	(.89)

[1]Note: N=128
[a]$p < .001$ [b]$p < .01$, [c]$p < .05$

As a test of Hypothesis 2, correlation coefficients were calculated between the REQ (Sonnetag & Fritz, 2007) and the OTJR scale. The following significant relationships were found: the OTJR Mastery subscale was positively related to the REQ Mastery subscale ($r(128) = .21$, $p < .05$); the OTJR Control subscale was positively related to the REQ Control subscale ($r(128) = .19$, $p < .05$); the OTJR Distraction subscale was positively related to the REQ Relaxation subscale ($r(128) = .20$, $p < .05$); and the OTJR Relaxation subscale was positively related to the REQ Detachment subscale ($r(128) = .27$, $p < .01$), the REQ Relaxation subscale ($r(128) = .28$, $p < .01$), the REQ Mastery subscale ($r(128) = .21$, $p < .05$) and the REQ Control subscale ($r(128) = .29$, $p < .01$).

Hypothesis 2 was supported; the subscales of the On-The-Job-Recovery scale were significantly correlated with the subscales of the Recovery Experiences Questionnaire (Sonnentag & Fritz, 2007). As expected, the correlations were low to moderate in range, providing evidence that the OTJR and REQ are related, but likely distinct constructs. When examining the specific relationships between the subscales, as anticipated the OTJR: Mastery scale was related to the REQ: Mastery scale; and the OTJR: Control scale was related to the REQ: Control scale. Interestingly, the OTJR: Distraction scale was only significantly related to the REQ: Relaxation scale, suggesting that low-effort activities such as making personal phone calls and using the internet for personal use are viewed as relaxing in nature. The OTJR: Relaxation scale was related to REQ: Detachment, Relaxation, Mastery, and Control subscales. A review of the individual scale items may provide an indication of why this subscale is related to

multiple subscales of the REQ. The items within this scale are "get a break from demands", "use break time for leisure", and "physical activities". It could be argued that a high degree of control would be required to complete these activities, but that completion of these activities would allow an individual to temporarily detach from their work environments.

As a test of Hypothesis 3a, correlation coefficients were calculated between the subscales of the OTJR and the GHQ (Banks et al., 1980). The hypothesis was partially supported, as the OTJR Relaxation subscale was positively correlated with the GHQ ($r(128) = .19$, $p < .05$). This result is surprising as I anticipated that feelings of control and mastery would be related to a measure of general health as well. However, it is possible that the benefits of engaging in on-the-job recovery activities cannot be captured by a measure like the GHQ that is designed to assess more severe or long-term psychological morbidity.

As a test of Hypothesis 3b, correlation coefficients were calculated between the subscales of the OTJR and a measure of job satisfaction. The hypothesis was partially supported, as both the OTJR Mastery subscale ($r(128) = .20$, $p < .05$), and the OTJR Relaxation subscale ($r(128) = .18$, $p < .05$) had low positive correlations with Job Satisfaction. Again, this finding was unexpected as it was also anticipated that engaging in activities that allow one to assert control over the work environment would be related to satisfaction with one's job.

As a test of Hypothesis 4a, correlation coefficients were calculated between the subscales of the OTJR and a measure of workload. The hypothesis was partially

supported as the following significant relationships were found: the OTJR Distraction subscale ($r(128) = -.28$, $p < .01$) and the OTJR Relaxation subscale ($r(128) = -.35$, $p < .001$) were negatively correlated with Workload. These findings suggested that engaging in recovery activities that were low-effort or relaxing in nature was associated with a decrease in perceptions of workload. This finding is not unexpected, as it is plausible to assume that if an individual feels as though they can complete all of their required work they will have a greater capacity to engage in low-effort and relaxing recovery activities.

As a test of Hypothesis 4b, correlation coefficients were calculated between the subscales of the OTJR and a measure of control over decision-making. The hypothesis received partial support as the OTJR Mastery subscale ($r(128) = .29$, $p < .01$), and the OTJR Control subscale ($r(128) = .40$, $p < .001$) were both positively related to control over decision-making. These findings indicate that having greater control over decision-making is related to a greater participation in mastery and control related recovery activities.

As a test of Hypothesis 4c, correlation coefficients were calculated between the subscales of the OTJR and a measure of job control. The hypothesis received partial support, as the OTJR Mastery subscale ($r(128) = .24$, $p < .01$) and the OTJR Control subscale ($r(128) = .66$, $p < .001$) were both positively related with job control. These findings mirror those obtained for the control over decision-making measure, and provide additional support that distraction and relaxation activities do not appear to be significantly related to characteristics of the work environment that provide employees greater control.

Although not tied to a specific hypothesis, a number of additional significant correlations were obtained between OTJR subscales and Job Stressor subscales. The OTJR Mastery subscale was significantly related to: Routine ($r(128) = -.51$, $p < .001$); Skill Use ($r(128) = .46$, $p < .001$); and Recognition ($r(128) = -.19$, $p < .05$). The OTJR Control subscale was significantly related to: Routine ($r(128) = -.31$, $p < .001$) and Skill use ($r(128) = .28$, $p < .01$). Lastly, the OTJR Relaxation subscale was significantly related to: Schedule ($r(128) = -.18$, $p < .05$); Role Ambiguity ($r(128) = .19$, $p < .05$); Skill Use ($r(128) = .19$, $p < .05$); and Work-Family Conflict ($r(128) = -.36$, $p < .001$). A number of observations can be made in relation to these findings. Having the ability to use your skills and learn new things (i.e., Skill Use subscale) is positively related to engaging in activities that are challenging (i.e., mastery), activities that allow individuals to decide how they will spend their time (i.e., control), and activities that allow individuals to take a break (i.e., relaxation). Inversely, feeling as though your work is repetitive was negatively related to mastery and control-related recovery activities. Engaging in activities that allowed individuals to get a break from their demands and engage in leisure or physical activities had a positive impact on perceptions of work-family conflict, knowing the expectations of one's job and work schedule. Taken together these findings provide evidence that on-the-job recovery is related to important characteristics of the work environment.

Study 1 Discussion

The primary focus of Study 1 was the development of an On-the-Job Recovery scale that would adequately capture the range of activities that employees engage in

during the work day that aid in the recovery process. Exploratory factor analyses provided support for four distinct recovery categories: relaxation, control, mastery and distraction. The factor structure is similar to previous scale development within the recovery literature (Sonnentag & Fritz, 2007), with three of four scales mapping onto existing recovery categories. The detachment subscale was not replicated within the OTJR scale, however upon additional reflection, items included on this factor do not seem to particularly reflect detachment. Considering this further, one could argue that it is likely difficult for employees to fully distance themselves and truly detach from their work during the course of the workday. The concept of on-the-job recovery represents a significant expansion of the recovery literature as it indicates that there are certain activities that employees can engage in during their work day that will support the recovery process. Further, evidence suggests that engaging in these activities is related to important job characteristics such as job satisfaction, job control, skill use, and control over decision-making.

There are a number of caveats that should be discussed in relation to the Study 1 design and results. The approach used in the item design process could be viewed as a potential limitation. A more qualitative approach that utilized focus groups may have provided a richer bank of potential items. However, given that off-the job recovery has been extensively studied, it was deemed appropriate to begin with a review of the existing literature to develop an initial item bank. The initial list of items was then presented to a group of subject matter experts that consisted of both graduate students who have been exposed to the concept of recovery and members of the working

population. The subject matter experts were also instructed to provide any additional items they felt captured their own unique recovery experiences, which resulted in the addition of three additional items. Therefore, although the use of a different item construction strategy may have resulted in different item suggestions, the initial bank of 31 items likely represent a range of activities that are reflective of the average worker.

There may also be concerns that individuals were inclined to socially desirable responding based on some of the items having a high percentage of individuals indicating that they never performed the activity (e.g., using the internet for social purposes, watching TV/Internet). However, if this was the case, it would stand to reason that a number of additional activities would suffer from this response pattern as well, for example playing games or reading. Instead, it could be argued that in some cases the work environment simply did not allow the opportunity for some activities to occur. For instance, some workplaces may monitor or limit access to the Internet.

Perhaps the biggest concern in regards to Study 1 is the low reliability of two of the subscales, with reliabilities for the Distraction and Relaxation subscales falling at .66 and .58 respectively. A review of the inter-item correlations indicates that all of the items within the Relaxation subscale, although significant, are within the .27 to .37 range indicating only weak relationships between the items. When considering the Distraction subscale, the inter-item correlations ranged from .34 to .51, again suggesting weak to moderate relationships between the items. Low inter-item correlations can cause low reliability estimates as the interrelatedness of the items may be called into question (Schmitt, 1996; Cortina, 1993) as alpha is a function of the number of items in a scale as

well as the item inter-correlations (Cortina, 1993). One might suggest that these inter-item correlations on the Distraction and Relaxation subscales may suggest that the items are not unidimensional, and alpha may be an underestimate of reliability unless there is unidimensionality (Schmitt, 1996).

Although the factor loadings for each of the items range from .61 to .86, and provide evidence for the viability of the Distraction and Relaxation subscales, it is possible that the items selected are not fully representative of each domain. In an attempt to improve the reliability of the subscales while maintaining the factor structure, I conducted supplementation analyses by reintroducing into the reliability analyses items that had been deleted when paring down the number of items in those factors. The reliability estimates could not be improved by the reintroduction of items without creating an unstable factor structure.

Cortina (1993) suggested that an adequate level of reliability should also be interpreted based on the purposes of the scales. The primary goal of the On-the-Job Recovery scale is to determine the *types* of activities that support the recovery process during the work day. A finer examination of the item wording suggests a possible reason for the low reliability estimates in comparison to the Mastery and Control subscales. Unlike the Mastery and Control subscales, the Distraction and Relaxation subscales are largely composed of specific recovery activities that may or may not be completed by all individuals. When reviewing the frequency distributions, those items that reflected specific activities had a greater proportion of individuals indicating that they never, rarely or only sometimes engaged in that activity in comparison to the Mastery and Control

subscale items, which may impact the ability to measure activity based scales reliably. However, it has been suggested that low reliability may not be an impediment to the use of a scale if it has other desirable properties such as meaningful content and domain coverage (Schmitt, 1996). The results presented above provide evidence that despite the low reliabilities, the Distraction and Relaxation subscales were both related to important organizational characteristics.

Study 2

Cross-Sectional Survey

Study 2 consisted of a cross-sectional survey administration designed to confirm the factor structure of the On-the-Job Recovery scale developed in Study 1 that consisted of a four-factor model with the following subscales: mastery, control, distraction and relaxation. An additional goal of Study 2 was to determine if general recovery activities at work (i.e., what you tend to do) is associated with need for recovery, job outcomes (e.g., work stressors, affective commitment), and well-being. Need for recovery, affective commitment, and well-being represent expansions of Study 1 as they were not included as Study 1 measures. Lastly, analyses will determine if the OTJR scale explains unique variance above and beyond the REQ.

Need for Recovery

As mentioned previously, research has shown that working in the presence of stressors will result in employees experiencing symptoms of strain (Fuller et al., 2003; Zohar, Tzischinski, & Epstein, 2003). However, prior research also suggests that

individuals can respond to a stressful workday with specific behaviours during their leisure time that can help alleviate the negative impact of stress that is experienced at work (Repetti, 1989). *Recovery* is an important concept in the context of job stress and strain (Sonnentag, Binnewies, & Mojzo, 2008), and recovery is viewed as playing a crucial role in the relationship between stressful work characteristics, health and well-being, and performance outcomes (Sonnentag & Geurts, 2009).

Need for recovery is defined as the desire of the individual to be temporarily relieved from stressors so that their resources can be replenished. Within the recovery literature need for recovery is viewed as one of the concepts that capture the basic elements of the recovery process (Siltaloppi, Kinnunen, Feldt, & Tolvanen, 2012; Korpela & Kinnunen, 2011). It is characterized by the sense of urgency individuals' feel when they have the desire to take a break from their demands, and represents the short-term effects experienced after completing a day's work. As such, need for recovery is generally observed during the last few hours of the work day or immediately following work (Coffeng et al., 2012). Need for recovery is also viewed as one of the early indicators of the long-term strain process (Jansen, Kant, & van den Brandt, 2002).

The availability of time and the opportunity to avoid demands are essential components of the need for recovery concept (Sonnentag & Zijlstra, 2006). Given optimal circumstances, individuals will reduce their need for recovery by having sufficient rest periods or by engaging in activities that allow recovery to occur. Ideally, these activities should not place additional demands on the individual, but should facilitate disengagement from work. Some level of need for recovery is found in nearly

all employees, and levels tend to be higher in men than in women (Jansen, Kant, & van den Brandt, 2002). Research has also suggested that employees with long-term illness or those with moderate or poor health status have substantially higher need for recovery.

When considering various work-related factors, employees who reported low decision latitude expressed a significantly higher need for recovery, while employees who reported medium levels of psychological job demands indicated they had less need for recovery (Jansen, Kant, & van den Brandt, 2002). Additionally, job demands, low job control and engaging in work-related activities during off-job time were related to an increased need for recovery and poor well-being. However, the ability to pursue social and physical activities reduces an individuals' need for recovery (Sonnentag & Zijlstra, 2006). Job resources play a role in need for recovery levels, as those employees who report having greater control at work, and the support of their supervisor have a low need for recovery (Siltaloppi, Kinnunen, Feldt, & Tolvanen, 2012). Those with a low need for recovery had more successful recovery experiences as they reported higher levels of psychological detachment, relaxation, and control during non-work time. Those employees with a higher need for recovery tended to report more time demands, spending more time doing work-related activities and less time engaging in social activities.

Kiss, De Meester and Braeckman (2008) have provided evidence that ageing workers have a higher need for recovery in comparison to younger workers, and a greater proportion of individuals in the older population tend to report a higher need for recovery. The finding that need for recovery was highest among older employees was further supported in a study that investigated need for recovery and its determinants

across three age categories. However, although higher scores were observed among older employees, those employees aged 55 or older actually exhibited a substantial decrease in their need for recovery scores. Men were also more likely to report a higher need for recovery, and overtime work was found to be a risk factor among men in the youngest age category. Job demands, low social support from co-workers and supervisors were considered risk factors for need for recovery in the youngest and middle age category groups, while depressed mood was found to be a risk factor in the youngest and oldest age categories (Gommans, Jansen, Stynen, de Grip, & Kant, 2015). Mohren, Jansen and Kant (2010) also observed decreasing levels of need for recovery in those employees over the age of 55. Their findings suggest that generally speaking, need for recovery increased with age until the age of 55, and then was followed by a decreased need for recovery.

Need for recovery is a strong predictor of negative well-being (Sluiter et al., 1999) and can be considered a risk factor for developing health problems (Coffeng et al., 2012), and as an intermediate variable between exposure to stressful working conditions and the onset of psychosomatic health problems (de Croon, Sluiter, Frings-Dresen, 2003). As such, addressing a high need for recovery was viewed as an integral component of intervention programs (Coffeng et al., 2012).

Recall that the analyses in Study 1 supported a 12-item, four-factor model of On-the-Job-Recovery, I expected to replicate this factor structure and further support existing literature that indicates the presence of a four-factor model of recovery (Sonnentag & Fritz, 2007) in Study 2.

Hypothesis 1: the four-factor oblique model of the On-the-Job Recovery scale from Study 1 that consisted of the following subscales: mastery, control, distraction and relaxation will be confirmed in Study 2.

Need for recovery is the desire to be temporarily relieved from stressors (Siltaloppi et al., 2012) and is viewed as an early indicator of long-term strain (Jansen, Kant, & van den Brandt, 2002). Need for recovery is impacted by a number of job characteristics (e.g., Sonnentag & Zijlstra, 2006; Siltaloppi et al., 2012) and is a predictor of negative well-being (Sluiter et al., 1999) and the onset of health problems (Coffeng et al., 2012; de Croon et al., 2003). However, the ability to engage in off-job recovery activities reduces the need for recovery (Sonnentag & Zijlstra, 2006), and for that reason I anticipated that participation in on-the-job recovery would reduce an individual's need for recovery as it represented another avenue by which recovery can occur.

Hypothesis 2: the On-the-Job Recovery scale will be a negative predictor of need for recovery, and will account for additional variance in need for recovery beyond that attributable to the Recovery Experiences Questionnaire (Sonnentag & Fritz, 2007).

Previous research has shown that successful off-job recovery restores impaired mood, decreases physiological strain indicators (Sonnentag & Fritz, 2007), and improves employee well-being (e.g., Sonnentag, Unger, & Nagel, 2013; Fritz & Sonnentag, 2006; Strauss-Blasche, Ekmekcioglu, & Marktl, 2000; Westman & Eden, 1997). As such I hypothesized that on-the-job recovery would be related to measures of well-being.

Hypothesis 3: the On-the-Job Recovery scale will be a positive predictor of measures of well-being including: situational well-being, job-related affective well-being, physical health, and general health. Further, the On-the-Job Recovery scale will account for additional variance in these well-being measures beyond that attributable to the Recovery Experiences Questionnaire (Sonnentag & Fritz, 2007).

Previous research has also shown that engaging in respite activities is associated with an increase in positive emotions and a decrease in negative emotions (Trougakos, Beal, Green, & Weiss, 2008; (Fritz, Sonnentag, Spector, & McInroe, 2010) and the elimination of negative activation states (Sonnentag, Binnewies, & Mojza, 2008; Sonnentag & Fritz, 2007). Therefore, I hypothesized that on-the-job recovery would impact activation states.

Hypothesis 4: the On-the-Job Recovery scale will significantly predict both positive and negative affect (Watson, Clark & Tellegen, 1988), and will account for additional variance beyond that attributable to the Recovery Experiences Questionnaire (Sonnentag & Fritz, 2007).

When considering characteristics of the work environment, research has shown that the recovery process is influenced by such factors as job demands, decision latitude, job control, and job performance (Jansen, Kant, & van den Brandt, 2002; Binnewies, Sonnentag & Mojza, 2009a). Accordingly, I anticipated that on-the-job recovery would also be impacted by similar job design factors.

Hypothesis 5: characteristics of the work environment will be related to an individuals' on-the-job recovery, and the On-the-Job Recovery scale will account for additional variance beyond that of the Recovery Experiences Questionnaire (Sonnentag & Fritz, 2007).

The magnitude of the correlations obtained in Study 1 provided evidence that although related, off-job and on-the-job recovery can be viewed as distinct recovery opportunities. From a theoretical perspective this distinction is supported by the Conservation of Resources Theory (Hobfoll, 1998), as the ability to engage in recovery activities throughout the course of the workday should represent an additional avenue through which the recovery process can occur and resources can be replenished. As off-job recovery, measured by the Recovery Experiences Questionnaire (Sonnentag & Fritz, 2007), has received empirical support within the literature, it is important that the present study determined if the On-the-Job Recovery scale offers unique prediction above and beyond the REQ. Additionally, the analysis determined if the OTJR accounted for substantial variance when not controlling for the REQ. As such, to further demonstrate that on-the-job recovery represents a distinct construct, redundancy analyses were performed to determine if the REQ explains unique variance above that of the OTJR scale (i.e., when controlling for the OTJR).

Hypothesis 6: the Recovery Experiences Questionnaire will capture unique variance in study measures above and beyond the On-the-Job Recovery scale.

Study 2 Method

Participants

The sample was generated using the Atlantic Province Workplace Study. A subset of participants (N = 545) agreed to be contacted for future research projects, as such all 545 participants were contacted and invited to participate. The total sample size for the study was 127 participants (83 females, 41 males, 3 participants did not provide their sex) with a response rate of 24%. The mean age was 46 (*SD* = 9.75). Participants were from a variety of occupations and 23 indicated that they currently held a management position. Given the low response rate obtained it was deemed necessary to recruit additional participants using a snowball sampling strategy. An additional 117 participants (79 females, 29 males, 9 participants did not provide their sex) were recruited, with a mean age of 35 (*SD* = 10.24). Again participants indicated they were from a variety of occupations and 27 indicated that they currently held a management position. Thus, the total sample size for Study 2 was 244 participants. As an incentive to participate, participants were entered into a draw for one of two cash prizes of $250.

Procedure

Participants were asked to complete a short cross-sectional survey that was posted online using the Saint Mary's University Qualtrics system. Participants were provided a link for the online survey in a recruitment email that was distributed to all participants.

Measures

On-the Job Recovery: On-the-job recovery was measured using the newly developed 12-item On-the-Job Recovery scale from Study 1. The OTJR scale consists of the following subscales: Mastery (3 items; $\alpha = .90$), Control (3 items; $\alpha = .82$), Distraction (3 items; $\alpha = .49$), and Relaxation (3 items; $\alpha = .60$). Responses were rated on a five-point scale with anchors ranging from "Never" (1) to "Extremely Often or Always" (5).

Off-the-Job Recovery: Off-the-job recovery was measured using the 16-item Recovery Experiences Questionnaire (REQ) (Sonnentag & Fritz, 2007). The REQ consists of the following subscales: Detachment (4 items; $\alpha = .88$), Relaxation (4 items; $\alpha = .93$), Mastery (4 items; $\alpha = .93$), and Control (4 items; $\alpha = .89$). Responses were rated on a seven-point scale with anchors ranging from "Strongly Disagree" (1) to "Strongly Agree" (7).

Need for recovery: Need for recovery was measured using two items developed by Sonnentag and Zijlstra (2006). Responses were rated on a seven-point scale with anchors ranging from "Strongly Disagree" (1) to "Strongly Agree" (7). The correlation coefficient between the two items is $r = .70$.

Well-being: Situational well-being (focusing on one's present state) is an indicator that recovery is occurring (Sonnentag, 2001) and was measured using a short situational well-being measure developed by Sonnentag (2001). *Situational well-being at the end of the work day* refers to an individual's situational well-being after leaving their workplace and returning home and was measured with three items. An additional item measuring

situational well-being during the commute was developed for the present study by the researcher "I am in a good mood during my commute home from work". Responses were rated on a seven-point scale with anchors ranging from "Strongly Disagree" (1) to "Strongly Agree" (7). An analysis of internal consistency produced a standardized item alpha of $\alpha = .92$.

Physical Health: Physical health was measured using the 14-item Physical Health Questionnaire (Schat, Kelloway, & Desmarais, 2005). Responses were rated on a seven-point scale with anchors ranging from "Not at All" (1) to "All of the Time" (7). An analysis of internal consistency produced a standardized item alpha of $\alpha = .87$.

General Health: General health was measured using the 12-item General Health Questionnaire (GHQ) (Banks et al., 1980). Responses were rated on a seven-point scale with anchors ranging from "Not at All" (1) to "All of the Time" (7). An analysis of internal consistency produced a standardized item alpha of $\alpha = .91$.

Work stressors: Work stressors were measured using the Job Stressors scale (Kelloway & Barling, 1994). The Job Stressors scale consists of the following subscales: Workload (4 items; $\alpha = .93$), Skill Use (3 items; $\alpha = .85$), Control Over Decision Making (3 items; $\alpha = .87$), Job Control (3 items; $\alpha = .85$), Work Schedule (4 items; $\alpha = .76$), Role Conflict (3 items; $\alpha = .81$), Role Ambiguity (4 items; $\alpha = .78$), Routine (3 items; $\alpha = .78$), Work Family Conflict (4 items; $\alpha = .84$), and Recognition (3 items; $\alpha = .86$). Responses were rated on a seven-point scale with anchors ranging from "Strongly Disagree" (1) to "Strongly Agree" (7).

Job satisfaction: Job satisfaction was measured using one item from the Job Stressors scale (Kelloway & Barling, 1994), "Overall I am satisfied with my job". Responses were rated on a seven-point scale with the anchor ranging from "Strongly Disagree" (1) to "Strongly Agree" (7). The use of a single item measure of workload has been previously supported (Gilbert & Kelloway, 2014).

Job-Related Affective Well-Being: Job-related affective well-being was measured using the 30-item JAWS (van Katwyk, Fox, Spector & Kelloway, 2000). Responses were rated on a five-point scale with anchors ranging from "Never" (1) to "All the Time" (5). The JAWS consists of the following subscales consisting of items that reflect both negative and positive emotions: High Pleasurable-High Arousal (5 items; $\alpha = .93$), High Pleasurable-Low Arousal (5 items; $\alpha = .90$), Low Pleasurable-High Arousal (5 items; $\alpha = .86$) and Low Pleasurable-Low Arousal (5 items; $\alpha = .80$).

Affective Commitment: Affective commitment was measured using the 8- item Affective Commitment subscale (Allen & Meyer, 1990). Responses were rated on a seven-point scale with anchors ranging from "Strongly Disagree" (1) to "Strongly Agree" (7). An analysis of internal consistency produced a standardized item alpha of $\alpha = .88$.

Positive and Negative Affect: state level affect was measured using the 20-item Positive and Negative Affect Schedule (PANAS) (Watson, Clark & Tellegen, 1988). The PANAS is divided into 10 positive affect items and 10 negative affect items. An analysis of internal consistency produced a standardized item alpha of $\alpha = .95$ for the positive items, and a standardized item alpha of $\alpha = .90$ for the negative items. Responses are rated

on a five-point scale with anchors ranging from “Very Slightly or Not at All” (1) to “Extremely” (5).

Study 2 Results

Prior to testing hypotheses, the data was examined for violations of the assumptions of normality, linerarity, heterogeneity of variance, and multicollinearity using SPSS version 22; no violations were detected. The correlation coefficients and descriptive statistics for all Study 2 variables are presented in Table 5.

Table 5

Correlations among Study 2 variables. Reliability coefficients for each of the measures are shown in parentheses along the diagonal[1].

	Variable	M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	OTJR: Mastery	3.43	.85	(.90)														
2	OTJR: Control	3.53	1.02	.44[a]	(.82)													
3	OTJR: Distraction	2.13	.70	.01	.24[a]	(.49)												
4	OTJR: Relax	2.75	1.61	.21[b]	.26[a]	.31[a]	(.60)											
5	REQ: Detach	2.96	1.08	-.09	-.09	.02	.22[b]	(.88)										
6	REQ: Relax	3.79	.95	.01	-.08	.09	.26[a]	.38[a]	(.93)									
7	REQ: Mastery	3.58	.94	.29[a]	.07	.09	.27[a]	.08	.44[a]	(.93)								
8	REQ: Control	4.11	.82	.10	.07	.00	.22[b]	.20[b]	.51[a]	.31[a]	(.89)							
9	Workload	4.07	1.57	.08	.06	-.15[c]	-.25[a]	-.31[a]	-.27[a]	-.16[b]	-.14[c]	(.93)						
10	Schedule	3.06	1.58	.01	-.09	-.10	-.16[c]	-.17[c]	-.10	.07	-.05	.34[a]	(.76)					
11	Role Conflict	4.54	1.62	.10	.09	-.00	-.11	-.16[c]	-.08	-.01	.00	.56[a]	.34[a]	(.81)				
12	Role Ambiguity	4.45	.81	.06	-.03	-.06	.13	.17[c]	.27[a]	.08	.14[c]	-.23[b]	-.09	-.16[c]	(.78)			
13	Routine	3.54	1.45	-.34[a]	-.23[a]	.03	-.09	.17[c]	.05	-.07	-.02	-.07	.03	-.04	-.04	(.78)		
14	Skill Use	5.52	1.19	.50[a]	.26[a]	-.13	.11	-.11	.03	.13[b]	.11	.03	.05	.04	.34[a]	-.51[a]	(.85)	
15	Cont. Decision	5.14	1.29	.32[b]	.48[a]	.03	.18[b]	.04	.01	.06	.08	-.04	-.17[c]	-.10	.34[a]	-.40[a]	.54[a]	(.87)
16	Job Control	4.79	1.50	.34[a]	.68[a]	.00	-.23[a]	-.02	-.01	.06	.08	-.08	-.23[b]	-.14[c]	.18[b]	-.25[a]	.30[a]	.67[a]
17	Work Fam. Con.	3.12	1.53	-.04	-.07	.07	-.11	-.26[a]	-.25[a]	-.04	-.28[a]	.34[a]	.59[a]	.35[a]	-.19[b]	-.00	-.04	-.21[b]
18	Recognition	4.00	.94	-.13[c]	-.00	.03	-.12	-.14[c]	-.09	-.12	-.07	.43[a]	.13[c]	.31[a]	-.35[a]	.20[b]	-.26[a]	-.30[a]
19	Job Satisfaction	5.09	1.61	.28[a]	.12	-.02	.18[b]	.15[c]	.11	.02	.00	-.30[a]	-.16[c]	-.31[a]	.45[a]	-23[b]	.47[a]	.38[a]
20	GHQ	4.95	1.00	.25[a]	.09	-.05	.24[a]	.34[a]	.31[a]	.27[a]	.26[a]	-.33[a]	-.19[b]	-.35[a]	.44[a]	-.26[a]	.41[a]	.38[a]
21	PosPanas	3.01	.90	.43[a]	.17[c]	.06	.24[a]	.08	.19[b]	.25[a]	.09	-.22[b]	-.00	-.23[b]	.37[a]	-.32[a]	.49[a]	.37[a]
22	NegPanas	1.75	.69	-.10	-.06	.09	-.18[b]	-.22[b]	-.19[b]	-.15[b]	-.11	.35[a]	.22[b]	.23[b]	-.42[a]	-.42[a]	-.27[a]	-.34[a]
23	Need for Recovery	4.29	1.55	-.09	-.03	-.11	-.37[a]	-.30[a]	-.29[a]	-.22[b]	-.23[a]	.57[a]	.28[a]	.46[a]	-.23[b]	-23[b]	-.10	-.19[b]
24	Sit. Well-being	4.56	1.33	.08	-.01	-.04	.28[a]	.33[a]	.29[a]	.17[b]	.16[c]	-.50[a]	-.29[a]	-.39[a]	.38[a]	-.13[c]	.26[a]	.28[a]
25	PHQ	2.78	.93	-.13	-.09	.00	-.15[c]	-.32[a]	-.22[b]	-.24[a]	-.11	.29[a]	.24[a]	.26[a]	-.23[a]	.24[a]	-.23[a]	-.24[a]
26	Affective Com.	4.23	1.31	.17[c]	.15[c]	.04	.15[c]	-.05	.03	.02	-.07	-.16[c]	-.04	-.09	.34[a]	-.17[c]	.44a	.38a
27	JAWS: HPHA	2.78	.86	.39[a]	.13	.08	.24[a]	.01	.12	.27[a]	.08	-.27[a]	-.05	-.24[a]	.38[a]	-.37[a]	.51[a]	.39[a]
28	JAWS: HPLA	3.15	.74	.21[b]	.11	.02	.33[a]	.23[b]	.27[a]	.22[b]	.17[c]	-.44[a]	-.21[b]	-.39[a]	.47[a]	-.23[a]	.37[a]	.40[a]
29	JAWS: LPHA	2.30	.77	-.11	-.08	.00	-.34[a]	-.30[a]	-.22[b]	-.14[c]	-.11	.46[a]	.33[a]	.36[a]	-.43[a]	.13	-.21[b]	-.28[a]
30	JAWS: LPLA	2.42	.76	-.24[a]	-.12	.05	-.27[a]	-.15[c]	-.18[b]	-.14[c]	-.14[c]	.35[a]	.20[b]	.34[a]	-.48[a]	.21[b]	-.41[a]	-.35[a]

Table 5
Cont'd.

	Variable	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
16	Job Control	(.85)														
17	Work Fam. Con.	-.21[b]	(.84)													
18	Recognition	-.24[a]	.31[a]	(.86)												
19	Job Satisfaction	.28[a]	-.24[a]	-.50[a]	--											
20	GHQ	.26[a]	-.36[a]	-.43[a]	.61[a]	(.91)										
21	PosPanas	.28[a]	-.15[c]	-.44[a]	.61[a]	.57[a]	(.95)									
22	NegPanas	-.21[b]	.35[a]	.40[a]	-.50[a]	-.65[a]	-.29[a]	(.90)								
23	Need for Recovery	-.21[b]	.43[a]	.41[a]	-.39[a]	-.48[a]	-.37[a]	.36[a]	(.82)							
24	Sit. Well-being	.19[b]	-.42[a]	-.48[a]	.57[a]	.63a	.54[a]	-.54[a]	-.59[a]	(.92)						
25	PHQ	-.19[b]	.27[a]	.34[a]	-.37[a]	-.61[a]	-.32[a]	.49[a]	.39[a]	-.43[a]	(.87)					
26	Affective Com.	.31a	-.06	-.45[a]	.60[a]	.34[a]	.55[a]	-.36[a]	-.24[a]	.35[a]	-.15[c]	(.88)				
27	JAWS: HPHA	.27[a]	-.13	-.50[a]	.65[a]	.59[a]	.82[a]	-.38[a]	-.37[a]	.54[a]	-.39[a]	.60[a]	(.93)			
28	JAWS: HPLA	.31[a]	-.37[a]	-.52[a]	.71[a]	.71[a]	.68[a]	-.59[a]	-.55[a]	.72[a]	-.44[a]	.57[a]	.75[a]	(.90)		
29	JAWS: LPHA	-.27[a]	.43[a]	.46[a]	-.55[a]	-.63[a]	-.45[a]	.70[a]	.51[a]	-.67[a]	.50[a]	-.40[a]	-.50[a]	-.70[a]	(.86)	
30	JAWS: LPLA	-.27[a]	.35[a]	.51[a]	-.65[a]	-.70[a]	-.59[a]	.63[a]	.48[a]	-.64[a]	.52[a]	-.53[a]	-.62[a]	-.74[a]	.82[a]	(.80)

[1]Note: N=221

[a]$p < .001$ [b]$p < .01$, [c]$p < .05$

MANOVA analysis

As a primary analysis, a multivariate analysis of variance was conducted to determine if there were significant differences between the participants who were recruited for the study using the previous study participation list versus those who were recruited using the snowball sampling strategy. More specifically, the analysis was used to determine if differences existed between participants from each sampling strategy based on age, sex, full vs part-time work status, years worked, as well as all measures included in Study 2.

The multivariate test indicated that there was a statistically significant difference in Study 2 variables based upon which sampling strategy participants were from, F (34, 153) = 4.037, $p < .001$; Wilk's $\Lambda = 0.527$, partial $\eta^2 = .47$. To determine how the dependent variables differed based on the sampling strategy, the tests of between-subjects effects were examined.

MANOVA – Between-Subjects

Participants recruited from the previous research project participation list were older (M = 46, SD = 9.57) than those recruited from the snowball sample (M = 34.36, SD = 9.53), (F (1, 186) = 69.71; $p < .001$; partial $\eta^2 = .27$). Participants from the snowball sample were more likely to have a full-time job, (F (1, 186) = 4.050; $p < .05$; partial $\eta^2 = .02$), while participants from the previous research project indicated they had been employed for a greater number of years, (F (1, 186) = 32.91; $p < .001$; partial $\eta^2 = .15$).

The univariate analysis also revealed a number of significant differences between the samples on study variables. Participants in the snowball sample indicated they had more job control, (F (1, 186) = 12.408; $p < .01$; partial $\eta^2 = .06$), had greater control over their work schedule (F (1, 186) = 4.9; $p < .05$; partial $\eta^2 = .03$), as well as greater control over decision-making (F (1, 186) = 6.21; $p < .05$; partial $\eta^2 = .03$). Participants in the snowball sample also had a higher mean score on the On-the-Job Recovery Control subscale, indicating that they participated in recovery activities that reflected job control more frequently, (F (1, 186) = 9.39; $p < .01$; partial $\eta^2 = .05$).

The aforementioned results indicated that there were significant differences between the study participants based on which sampling strategy they were obtained from. As a result, the source of the study participants was controlled for when conducting the confirmatory factor analysis.

Confirmatory factor analysis

A series of three confirmatory factor analyses (CFAs) with maximum likelihood estimation were conducted using MPLUS Version 7 to confirm the proposed 12-item four-factor, oblique model of the On-the-Job Recovery scale identified in Study 1. The three models that were tested and compared are the hypothesized four-factor with oblique (correlated) factors, a four-factor model with orthogonal factors, and a one-factor model. Note that for each CFA sampling strategy was used as a control variable. The orthogonal four-factor model had a SRMR of .15, a RMSEA of .10, and a CFI of .85. In comparison, the oblique four-factor model had a SRMR of .05, a RMSEA of .05, and a

CFI of .97. A chi-square test of goodness-of-fit was performed to determine which model was a better representation of the factor structure. The analysis indicated that the oblique four-factor model provided better model fit X^2 (6, N = 201) = 108.15, p < .001, which was also supported by the fit indices presented above. As a final test of the factor structure, a one-factor model containing all 12 items was calculated. The one-factor model had a SRMR of .13, a RMSEA of .16, and a CFI of .62. A chi-square test of goodness-of-fit was performed to determine which model was a better representation of the factor structure. The analysis indicated that the oblique four-factor model provided better model fit X^2 (9, N = 201) = 302.82, p < .001. Based on these analyses the four-factor oblique model was retained.[3]

All factor loadings were significant providing support for Hypothesis 1, as the factor structure from Study 1 was confirmed. The factor loadings are presented in Table 6, fit indices are presented in Table 7, and the oblique measurement model is depicted in Figure 1.

[3] Given the large effect size of sampling indicated by the MANOVA analyses, additional analyses were conducted to determine if the factor structure differed by subsample. Although the analysis is strained by the size of each sample and the fit indices are accordingly poor, the results indicate that the factor structure did not differ by subsample.

Additionally, each of the CFAs was run not controlling for source. In this case the model fits and factor loadings were similar to the parallel analysis controlling for sampling source as reported above.

Table 6

Factor loadings for On-the-Job Recovery Scale

	Factor 1 "Mastery"	Factor 2 "Control"	Factor 3 "Distraction"	Factor 4 "Relaxation"
Seek out intellectual challenges	**.88**			
Do things that challenge me	**.88**			
Broaden my horizons	**.86**			
Make phone calls just to chat			**.39**	
Use the internet for personal use			**.91**	
Read a magazine or book			**.26**	
Decide for myself what to do		**.73**		
Decide my own schedule		**.73**		
Determine how I will spend time		**.86**		
Get a break from demands				**.74**
Use break time for leisure				**.56**
Physical activities				**.42**

Note. The following factor inter-correlations were obtained: Mastery & Control: r (201) = .51, p < .001; Mastery & Distraction: r (201) = -.06, p > .05; Mastery & Relaxation: r (201) = .26, p < .01; Control & Distraction; r (201) = .36, p < .01; Control & Relaxation: r (201) = .41, p < .001; Distraction & Relaxation: r (201) = .47, p < .001.

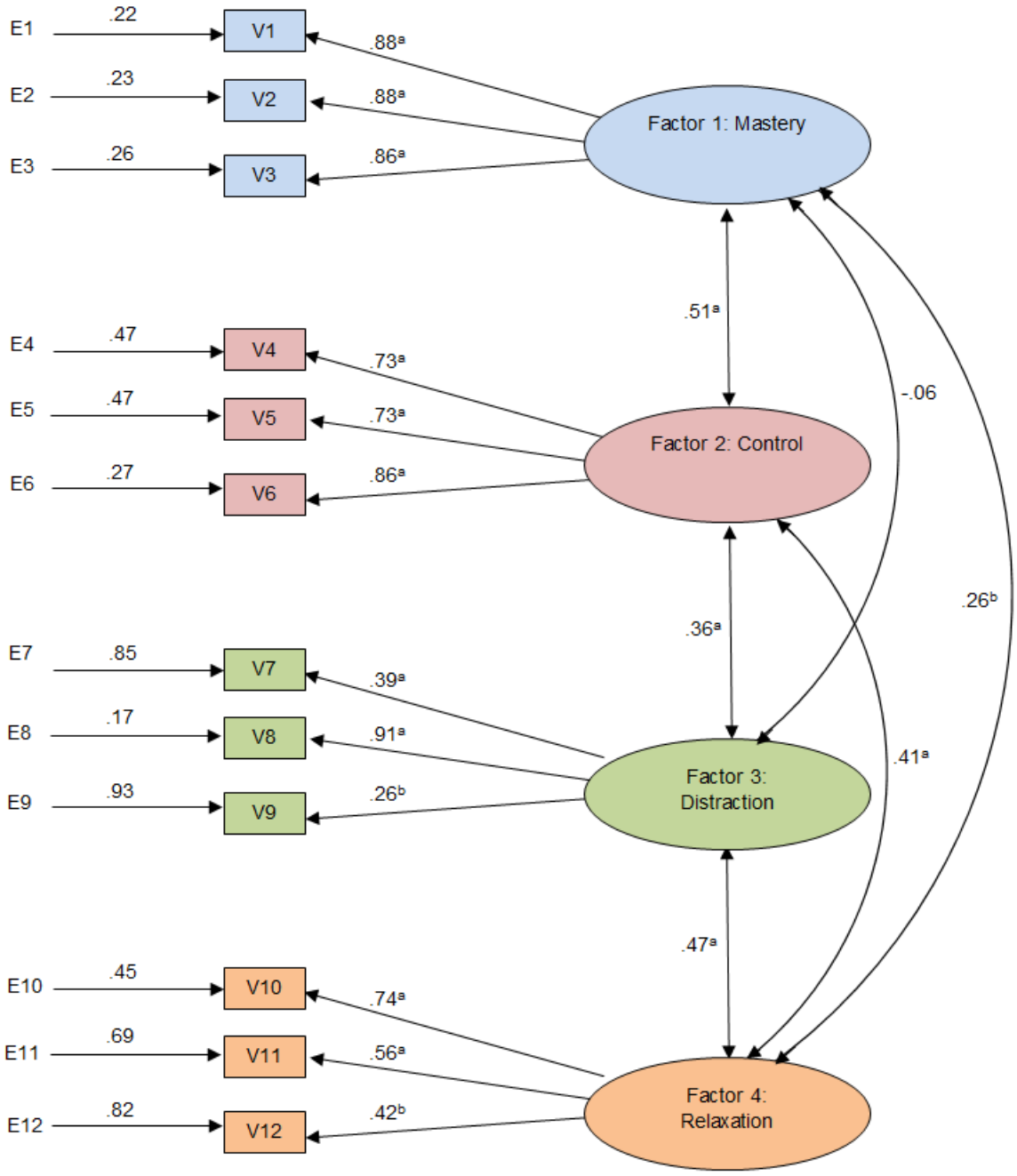
Table 7

Fit indices for the four-factor On-The-Job Recovery Scale (N=201).

Model	χ^2	*df*	SRMR	CFI	RMSEA
Four-factor (oblique)	79.390*	56	.05	.97	.05
Four-factor (orthogonal)	187.544*	62	.15	.85	.10
One-factor	382.208*	65	.13	.62	.16

Note. χ^2= chi square goodness of fit statistic; *df*=degrees of freedom; SRMR= Standardized Square Root Mean Residual; CFI= Comparative Fit Index; RMSEA=Root Mean Square Error of Approximation.
*p<.001.

Figure 1. CFA estimates of the four-factor oblique measurement model (*N=201).*



Please note that [a] indicates loadings that are significant at $p < .001$, and [b] indicates loadings that are significant at $p < .01$.

Hierarchical Regression Analyses

Hierarchical regression analyses were conducted to test Hypotheses 2, 3, 4, and 5 that on-the-job-recovery is related to job characteristics, affect, and health outcomes even after controlling for the Recovery Experiences Questionnaire (Sonnentag & Fritz, 2007). For each analysis, control variables (i.e., age, sex and sampling strategy) were entered in Step 1, the four subscales of the REQ (i.e., psychological detachment, mastery, control and relaxation) were entered in Step 2, and the subscales of the On-the-Job-Recovery scale (i.e., mastery, control, distraction, relaxation) were entered in Step 3. The results from the analyses are presented in Table 8.

When entered in Step 1, the control variables (i.e., age, sex, sampling strategy) accounted for a significant amount of variance for job control (R^2_{change} = .08, p <.001), control over decision-making (R^2_{change} = .08, p < .01) and the PHQ (R^2_{change} = .05, p < .05). When entered in Step 2, the four subscales of the REQ accounted for a significant amount of variance in situational well-being (R^2_{change} = .11, p < .001), need for recovery (R^2_{change} = .13, p < .001), positive PANAS (R^2_{change} = .05, p < .05), negative PANAS (R^2_{change} = .05, p < .05), the high pleasurable-high arousal subscale of the JAWS (R^2_{change} = .06, p < .05), the low pleasurable-high arousal subscale of the JAWS (R^2_{change} = .08, p < .01), the high pleasurable-low arousal subscale of the JAWS (R^2_{change} = .08, p < .01), the GHQ (R^2_{change} = .16, p < .001), the PHQ (R^2_{change} = .11, p < .001), and the following subscales of the Job Stressors scale: work family conflict (R^2_{change} = .10, p < .001), workload (R^2_{change} = .10, p < .001), role ambiguity (R^2_{change} = .08, p < .01).

When entered in Step 3, the four subscales of the On-the-Job-Recovery scale accounted for a significant amount of additional variance in, situational well-being (R^2_{change} = .06, p < .01), need for recovery (R^2_{change} = .06, p < .01), the low pleasurable-low arousal subscale of the JAWS (R^2_{change} = .12, p < .001), the high pleasurable-high arousal subscale of the JAWS (R^2_{change} = .14, p < .001), the low pleasurable-high arousal subscale of the JAWS (R^2_{change} = .08, p < .01), the high pleasurable-low arousal subscale of the JAWS (R^2_{change} = .08, p < .01), the positive PANAS scale (R^2_{change} = .18, p < .001), the GHQ (R^2_{change} = .08, p < .01), affective commitment (R^2_{change} = .06, p < .05), and the following subscales of the Job Stressors scale: job control (R^2_{change} = .41, p < .001), control over decision-making (R^2_{change} = .20, p < .001), routine (R^2_{change} = .12, p < .001), and skill use (R^2_{change} = .26, p < .001).

The subscales of the On-the-Job Recovery scale did not account for unique variance beyond that of the Recovery Experiences Questionnaire on the following measures: PHQ, role ambiguity, workload, work family conflict, and the negative PANAS scale. However, in support of Hypotheses 2, 3, and 4, the results clearly indicate that the On-the-Job-Recovery scale accounts for unique variance above and beyond the Recovery Experiences Questionnaire on the measures of well-being, need for recovery, the positive PANAS scale, the high pleasurable-high arousal subscale of the JAWS, the low pleasurable-high arousal subscale of the JAWS, the high pleasurable-low arousal subscale of the JAWS, and the GHQ. Additionally, and in partial support of Hypothesis 5 the On-the-Job Recovery scale accounted for unique variance on the following measures that were not significantly predicted by the REQ: the low pleasurable-low

arousal subscale of the JAWS, affective commitment, job control, control over decision-making, routine, and skill use. These findings suggest that on-the-job recovery can be considered as a distinct recovery opportunity that plays an important role in the recovery process.

Table 8

Summary of hierarchical multiple regression analyses for study variables (N=218).

	SWB			NFR			Positive PANAS			Negative PANAS			GHQ			PHQ		
	B	*B*	R^2 *change*	*B*	*β*	R^2 *change*	*B*	*β*	R^2 *change*	*B*	*β*	R^2 *change*	*B*	*β*	R^2 *change*	*B*	*β*	R^2 *change*
Step 1			.01			.02			.00			.00			.01			.05[c]
Age	-.01	-.07		.02	.15		.00	.00		-.00	-.07		.01	.07		-.01[c]	-.17[c]	
Sex	-.26	-.09		.06	.02		.03	.02		-.01	-.01		-.03	-.02		.31[c]	.15[c]	
Source	.08	.03		.07	.02		.10	.06		-.01	-.01		.13	.06		-.17	-.09	
Step 2			.11[a]			.13[a]			.05[c]			.05[c]			.16[a]			.11[a]
Age	-.00	-.04		.02	.13		.00	.01		-.01	-.09		.01	.10		-.02[b]	-.20[b]	
Sex	-.16	-.06		-.09	-.03		.09	.04		-.05	-.03		.08	.04		.23	.11	
Source	.06	.02		.16	.05		.08	.04		.00	.00		.07	.04		-.16	-.09	
REQ - Detachment	.29[b]	.24[b]		-.33[b]	-.22[b]		-.01	-.01		-.10[c]	-.16[c]		.23[a]	.25[a]		-.23[a]	-.27[a]	
REQ - Relaxation	.16	.12		-.08	-.05		.09	.09		-.03	-.04		.04	.04		-.05	-.05	
REQ - Mastery	.09	.10		-.22	-.13		.18[c]	.19[c]		-.06	-.08		.18[c]	.18[c]		-.17[c]	-.18[c]	
REQ - Control	.05	.12		-.24	-.13		-.05	-.05		-.03	-.04		.14	.12		.06	.06	
Step 3			.06[b]			.06[b]			.18[a]			.03			.08[b]			.03
Age	-.00[b]	-.03[b]		.01	.10		-.00	-.18		-.00	-.08		.01	.07		-.01c	-.18c	
Sex	-.20	-.07		-.12	-.04		.07	.03		-.03	-.02		.04	.02		.25	.12	
Source	.06	.02		.21	.07		-.02	-.01		.03	.02		-.01	-.00		-.10	-.05	
REQ - Detachment	.26	.21		-.27[b]	-.19[b]		.02	.02		-.10[c]	-.15[c]		.24[a]	.26[a]		-.25[a]	-.29[a]	
REQ - Relaxation	.18	.13		-.06	-.03		.14	.15		-.05	-.07		.10	.09		-.08	-.08	
REQ - Mastery	.02	.01		-.12	-.07		.04	.04		-.04	-.05		.09	.09		-.13	-.14	
REQ - Control	-.02	-.01		-.20	-.11		-.09	-.09		-.00	-.00		.09	.08		.09	.08	
OTJR - Mastery	.13	.08		-.05	-.03		.46[a]	.43[a]		-.02	-.03		.27[b]	.23[b]		-.12	-.11	
OTJR - Control	-.05	-.04		.06	.04		-.02	-.02		-.06	-.09		.04	.04		-.09	-.10	
OTJR - Distraction	-.30[c]	-.16[c]		-.09	-.04		-.03	-.02		.14[c]	.15[c]		-.17	-.13		.10	.08	
OTJR - Relaxation	.38[b]	.23[b]		-.51[a]	-.26[a]		.13	.11		-.10	-.11		.12	.09		-.02	-.02	

Table 8
Cont'd.

	HPHA			HPLA			LPHA			LPLA			Affective Commitment			Control		
	B	*B*	R^2 *change*	*B*	*β*	R^2 *change*	*B*	*β*	R^2 *change*	*B*	*β*	R^2 *change*	*B*	*β*	R^2 *change*	*B*	*β*	R^2 *change*
Step 1			.00			.01			.01			.00			.02			.08[a]
Age	.00	-.00		.01	.10		.01	.08		-.00	-.04		.00	.01		.02[c]	.18[c]	
Sex	.06	.03		.03	.02		.05	.03		.05	.03		.37	.13		-.01	-.00	
Source	.06	.03		.10	.07		.07	.05		.03	.02		-.07	-.03		.97[a]	.33[a]	
Step 2			.06[c]			.08[b]			.08[b]			.03			.02			.01
Age	-.00	-.01		.01	.12		.00	.05		-.00	-.05		.00	.02		.02[c]	.16[c]	
Sex	.11	.06		.09	.05		.00	.00		.02	.01		.35	.12		-.01	-.00	
Source	.01	.01		.07	.05		.08	.05		.05	.03		-.03	-.01		.92[a]	.31[a]	
REQ - Detachment	-.04	-.05		.09	.13		-.16[b]	-.22[b]		-.04	-.05		-.11	-.09		-.06	-.04	
REQ - Relaxation	-.00	-.00		.10	.13		-.07	-.08		-.06	-.07		.15	.10		-.14	-.09	
REQ - Mastery	.23[b]	.25[b]		.09	.11		-.04	-.05		-.04	-.04		.01	.01		.07	.04	
REQ - Control	-.00	-.00		.03	.04		-.01	-.01		-.05	-.06		-.18	-.12		.13	.07	
Step 3			.14[a]			.08[b]			.08[b]			.12[a]			.06[c]			.41[a]
Age	-.00	-.02		.01	.12		.00	.05		-.00	-.04		.00	.01		.01	.08	
Sex	.10	.05		.08	.05		.01	.00		.04	.03		.35	.12		.05	.02	
Source	-.05	-.03		.02	.01		.13	.09		.11	.07		-.16	-.06		.38[c]	.13[c]	
REQ - Detachment	-.03	-.04		.08	.12		-.14[b]	-.20[b]		-.03	-.05		-.11	-.09		.02	.02	
REQ - Relaxation	.03	.03		.12	.15		-.09	-.11		-.09	-.12		.19	.13		.02	.01	
REQ - Mastery	.09	.10		.02	.02		.02	.02		.05	.06		-.10	-.07		-.03	-.02	
REQ - Control	-.03	-.03		-.00	-.01		.04	.04		.00	.00		-.24	-.15		.01	.01	
OTJR - Mastery	.39[a]	.39[a]		.12	.14		-.06	-.07		-.19[b]	-.21[b]		.24	.15		.06	.04	
OTJR - Control	-.09	-.10		.02	.02		-.06	-.08		-.03	-.04		.09	.07		.96[a]	.66[a]	
OTJR - Distraction	.04	.03		-.09	-.09		.14	.13		.18[c]	.17[c]		-.04	-.02		-.15	-.07	
OTJR - Relaxation	.16[c]	.14[c]		.23[b]	.24[b]		-.26[a]	-.27[a]		-.23[b]	-.24[b]		.25	.15		.07	.04	

Table 8
Cont'd.

	Control Over Decision-Making			Routine			Skill Use			Role Ambiguity			Workload			Work-Family Conflict		
	B	*B*	R^2 *change*	*B*	*β*	R^2 *change*	*B*	*β*	R^2 *change*	*B*	*β*	R^2 *change*	*B*	*β*	R^2 *change*	*B*	*β*	R^2 *change*
Step 1			.08[b]			.01			.03			.01			.03			.01
Age	.03[b]	.25[b]		-.01	-.08		.02[b]	.20[b]		.01	.09		.02	.15		-.00	-.03	
Sex	-.02	-.01		.06	.02		.08	.03		.05	.03		.37	.11		.04	.01	
Source	.78[a]	.30[a]		-.26	-.09		.26	.11		.05	.03		.08	.03		-.26	-.08	
Step 2			.00			.04			.04			.08[b]			.10[a]			.10[a]
Age	.03[b]	.25[b]		-.01	-.06		.02[b]	.18[b]		.01	.11		.02	.12		-.01	-.05	
Sex	.00	.00		.06	.02		.09	.04		.08	.04		.26	.07		-.03	-.01	
Source	.75[a]	.29[a]		-.21	-.07		.21	.09		.05	.03		.10	.03		-.19	-.06	
REQ - Detachment	.02	.02		.21[c]	.16[c]		-.18[b]	-.16[b]		.05	.06		-.32[b]	-.22[b]		-.19	-.13	
REQ - Relaxation	-.05	-.04		.10	.07		-.02	-.02		.24[b]	.27[b]		-.21	-.13		-.14	-.09	
REQ - Mastery	.04	.03		-.16	-.10		.11	.09		-.07	-.08		-.11	-.07		.17	.11	
REQ - Control	.09	.06		-.08	-.04		.13	.09		.02	.02		-.03	-.02		-.41[b]	-.23[b]	
Step 3			.20[a]			.12[a]			.26[a]			.02			.04			.03
Age	.02[b]	.19[b]		-.00	-.03		.01	.13		.01	.12		.01	.09		-.01	-.04	
Sex	.01	.00		.10	.03		.01	.01		.06	.03		.20	.06		-.03	-.01	
Source	.43[b]	.17[b]		-.04	-.02		.06	.02		.06	.04		.09	.03		-.09	-.03	
REQ - Detachment	.07	.06		.17	.13		-.13	-.12		.04	.06		-.27[b]	-.19[b]		-.17	-.12	
REQ - Relaxation	.06	.04		.01	.01		.10	.08		.24[b]	.28[b]		-.16	-.09		-.17	-.10	
REQ - Mastery	-.07	-.05		.02	.01		-.08	-.06		-.10	-.11		-.12	-.07		.22	.14	
REQ - Control	.00	.00		-.01	-.01		.05	.04		.00	.00		-.05	-.03		-.36[c]	-.20[c]	
OTJR - Mastery	.21	.14		-.55	-.33		.65[a]	.47[a]		.08	.08		.20	.11		-.03	-.01	
OTJR - Control	.51[a]	.40[a]		-.09[a]	-.07[a]		.08	.06		-.04	-.05		.05	.03		-.14	-.09	
OTJR - Distraction	-.18	-.10		.11	.06		-.31[b]	-.18[b]		-.10	-.08		-.23	-.11		.15	.07	
OTJR - Relaxation	.11	.07		-.12	-.07		.10	.07		.09	.08		-.23	-.12		-.25	-.13	

Table 8
Cont'd.

	Schedule			Role Conflict			Recognition		
	B	*B*	R^2 change	*B*	*β*	R^2 change	*B*	*β*	R^2 change
Step 1			.02			.01			.01
Age	.00	.01		.01	.06		.00	.05	
Sex	-.11	-.03		.16	.04		-.01	-.00	
Source	-.40	-.13		.33	.10		-.13	-.07	
Step 2			.04			.02			.03
Age	-.00	-.01		.01	.05		.00	.04	
Sex	-.13	-.04		.12	.03		-.05	-.02	
Source	-.43	-.14		.31	.09		-.11	-.06	
REQ - Detachment	-.23 [c]	-.16 [c]		-.23 [c]	-.15 [c]		-.12	-.13	
REQ - Relaxation	-.09	-.06		-.04	-.03		.02	.02	
REQ - Mastery	.19	.11		-.02	-.01		-.09	-.09	
REQ - Control	-.08	-.04		.07	.04		-.03	-.03	
Step 3			.02			.02			.03
Age	-.00	-.02		.00	.03		.00	.04	
Sex	-.18	-.05		.11	.03		-.02	-.01	
Source	-.35	-.11		.26	.08		-.12	-.07	
REQ - Detachment	-.21	-.15		-.18	-.12		-.12	-.13	
REQ - Relaxation	-.08	-.05		-.01	-.00		.01	.01	
REQ - Mastery	.21	.13		-.03	-.02		-.04	-.04	
REQ - Control	-.07	-.04		.08	.04		-.02	-.02	
OTJR - Mastery	.09	.05		.17	.09		-.16	-.15	
OTJR - Control	-.09	-.06		.06	.04		.08	.08	
OTJR - Distraction	-.16	-.07		.04	.02		.09	.07	
OTJR - Relaxation	-.20	-.10		-.24	-.12		-.08	-.06	

Hierarchical Regression Redundancy Analyses

As a further redundancy analysis, to determine the extent to which the REQ explains variance beyond the OTJR, the subscales of the OTJR scale were entered on the second step of hierarchical regression analyses followed by the subscales of the REQ on the third step. The purpose of the redundancy analysis was to ensure that both of the theoretically linked scales predict unique variance and therefore both warranted inclusion in the study. Results from the analyses are presented in Table 9.

When entered in Step 1, the control variables accounted for a significant amount of variance on the PHQ (R^2_{change} = .05, p < .05), job control (R^2_{change} = .08, p < .001), and control over decision-making (R^2_{change} = .08, p < .01). When entered in Step 2, the four subscales of the OTJR scale accounted for a significant amount of variance in situational well-being (R^2_{change} = .10, p < .001), need for recovery (R^2_{change} = .12, p < .001), positive PANAS (R^2_{change} = .21, p < .001), the low pleasurable-low arousal subscale of the JAWS (R^2_{change} = .13, p < .001), the high pleasurable-high arousal subscale of the JAWS (R^2_{change} = .19, p < .001), the low pleasurable-high arousal subscale of the JAWS (R^2_{change} = .11, p < .001), and the high pleasurable-low arousal subscale of the JAWS (R^2_{change} = .12, p < .001), the GHQ (R^2_{change} = .11, p < .001), affective commitment (R^2_{change} = .06, p < .05), and the following subscales of the Job Stressors scale: job control (R^2_{change} = .42, p < .001), control over decision-making (R^2_{change} = .20, p < .001), routine (R^2_{change} = .15, p < .001), skill use (R^2_{change} = .28, p < .001), workload (R^2_{change} = .07, p < .01), and work family conflict (R^2_{change} = .04, p = .05).

When entered in Step 3, the four subscales of the REQ accounted for a significant amount of variance in situational well-being (R^2_{change} = .07, p < .01), need for recovery (R^2_{change} = .07, p < .01), the low pleasurable-high arousal subscale of the JAWS (R^2_{change} = .05, p < .05), the high pleasurable-low arousal subscale of the JAWS (R^2_{change} = .04, p < .05), the GHQ (R^2_{change} = .12, p < .001) the PHQ (R^2_{change} = .11, p < .001), and the following subscales of the Job Stressors Scale: role ambiguity (R^2_{change} = .07, p < .01), workload (R^2_{change} = .06, p < .01), and work family conflict (R^2_{change} = .08, p < .01). The four subscales of the REQ did not account for a significant amount of variance in job control, control over decision-making, routine, skill use, positive PANAS, the low pleasurable-low arousal subscale of the JAWS, the high pleasurable-high arousal subscale of the JAWS, or affective commitment.

In support of Hypothesis 6, the results of the hierarchical and redundancy analyses clearly indicate that the On-the-Job Recovery scale offers unique prediction beyond that of the Recovery Experiences Questionnaire, and therefore both recovery measures warrant inclusion.

Table 9

Summary of hierarchical multiple regression redundancy analyses for study variables (N=218).

	SWB			NFR			Positive PANAS			Negative PANAS			GHQ			PHQ		
	B	*β*	R^2 change	*B*	*β*	R^2 change	*B*	*β*	R^2 change	*B*	*β*	R^2 change	*B*	*β*	R^2 change	*B*	*β*	R^2 change
Step 1			.01			.02			.00			.00			.01			.05[c]
Age	-.01	-.07		.02	.15		.00	.00		-.00	-.07		.01	.07		-.01[c]	-.17[c]	
Sex	-.26	-.09		.06	.02		.03	.02		-.01	-.01		-.03	-.02		.31[c]	.15[c]	
Source	.08	.03		.07	.02		.10	.06		-.01	-.01		.13	.06		-.17	-.09	
Step 2			.10[a]			.12[a]			.21[a]			.04			.11[a]			.04
Age	-.01	-.05		.01	.10		-.00	-.02		-.00	-.07		.01	.06		-.01[c]	-.16[c]	
Sex	-.25	-.09		-.03	-.01		.05	.03		-.01	-.00		-.04	-.02		.30[c]	.15[c]	
Source	.07	.03		.14	.04		-.03	-.02		.02	.02		.04	.02		-.11	-.06	
OTJR - Mastery	.09	.06		-.05	-.03		.46[a]	.44[a]		-.02	-.02		.27[b]	.23[b]		-.12	-.11	
OTJR - Control	-.11	-.09		.13	.08		-.05	-.05		-.03	-.05		-.03	-.03		-.03	-.03	
OTJR - Distraction	-.30[b]	-.17[b]		-.06	-.03		-.01	-.01		.14[c]	.15[c]		-.19	-.14		.09	.07	
OTJR - Relaxation	.52[a]	.31[a]		-.70[a]	-.35[a]		.16[c]	.14[c]		-.15[c]	-.18[c]		.28[b]	.22[b]		-.14	-.12	
Step 3			.07[b]			.07[b]			.02			.04			.12[a]			.11[a]
Age	-.00	-.03		.01	.10		-.00	-.01		-.00	-.08		.01	.07		-.01[c]	-.18[c]	
Sex	-.20	-.07		-.12	-.04		.07	.03		-.03	-.02		.04	.02		.25	.12	
Source	.06	.02		.21	.07		-.02	-.01		.03	.02		-.01	-.00		-.10	-.05	
OTJR - Mastery	.13	.08		-.05	-.03		.46[a]	.43[a]		-.02	-.03		.27[a]	.23[a]		-.12	-.11	
OTJR - Control	-.05	-.04		.06	.04		-.02	-.02		-.06	-.09		.04	.04		-.09	-.10	
OTJR - Distraction	-.30[c]	-.16[c]		-.09	-.04		-.03	-.02		.14[c]	.15[c]		-.17	-.13		.10	.08	
OTJR - Relaxation	.38[b]	.23[b]		-.51[a]	-.26[a]		.13	.11		-.10	-.11		.12	.09		-.02	-.02	
REQ - Detachment	.26[b]	.21[b]		-.27[b]	-.19[b]		.02	.02		-.10[c]	-.15[c]		.24[a]	.26[a]		-.25[a]	-.29[a]	
REQ - Relaxation	.18	.13		-.06	-.03		.14	.15		-.05	-.07		.10	.09		-.08	-.08	
REQ - Mastery	.02	.01		-.12	-.07		.04	.04		-.04	-.05		.09	.09		-.13	-.14	
REQ - Control	-.02	-.01		-.20	-.11		-.09	-.09		-.00	-.00		.09	.08		.09	.08	

Table 9
Cont'd

	HPHA			HPLA			LPHA			LPLA			Affective Commitment			Control		
	B	*B*	R^2 *change*	*B*	*β*	R^2 *change*	*B*	*β*	R^2 *change*	*B*	*β*	R^2 *change*	*B*	*β*	R^2 *change*	*B*	*β*	R^2 *change*
Step 1						.01			.01			.00			.02			.08[a]
Age	.00	-.00	.00	.01	.10		.01	.08		-.00	-.04		.00	.01		.02[c]	.18[c]	
Sex	.06	.03		.03	.02		.05	.03		.05	.03		.37	.13		-.01	-.00	
Source	.06	.03		.10	.07		.07	.05		.03	.02		-.07	-.03		.97[a]	.33[a]	
Step 2			.19[a]			.12[a]			.11[a]			.13[a]			.05[c]			.42[a]
Age	-.00	-.01		.01	.11		.01	.07		-.00	-.03		.00	-.00		.01	.08	
Sex	.08	.04		.05	.03		.03	.02		.05	.03		.39[c]	.14[c]		.05	.02	
Source	-.04	-.03		.03	.02		.14	.09		.11	.07		-.22	-.08		.38[c]	.13[c]	
OTJR - Mastery	.43[a]	.43[a]		.12	.14		-.03	-.03		-.17[c]	-.19[c]		.21	.14		.05	.03	
OTJR - Control	-.10	-.12		-.01	-.02		-.03	-.04		-.02	-.02		.09	.07		.96[a]	.66[a]	
OTJR - Distraction	.05	.04		-.08	-.08		.14	.13		.18[c]	.17[c]		-.01	-.00		-.16	-.08	
OTJR - Relaxation	.17[b]	.16[b]		.29[a]	.31[a]		-.32[a]	-.33[a]		-.26[a]	-.27[a]		.18	.11		.08	.04	
Step 3			.01			.04[c]			.05[c]			.02			.03			.00
Age	-.00	-.02		.01	.12		.00	.05		-.00	-.04		.00	.00		.01	.08	
Sex	.10	.05		.08	.05		.01	.00		.04	.03		.35	.12		.05	.02	
Source	-.05	-.03		.02	.01		.13	.09		.11	.07		-.16	-.06		.38[c]	.13[c]	
OTJR - Mastery	.39[a]	.39[a]		.12	.14		-.06	-.07		-.19[b]	-.21[b]		.24	.15		.06	.04	
OTJR - Control	-.09	-.10		.02	.02		-.06	-.08		-.03	-.04		.09	.07		.96[a]	.66[a]	
OTJR - Distraction	.04	.03		-.09	-.09		.14	.13		.18[c]	.17[c]		-.04	-.02		-.15	-.07	
OTJR - Relaxation	.16[c]	.14[c]		.23[a]	.24[a]		-.26[a]	-.27[a]		-.23[b]	-.24[b]		.25	.15		.07	.04	
REQ - Detachment	-.03	-.04		.08	.12		-.14[b]	-.20[b]		-.03	-.05		-.11	-.09		.02	.02	
REQ - Relaxation	.03	.03		.12	.15		-.09	-.11		-.09	-.12		.19	.13		.02	.01	
REQ - Mastery	.09	.10		.02	.02		.02	.02		.05	.06		-.10	-.07		-.03	-.02	
REQ - Control	-.03	-03		-.00	-.01		.04	.04		.00	.00		-.24	-.15		.01	.01	

Table 9
Cont'd.

	Control Over Decision Making			Routine			Skill Use			Role Ambiguity			Workload			Work-Family Conflict		
	B	*B*	R^2 *change*	*B*	*β*	R^2 *change*	*B*	*β*	R^2 *change*	*B*	*β*	R^2 *change*	*B*	*β*	R^2 *change*	*B*	*β*	R^2 *change*
Step 1			.08[b]			.01			.03			.01			.03			.01
Age	.03[b]	.25[b]		-.01	-.08		.02[b]	.20[b]		.01	.09		.02	.15		-.00	-.03	
Sex	-.02	-.01		.06	.02		.08	.03		.05	.03		.37	.11		.04	.01	
Source	.78[a]	.30[a]		-.26	-.09		.26	.11		.05	.03		.08	.03		-.26	-.08	
Step 2			.20[a]			.15[a]			.28[a]			.03			.07[b]			.04[c]
Age	.02[b]	.18[b]		-.00	-.03		.01	.13		.01	.10		.01	.10		-.01	-.04	
Sex	.01	.00		.07	.02		.04	.01		.05	.03		.29	.08		.01	.00	
Source	.43[c]	.16[c]		-.03	-.01		.06	.02		.06	.04		.05	.01		-.16	-.05	
OTJR - Mastery	.17	.11		-.57[a]	-.34[a]		.65[a]	.47[a]		.04	.04		.21	.11		.06	.03	
OTJR - Control	.50[a]	.39[a]		-.12	-.08		.08	.07		-.07	-.09		.12	.08		-.11	-.08	
OTJR - Distraction	-.19	-.10		.10	.05		-.30[b]	-.18[b]		-.09	-.08		-.23	-.10		.21	.10	
OTJR - Relaxation	.13	.08		-.05	-.03		.08	.05		.15	.14		-.41[b]	-.21[b]		-.39[b]	-.20[b]	
Step 3			.01			.02			.02			.07[b]			.06[b]			.08[b]
Age	.02[b]	.19[b]		-.00	-.03		.01	.13		.01	.12		.01	.09		-.01	-.04	
Sex	.01	.00		.10	.03		.01	.01		.06	.03		.20	.06		-.03	-.01	
Source	.43[b]	.17[b]		-.04	-.02		.06	.02		.06	.04		.09	.03		-.09	-.03	
OTJR - Mastery	.21	.14		-.55[a]	-.33[a]		.65[a]	.47[a]		.08	.08		.20	.11		-.03	-.01	
OTJR - Control	.51[a]	.40[a]		-.09	-.07		.08	.06		-.04	-.05		.05	.03		-.14	-.09	
OTJR - Distraction	-.18	-.10		.11	.06		-.31[b]	-.18[b]		-.10	-.08		-.23	-.11		.15	.07	
OTJR - Relaxation	.11	.07		-.12	-.07		.10	.07		.09	.08		-.23	-.12		-.25	-.13	
REQ - Detachment	.07	.06		.17	.13		-.13	-.12		.04	.06		-.27[b]	-.19[b]		-.17	-.12	
REQ - Relaxation	.06	.04		.01	.01		.10	.08		.24[b]	.28[b]		-.16	-.09		-.17	-.10	
REQ - Mastery	-.07	-.05		.02	.01		-.08	-.06		-.10	-.11		-.12	-.07		.22	.14	
REQ - Control	.00	.00		-.01	-.01		.05	.04		.00	.00		-.05	-.03		-.36[c]	-.20[c]	

Table 9
Cont'd.

	Schedule			Role Conflict			Recognition		
	B	*B*	R^2 *change*	*B*	*β*	R^2 *change*	*B*	*β*	R^2 *change*
Step 1			.02			.01			.01
Age	.00	.01		.01	.06		.00	.05	
Sex	-.11	-.03		.16	.04		-.01	-.00	
Source	-.40	-.13		.33	.10		-.13	-.07	
Step 2			.03			.03			.03
Age	-.00	-.01		.01	.03		.00	.04	
Sex	-.18	-.05		.13	.04		.00	.00	
Source	-.35	-.11		.27	.08		-.13	-.07	
OTJR - Mastery	.19	.10		.19	.10		-.16	-.14	
OTJR - Control	-.08	-.05		.08	.05		.09	.10	
OTJR - Distraction	-.13	-.06		.04	.02		.10	.07	
OTJR - Relaxation	-.26	-.13		-.30	-.14		-.13	-.11	
Step 3			.04			.01			.02
Age	-.00	-.02		.00	.03		.00	.04	
Sex	-.18	-.05		.11	.03		-.02	-.01	
Source	-.35	-.11		.26	.08		-.12	-.07	
OTJR - Mastery	.09	.05		.17	.09		-.16	-.15	
OTJR - Control	-.09	-.06		.06	.04		.08	.08	
OTJR - Distraction	-.16	-.07		.04	.02		.09	.07	
OTJR - Relaxation	-.20	-.10		-.24	-.12		-.08	-.06	
REQ - Detachment	-.21	-.15		-.18	-.12		-.12	-.13	
REQ - Relaxation	-.08	-.05		-.01	-.00		.01	.01	
REQ - Mastery	.21	.13		-.03	-.02		-.04	-.04	
REQ - Control	-.07	-.04		.08	.04		-.02	-.02	

Study 2 Discussion

The primary focus of Study 2 was the validation of the 12-item four-factor model of On-the-Job Recovery scale developed in Study 1. Additionally, Study 2 sought to determine the relationship between the On-the-Job Recovery scale and pertinent measures that were not captured in Study 1. In support of existing literature (Sonnentag & Fritz, 2007) and the results presented in Study 1, the confirmatory factor analysis provided additional evidence for a four-factor model of recovery by confirming the four-factor structure suggested via the exploratory factor analyses conducted in Study 1.

Another important finding was that the On-the-Job Recovery scale provides unique prediction above and beyond that of the REQ, suggesting that the concept of on-the-job recovery represents an important expansion of the recovery literature. More specifically, On-the-Job Recovery offered unique prediction on measures of well-being (situational well-being and general health), affect (positive affect, job affective well-being), need for recovery, and job characteristics (job control, control over decision making, routine, skill use, and affective commitment).

As with Study 1, the OTJR Distraction and Relaxation subscales continue to suffer from low internal consistency reliability estimates, and low inter-item correlations. These repeat findings further imply that, as discussed following Study 1, the items that tap particular recovery activities may not capture individual preferences reliably. However, despite the low reliability estimates it should be noted that both subscales were both significant predictors of study measures, and offered unique prediction above that of the REQ.

The effect sizes for the MANOVA analyses also warrant discussion as they indicate that there are strong effects of sampling that might have influenced the results. However, to account for this, sampling strategy was treated as a control variable in the confirmatory analyses. Addition analyses were also conducted on each sampling strategy separately to determine if the factor structure differed by the subsample selected; the results indicate that this was not the case.

Study 3

Daily Survey

The cross-sectional survey administration conducted in Study 2 allowed the confirmation of the factor structure of the newly developed On-the-Job Recovery Scale, as well as the opportunity to examine how on-the-job recovery activities related to need for recovery, well-being, and affect related outcomes. Study 3 sought to further explicate the positive impact of engaging in on-the-job recovery activities through the *daily* measurement of on-the-job recovery. To this end, the goal of Study 3 was to gather data over five work days using a diary study method. The daily diary survey examined how daily variations in the completion of on-the-job recovery activities influenced need for recovery and situational well-being at the end of each work day. More specifically, the daily survey sought to determine if well-being and need for recovery are influenced by *daily* on-the-job recovery activities.

Diary studies represent a relatively unobtrusive way to monitor and record individuals' sensations, thoughts, and emotions in daily life (Green, Rafaeli, Bolger,

Shrout, & Reis, 2006). When considering everyday experience, mood and job performance may fluctuate from day-to-day and diary studies offer a means to analyze these fluctuations, while reducing retrospective bias (Ohly, Sonnentag, Niessen, & Zapf, 2010). Gaining knowledge about day-specific recovery activities is also essential for practical purposes, as it will allow organizations to gain a deeper understanding of how work can be structured to further support employee well-being.

On-the-job recovery refers to activities that an individual is able to complete during the workday that offer a respite from one's work tasks and provide an opportunity to replenish resources. These respites can consist of both recovery activities (e.g, Sonnentag, 2001) and more subjective underlying psychological experiences known as recovery experiences (e.g., Sonnentag & Fritz, 2007). For the present study the activities were organized into four categories: (a) mastery related activities, (b) control related activities, (c) distraction activities, and (d) relaxation activities. Ragsdale and colleagues (2011) proposed that the activities or behaviours one engages in should be logically associated with the subjective experiences of recovery. Further, it is likely not a specific activity per se that aids in the recovery process, but rather the psychological attributes attached to those activities (Sonnentag & Fritz, 2007).

I proposed that on-the-job recovery should reduce an individual's need for recovery after the work day based on the assumption that having the ability to pursue recovery activities while at work is a positive experience and will allow an individual to prevent resource depletion. Previous research has shown that need for recovery can be reduced if sufficient opportunities to engage in respite activities are available (Jansen et

al., 2002), as such on-the-job recovery should present an additional opportunity to facilitate the recovery process. Further, results from Study 2 provided evidence that on-the-job recovery can be viewed as a conceptually different recovery process from off-job recovery; certainly this assertion was supported empirically in Study 2 where on-the-job recovery explained unique variance above that of an established off-job recovery measure. Research has also shown that need for recovery is generally observed during the last few hours of the work day or immediately after the work day is completed (Coffeng et al., 2012), and the results for Study 2 provided evidence that on-the-job recovery was a significant predictor of reduced need for recovery. Therefore I hypothesized that the structure of the daily survey should adequately capture need for recovery levels experienced by each individual.

Hypothesis 1: engaging in daily on-the-job recovery will reduce an individual's daily need for recovery.

Numerous studies have shown that successful off-job recovery is associated with improved employee well-being (e.g., Sonnentag & Geurts, 2009; Strauss-Blasche, Ekmekcioglu, & Marktl, 2000; Westman & Eden, 1997) and in a study conducted by Sonnentag (2001), engaging in low-effort, social, or physical activities had a positive effect on situational well-being. Results from Study 2 also indicated that on-the-job recovery was a significant predictor of situational well-being. As a result, it is hypothesized that daily on-the-job recovery will have a positive impact on well-being at the end of the workday.

Hypothesis 2: engaging in daily on-the-job recovery will improve an individual's daily situational well-being.

Study 3 Method

Participants

Those participants who completed Study 2 were asked at the end of the survey if they were willing to participate in a follow-up daily survey; a brief synopsis of Study 3 was provided. A total of 144 participants agreed to participate in the diary study. Upon receiving the recruitment email outlining the study design a number of participants indicated that they did not work a traditional 5 day work week, as they worked from home, or were unable to complete the survey at the end of their workday. As the diary study was designed to assess the daily on-the-job recovery activities of those employees working a traditional work week it was important that only those participants who fall into this category were included in the study.

As an incentive to participate, participants received one entry ticket per day for each day they completed the daily survey for a chance to win one of two cash prizes of $250. As an incentive to complete all 5 days of the daily survey, participants were entered into a cash prize draw reserved solely for those participants, valued at $500.

A total of 50 participants completed all 5 consecutive days of the daily survey. An analysis was performed to determine if the number of days participated was related to any of the study variables. The analysis indicated that there was no relationship between the number of days completed and any of the study measures including demographics,

day 1 control variables, and day-level measures. As no systematic bias was found, all participants who completed 2 or more days were retained for all of the analyses, resulting in a total sample size of 76 participants (52 females, 22 males, 2 participants did not provide their sex), and a total of 312 observations at Level 1 and 72 observations at Level 2. The mean age was 39.64 (*SD* = 11.22), with 16 participants indicating that they currently held a management position, and 62 participants with full-time employment status.

Procedure

Participants were asked to respond to a short number of questions (24) following each work day for a total of 5 days. Each daily survey was posted online using the Saint Mary's University online Qualtrics system. Participants were provided with a link to the survey that contained a unique ID code matched to each participant; this was used to ensure participant responses could be matched across each day. Participants were sent daily email reminders, containing a new link for each day of the week as well as their unique ID code, with instructions indicating that they should complete the survey once they returned home from work.

Measures

General Health: General health was used as a Day 1 baseline measure and was measured using the 12-item General Health Questionnaire (GHQ) (Banks et al., 1980). Responses were rated on a seven-point scale with anchors ranging from "Not at All" (1)

to "All of the Time" (7). An analysis of internal consistency produced a standardized item alpha of $\alpha = .94$.

Recovery: On-the-job recovery was measured using the newly developed 12-item On-the-Job Recovery scale from Study 2. However as measurement occurred daily, the anchors were modified to reflect the daily nature of the study. More specifically, given the nature of the work day participants were asked to indicate the frequency in which they engaged in each activity that day. Anchors were changed from a five-point scale (Never to Extremely Often or Always) to a four-point scale ranging from "Not at all" (1) to "3 times or more" (4). To assess the inter-rater reliability of day-level reporting, an inter-class correlation was conducted. A high degree of reliability was found between Day 1 and Day 2 responses, such that the average measure ICC was .76 with a 95% confidence interval ranging from .61 to .86 ($F(64,64) = 4.414$, $p < .001$).

Need for recovery: Need for recovery was measured using two items developed by Sonnentag and Zijlstra (2006); however the wording was slightly modified to reflect the daily nature of the survey. The two items were: "I needed more time for relaxing and recovering from work today", and "Considering the total of all activities that I pursued at work today, I had enough time to relax and to recover from work today". Responses were rated on a seven-point scale with anchors ranging from "Strongly Disagree" (1) to "Strongly Agree" (7). To assess the inter-rater reliability of day level reporting, an inter-class correlation was conducted. When comparing Day 1 and Day 2 responses, the average measure ICC was .70 with a 95% confidence interval ranging from .51 to .81 ($F(68,68) = 3.293$, $p < .001$).

Well-being: Situational well-being at the end of the work day refers to an individual's situational well-being after leaving their workplace and returning home, and was measured with a situational well-being scale developed by Sonnentag (2001). As per the need for recovery scale, the wording of the situational well-being items was slightly modified to reflect daily responses: "I feel tense today", "I was in a good mood when I got home from work today", and "I was in a good mood at the end of the workday". One additional item was developed to capture situational well-being during the commute home, "I was in a good mood during my commute home from work". Responses were rated on a seven-point scale with anchors ranging from "Strongly Disagree" (1) to "Strongly Agree" (7). To assess the inter-rater reliability of day level reporting, an inter-class correlation was conducted. When comparing Day 1 and Day 2 responses, the average measure ICC was .60 with a 95% confidence interval ranging from .36 to .76 ($F(68,68) = 2.524$, $p < .001$).

Workload: Workload was measured using one item reflecting workload (Kelloway & Barling, 1994); "Today, it was hard for me to keep up with the workload". The item was slightly modified to reflect daily perceptions of this job characteristic. Responses were rated on a seven-point scale with anchors ranging from "Strongly Disagree" (1) to "Strongly Agree" (7). The use of a single item measure of workload has been previously supported (Gilbert & Kelloway, 2014). To assess the inter-rater reliability of day level reporting, an inter-class correlation was conducted. When comparing Day 1 and Day 2 responses, the average measure ICC was .64 with a 95% confidence interval ranging from .43 to .78 ($F(68,68) = 2.798$, $p < .001$).

Study 3 Results

Prior to testing hypotheses, I examined the data for violations of the assumptions of normality, linerarity, homoskedasticity, and multicollinearity using SPSS for Windows version 22, no violations were detected. The correlation coefficients and descriptive statistics for all Study 3 variables are presented in Table 10.

Table 10

Correlations among Study 3 variables. Reliability coefficients for each of the measures are shown in parentheses along the diagonal[1].

	Variable	M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13
1	GHQ	5.11	1.05	(.94)												
2	OTJR: Mastery – Day 1	2.28	.82	.28	(.79)											
3	OTJR: Control – Day 1	3.16	1.00	.16	.35c	(.90)										
4	OTJR: Low-effort – Day 1	1.53	.57	.20	.31c	.02	(.40)									
5	OTJR: Distraction – Day 1	2.06	.71	.20	.32c	.17	.43b	(.70)								
6	Situational Well-being – Day 1	4.96	1.45	.66a	.31c	.13	.23	.46b	(.92)							
7	Need for Recovery – Day 1	3.44	1.58	-.61a	-.43b	-.31c	-.23	-.42b	-.82a	(.91)						
8	Workload – Day 1	3.19	1.69	-.18	.14	.07	-.21	-.05	-.21	.26	-					
9	OTJR: Mastery – Day 2	2.18	.85	.46b	.63a	.37c	.25	.09	.34c	-.42b	.09	(.84)				
10	OTJR: Control – Day 2	3.11	.95	.19	.32c	.73a	.04	.16	.16	-.30c	.12	.45b	(.86)			
11	OTJR: Distraction – Day 2	1.42	.50	.03	.17	-.02	.75a	.42b	.15	-.06	.01	.17	.03	(.43)		
12	OTJR: Relaxation – Day 2	1.90	.69	.11	.22	.04	.22	.42b	.21	.01	.06	.33c	.24	.41b	(.68)	
13	Situational Well-being – Day 2	4.93	1.35	.61a	.21	.03	.15	.36c	.47b	-.36c	-.09	.43b	.09	.03	.37c	(.91)
14	Need for Recovery – Day 2	3.42	1.56	-.54a	-.32c	-.18	-.11	-.36c	-.52a	.53a	.03	-.47b	-.25	.05	-.29c	-.82a
15	Workload – Day 2	3.30	1.72	-.14	-.00	.05	-.13	-.15	.07	-.02	.50a	.09	.10	-.07	-.18	-.12
16	OTJR: Mastery – Day 3	2.01	.95	.29	.64a	.42b	.14	-.01	.26	-.51a	-.08	.80a	.45b	-.09	.12	.27
17	OTJR: Control – Day 3	2.95	1.00	.24	.11	.67a	-.10	.06	.17	-.24	.02	.35c	.59a	-.24	.07	.08
18	OTJR: Distraction – Day 3	1.39	.48	.02	.14	-.03	.64a	.15	-.08	.08	-.00	.22	.14	.67a	.36c	-.06
19	OTJR: Relaxation – Day 3	1.83	.72	.11	.32c	.08	.21	.61a	.27	-.15	.13	.32c	.13	.33c	.74a	.30c
20	Situational Well-being – Day 3	4.92	1.21	.47b	.20	.05	.24	.33c	.50a	-.30c	-.22	.30c	.15	.24	.46b	.43b
21	Need for Recovery – Day 3	3.45	1.48	-.60a	-.32c	-.10	-.15	-.51a	-.63a	.57a	.17	-.45b	-.19	-.11	-.40b	-.60a
22	Workload – Day 3	3.21	1.68	-.19	.03	-.08	-.02	-.22	-.05	.08	.40b	.05	-.05	.01	-.15	-.14
23	OTJR: Mastery – Day 4	1.99	.95	.31c	.58a	.38c	.11	.07	.25	-.45b	.05	.78a	.44b	-.03	.21	.36c
24	OTJR: Control – Day 4	2.89	1.03	.23	-.05	.63a	-.10	-.04	.04	-.11	.07	.24	.65a	-.09	.13	.10
25	OTJR: Distraction – Day 4	1.33	.46	-.02	.10	-.05	.55a	.10	-.07	.11	.13	.25	.07	.74a	.29	-.09
26	OTJR: Relaxation – Day 4	1.81	.69	.17	.20	-.05	.31c	.48b	.24	-.25	.08	.26	.02	.29c	.60a	.36c
27	Situational Well-being – Day 4	5.17	1.20	.66a	.08	.01	-.04	.18	.38c	-.37c	-.17	.21	.04	-.04	.04	.56a
28	Need for Recovery – Day 4	3.35	1.63	-.61a	-.28	-.22	-.03	-.33c	-.50a	.59a	.17	-.35c	-.28	.02	-.14	-.58a
29	Workload – Day 4	3.35	1.75	.07	.22	.15	.11	-.09	.14	-.11	.07	.29	.26	.20	.07	.12
30	OTJR: Mastery – Day 5	1.97	1.05	.25	.58a	.41b	.09	.03	.18	-.47b	-.09	.54a	.34c	-.17	-.06	.10
31	OTJR: Control – Day 5	2.95	1.07	.19	.07	.52a	-.03	.05	.05	-.18	-.13	.23	.65a	-.06	.10	.40
32	OTJR: Distraction – Day 5	1.35	.46	-.13	.27	-.02	.50a	.17	-.10	.16	.12	.09	.09	.55a	.19	-.09

Table 10
Cont'd.

33	OTJR: Relaxation – Day 5	1.89	.74	-.04	.22	-.03	.07	.29	-.12	.07	-.08	.04	-.00	.07	.38c	.077
34	Situational Well-being – Day 5	5.29	1.34	.43b	-.11	.07	-.18	-.01	.14	-.24	-.43b	-.02	.03	-.29c	-.05	.25
35	Need for Recovery – Day 5	3.20	1.46	-.19	.11	-.09	.03	-.08	-.01	.11	.29	-.09	.01	.16	-.01	-.14
36	Workload – Day 5	2.78	1.57	-.23	-.01	-.03	-.02	-.21	-.14	.20	.46b	.08	.07	.10	-.04	-.27

[a]$p < .001$ [b]$p < .01$, [c]$p < .05$
Listwise N=46

Table 10
Cont'd.

	Variable	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
14	Need for Recovery – Day 2	(.86)														
15	Workload – Day 2	.19	-													
16	OTJR: Mastery – Day 3	-.42b	-.00	(.90)												
17	OTJR: Control – Day 3	-.23	-.08	.33c	(.87)											
18	OTJR: Low-effort – Day 3	.16	-.03	.03	-.03	(.49)										
19	OTJR: Relaxation – Day 3	-.25	-.04	.17	.19	.27	(.75)									
20	Situational Well-being – Day 3	-.35c	-.16	.13	.24	.18	.39b	(.87)								
21	Need for Recovery – Day 3	.73a	.30c	-.33c	-.33c	-.00	-.43b	-.62a	(.83)							
22	Workload – Day 3	.22	.70a	.01	-.12	.16	-.11	-.24	.40b	-						
23	OTJR: Mastery – Day 4	-.47b	.02	.84a	.37c	.09	.24	.25	-.37c	.03	(.91)					
24	OTJR: Control – Day 4	-.18	-.17	.22	.77a	.08	.03	.08	-.15	-.16	.37c	(.91)				
25	OTJR: Low-effort – Day 4	.18	.06	-.01	-.11	.79a	.20	.14	.02	.10	.12	.10	(.41)			
26	OTJR: Relaxation – Day 4	-.35c	-.03	.17	-.01	.31c	.68a	.23	-.38b	-.11	.34c	.12	.31c	(.72)		
27	Situational Well-being – Day 4	-.43b	-.16	.13	.15	-.13	.19	.56a	-.58a	-.28	.23	.16	-.07	.18	(.91)	
28	Need for Recovery – Day 4	.69a	.25	-.29c	-.22	.07	-.13	-.27	.74a	.41b	-.33c	-.27	.09	-.31c	-.58a	(.88)
29	Workload – Day 4	.00	.34c	.27	.11	.20	-.03	.13	.16	.47b	.18	.01	.08	-.17	-.14	.31c
30	OTJR: Mastery – Day 5	-.26	.02	.71a	.33c	.01	.14	.07	-.16	.07	.70a	.14	-.11	.06	.01	-.14
31	OTJR: Control – Day 5	-.24	-.14	.26	.63a	.11	.12	.25	-.31c	-.30c	.31c	.70a	.08	.11	.28	-.35c
32	OTJR: Low-effort – Day 5	.17	.02	-.06	-.11	.64a	.24	-.03	.14	.20	-.04	-.06	.63a	.12	-.18	.14
33	OTJR: Relaxation – Day 5	.06	-.14	.06	.03	.26	.55a	-.01	-.06	-.10	.17	.11	.13	.64a	.12	-.10
34	Situational Well-being – Day 5	-.26	-.40b	.01	.29	-.24	.01	.07	-.35c	-.45b	.00	.29c	-.25	.00	.41b	-.48b
35	Need for Recovery – Day 5	.27	.48b	-.06	-.32c	.17	-.12	.05	.37c	.43b	-.10	-.32c	.09	-.20	-.21	.40b
36	Workload – Day 5	.30c	.57a	-.02	-.06	.32c	.06	.04	.36c	.58a	.06	-.11	.28	.00	-.21	.55a

Table 10
Cont'd.

	Variable	29	30	31	32	33	34	35
29	Workload – Day 4	-						
30	OTJR: Mastery – Day 5	.21	(.94)					
31	OTJR: Control – Day 5	-.02	.22	(.92)				
32	OTJR: Low-effort – Day 5	.10	.04	.07	(.44)			
33	OTJR: Relaxation – Day 5	-.19	.10	.24	.32c	(.74)		
34	Situational Well-being – Day 5	-.41b	.08	.28	-.27	.13	(.93)	
35	Need for Recovery – Day 5	.57a	-.09	-.27	.10	-.23	-.70a	(.75)
36	Workload – Day 5	.52a	.07	-.07	.26	-.05	-.69a	.60a

Hierarchical Linear Modeling

As the data holds a hierarchical structure with days (Level 1) nested within persons (Level 2), hierarchical linear modeling was used to perform the analyses (Bryk & Raudenbush, 1992). Data analysis was performed using HLM7, and analyses were performed on both situational well-being and need for recovery separately. Level 2 variables were centered on the grand mean, and Level 1 variables were centered on the group or person mean. Maximum likelihood estimation was used and included random effects only if they were significant.

Analyses for situational well-being

As a first step, a null model containing just the intercept was conducted to determine if the variability in situational well-being was significantly different than zero, and confirm whether HLM was necessary (Woltman, Feldstain, MacKay, & Rocchi, 2012). The intercept for the estimation of variance components was significant suggesting that situational well-being varies across respondents, x^2 (71) = 231.46, $p < .01$, and that HLM is warranted. The intraclass correlation coefficient was calculated to determine the percentage of variance attributable to both within and between individuals. The results suggest that 66% of variance in situational well-being can be attributed to within individuals and 34% of variance is between individuals.

The next model was conducted to determine if situational well-being varied as a function of time. Both a linear and quadratic variable were entered as Level 1 predictors. An examination of the estimation of fixed effects indicated that individuals' average baseline levels of situational well-being on Monday start at very different levels (*b* =

4.97, $p < .001$), and although not significant, situational well-being appears to decrease during the course of the week ($b = -.17$, $p > .05$) and then tends to slightly rebound ($b = .07$, $p > .05$). When evaluating the variance components, the intercept for the estimation of variance components indicates that there is significant variability in the rate of drop off for situational well-being within individuals, x^2 (71) = 239.36, $p < .001$, with 65% of variance explained by individual differences.

As a next step, the subscales of the On-the-Job Recovery scale were entered into the model as Level 1 predictors with the inclusion of their linear and quadratic terms. The results for this analysis indicate that the time-varying effects of the subscales when entered as a full model are negligible. The previous time model estimated an average trajectory that showed a shallow, modestly increasing trend over time. However, as I attempted to model the four subscales of the OTJR scale, it is evident that the time effects of the subscales challenge the weak trajectory even further.[4] Mastery was the only subscale that had an effect on the intercept (situational well-being on Monday) ($b = .48$, $p < .05$), but did not appear to vary as a function of time when evaluating the linear ($b = -.18$, $p > .05$) and quadratic ($b = .02$, $p > .05$) estimates. Results are presented in Table 11.

[4] To determine the time effects of individual subscales separately, each subscale was entered into its own analysis with both the linear and quadratic terms predicting situational well-being. All subscales were significant when evaluating the intercept, linear, and quadratic estimates.

Table 11
Multilevel Estimates for Models Predicting Situational Well-Being

Parameter	Model 1	Model 2	Model 3
Intercept	5.04* (.11)	4.97* (.15)	4.59* (.42)
Interaction by Time		-.17 (.15)	.11 (.62)
Quadratic		.07 (.04)	.05 (.15)
Mastery			.48** (.20)
Mastery by Time			-.18 (.19)
Mastery Quadratic			.02 (.04)
Control			-.06 (.17)
Control by Time			-.02 (.16)
Control Quadratic			.01 (.04)
Distraction			.13 (.29)
Distraction by Time			.14 (.32)
Distraction Quadratic			-.04 (.08)
Relaxation			.38 (.23)
Relaxation by Time			.05 (.24)
Relaxation Quadratic			-.02 (.06)

Note: Standard errors are in parentheses. *p<.01 **p<.05

As the previous analysis provided evidence that situational well-being decreases as the work week progresses, followed by an increase in average scores, an additional model was conducted to examine the day level variability of the subscales. This analysis allowed the impact of each subscale on situational well-being to be compared throughout the course of the work week. Day-level time variables were entered as Level 1 predictors, while day-level measures of each subscale (Mastery, Control, Distraction and Relaxation) were entered as Level 2 predictors alongside sex, age, and a measure of general health. When evaluating average situational well-being estimates across each work day, on average individuals' levels of situational well-being decreased over

Monday (b = 4.94, p < .001), Tuesday (b = 4.93, p < .001) and Wednesday (b = 4.86, p < .001), however they increased on Thursday (b = 5.19, p < .001) and Friday (b = 5.44, p < .001). When examining the individual subscales of the OTJR scale the following significant relationships were found: on Monday situational well-being was likely to increase as a function of Relaxation activities (b = .44, p < .05); and on Tuesday situational well-being was likely to decrease as a function of Distraction activities (b = -.54, p < .05) and increase as a function of Relaxation activities (b = .63, p < .001). Although the coefficients of the OTJR subscales fluctuated during the rest of the work week, they did not significantly impact situational well-being. The results are presented in Table 12.

Table 12
Multilevel Estimates for OTJR Subscales Predicting Situational Well-Being

Parameter	Monday	Tuesday	Wednesday	Thursday	Friday
Level 1 Intercept	4.94* (.13)	4.93* (.13)	4.86* (.14)	5.19* (.10)	5.44* (.11)
Level 2					
Mastery	.04 (.16)	.31 (.17)	-.05 (.18)	.07 (.15)	-.01 (.09)
Control	.06 (.11)	-.11 (.16)	.19 (.13)	.11 (.12)	.09 (.10)
Distraction	-.01 (.25)	-.54** (.24)	.32 (.25)	.05 (.19)	-.28 (.25)
Relaxation	.44** (.20)	.63* (.17)	.04 (.20)	-.02 (.17)	-.04 (.14)
Workload	-.17** (.08)	-.06 (.09)	-.17** (.08)	-.26* (.08)	-.41* (.07)
Sex	.19 (.30)	-.34 (.30)	-.51 (.27)	-.40 (.25)	.23 (.21)
Age	-.55 (.33)	.38 (.35)	.13 (.34)	.53 (.27)	-.24 (.31)
GHQ	.67* (.14)	.57** (.19)	.33** (.14)	.65* (.15)	.43** (.17)

Note: Standard errors are in parentheses. *p<.01 **p<.05

Analyses for need for recovery

As a first step, a null model containing just the intercept was conducted to determine if the variability in need for recovery was significantly different than zero. The intercept for the estimation of variance components was significant suggesting that need for recovery varies across respondents, x^2 (71) = 375.77, p <.01, and that HLM is warranted. The intraclass correlation coefficient was calculated to determine the percentage of variance attributable to both within and between individuals. The results suggest that 50% of variance in need for recovery can be attributed within individuals and 50% is between individuals.

The next model was conducted to determine if need for recovery varied as a function of time. Both a linear and quadratic variable were entered as Level 1 predictors. An examination of the estimation of fixed effects indicated that individuals' average levels of need for recovery on Monday start at very different levels (b = 3.45, p < .001), however need for recovery levels do not appear to change over time when considering both the linear estimate (b = .06, p > .05) and the quadratic estimate (b = -.03, p > .05). When evaluating the variance components, the intercept for the estimation of variance indicates that there is variability at the individual level, x^2 (64) = 179.89, p < .001, however only 39% of variance is explained within individuals.

As a next step, the subscales of the On-the-Job Recovery scale were entered into the model as Level 1 predictors with the inclusion of their linear and quadratic terms. The same pattern emerges as the results for situational well-being. The results for this analysis indicate that the time-varying effects of the subscales when entered as a full

model are negligible. The previous time model estimated an average trajectory that indicated only minor fluctuations over time. However, as I attempted to model the four subscales of the OTJR scale, it is evident that the time effects of the subscales challenge the weak trajectory even further.[5] Mastery is the only subscale that has an effect on the intercept (need for recovery on Monday) (b = -.44, p < .05), but did not appear to vary as a function of time when evaluating the linear (b = .27, p > .05) and quadratic (b = -.04, p > .05) estimates. Results are presented in Table 13.

Table 13
Multilevel Estimates for Models Predicting Need for Recovery

Parameter	Model 1	Model 2	Model 3
Intercept	3.41* (.14)	3.45* (.17)	3.86* (.46)
Interaction by Time		.06 (.15)	-.17 (.68)
Quadratic		-.03 (.04)	-.03 (.17)
Mastery			-.44** (.18)
Mastery by Time			.27 (.16)
Mastery Quadratic			.03 (.04)
Control			-.04 (.04)
Control by Time			-.00 (.14)
Control Quadratic			.01 (.04)
Distraction			-.02 (.24)
Distraction by Time			.03 (.28)
Distraction Quadratic			-.02 (.07)
Relaxation			-.29 (.24)
Relaxation by Time			-.28 (.22)
Relaxation Quadratic			.06 (.05)

Note: Standard errors are parentheses. *p<.01 **p<.05

[5] To determine the time effects of individual subscales separately, each subscale was entered into his own analysis with both the linear and quadratic terms predicting need for recovery. All subscales were significant when evaluating the intercept, linear and quadratic estimates.

As the previous analysis provided evidence that need for recovery decreases as the work week progresses, an additional model was conducted to examine the day-level variability of the subscales. Day-level time variables were entered as Level 1 predictors, while day level measures of each subscale (Mastery, Control, Distraction, and Relaxation) were entered as Level 2 predictors alongside sex, age, and a measure of general health. When evaluating average need for recovery estimates across each work day, an interesting picture emerges; on average individuals' levels of need for recovery decreased over Monday (b = 3.50, p < .001) and Tuesday (b = 3.38, p < .001), with a slight increase in need for recovery on Wednesday (b = 3.35, p < .001), followed by a further decrease on Thursday (b = 3.35, p < .001) and Friday (b = 3.10, p < .001). When examining the individual subscales of the OTJR scale, on Monday, need for recovery decreased as function of Control activities (b = -.37, p < .01); on Tuesday, need for recovery decreased as a function of Mastery activities (b = -.38, p < .05) and Relaxation activities (b = -.41, p < .05) but increased as a function of Distraction activities (b = .60, p < .05); on Wednesday, need for recovery decreased as a function of Control activities (b = -.32, p < .05) and Relaxation activities (b = -.44, p < .05); and on Thursday, need for recovery decreased as a function of Control activities (b = -.39, p < .01). The subscales of the OTJR scale did not have an impact on need for recovery on Friday. The results are presented in Table 14.

Table 14

Multilevel Estimates for OTJR Subscales Predicting Need for Recovery

Parameter	Monday	Tuesday	Wednesday	Thursday	Friday
Level 1 Intercept	3.50* (.14)	3.38* (.15)	3.44* (.12)	3.35* (.10)	3.10* (.14)
Level 2					
Mastery	-.32 (.17)	-.38** (.19)	-.09 (.16)	-.13(.15)	-.08 (.15)
Control	-.37* (.11)	-.20 (.16)	-.32** (.14)	-.39* (.12)	-.23 (.12)
Distraction	-.02 (.22)	.60** (.25)	-.10 (.20)	.07 (.22)	-.09 (.28)
Relaxation	-.30 (.21)	-.41** (.20)	-.44** (.19)	-.20 (.22)	-.25 (.20)
Workload	.20* (.07)	.16 (.08)	.25* (.07)	.40* (.07)	.57* (.09)
Sex	.21 (.30)	.09 (.35)	.13 (.31)	-.10 (.34)	-.19 (.25)
Age	-.21 (.31)	-.59 (.40)	-.29 (.30)	-.69 (.36)	1.07* (.38)
GHQ	-.55* (.12)	-.38** (.18)	-.39* (.14)	-.59* (.18)	-.12 (.20)

Note: Standard errors are in parentheses. *p<.01 **p<.05

Study 3 Discussion

Study 3 sought to examine the daily fluctuations in situational well-being and need for recovery as influenced by daily on-the-job recovery activities. When considering the results for situational well-being, the initial null analysis provided evidence that a substantial amount of variability exists within each individual on their average situational well-being scores. However, although it appears as though individuals begin each work week (Monday) with variability in their average levels of situational well-being, the time-varying effects of the OTJR subscales are very small. As a result, Hypothesis 1 received only partial support, as the Mastery subscale was the only subscale to have an effect on average situational well-being scores on Monday. An additional analysis was conducted to examine the fluctuations in situational well-being across each individual workday. The analyses suggested that only Relaxation activities had a significant impact on situational well-being on Monday and Tuesday. Interestingly,

on Tuesday, engaging in Distraction activities actually reduced situational well-being. The OTJR subscales did not have any significant impact on situational well-being after Tuesday, suggesting that on-the-job recovery activities may play a greater role at the beginning of the workweek.

The initial analysis for need for recovery indicated that the variability within and between individuals is equally split. Similar to the result for situational well-being, while the analysis indicated that individuals begin Monday with varying levels of need for recovery, the time-varying effects of the OTJR subscales are very small. As such, Hypothesis 2 received only partial support, as the Mastery subscale was the only subscale to have an effect on average need for recovery scores on Monday. An additional analysis was conducted to examine the fluctuations in need for recovery across each individual workday. A stronger pattern of results emerges for these results in comparison to the situational well-being analyses as all subscales had a significant impact on at least one day. On Monday, Wednesday, and Thursday, engaging in Control activities reduced need for recovery. Engaging in Mastery activities reduced need for recovery on Tuesday, and Relaxation activities reduced need for recovery on Tuesday and Wednesday. However, engaging in Distraction activities led to an increased need for recovery on Tuesday.

Overall the analyses assessing the impact of time indicate that the time-varying effects of the OTJR subscales are very small. The continuous time model estimated an average trajectory that showed a shallow, slightly growing trend over time and the introduction of the time effects of the subscales challenged the weak trajectory even

further. Therefore, the results suggested that daily OTJR does not have a significant impact on situational well-being or need for recovery when assessing the linear and quadratic models. In fact, only the Mastery subscale had an impact on average scores on Monday. However, an analysis of the daily relationships of the variables, across each day separately, allowed the variability in individual fluctuations to be teased apart in more depth. These analyses provided evidence that the OTJR subscales do play an important role in situational well-being and need for recovery, dependent upon the workday.

General Discussion

The goal of Study 1 was the development of an on-the-job recovery scale designed to examine specific on-the-job recovery activities as they relate to previously supported recovery domains (Sonnentag & Fritz, 2007). In support of the first hypothesis, and replicating previous research on off-job recovery (Sonnentag & Fritz, 2007), exploratory factor analyses provided evidence of a four-factor model of on-the-job recovery consisting of the following recovery domains: mastery, control, distraction, and relaxation. Hypothesis 2 was also supported, as the newly-developed On-the-Job Recovery scale was positively correlated with the subscales of the REQ. Partial support was obtained for both Hypothesis 3 and 4, as subscales of the On-the-Job Recovery scale were related to a measure of general health as well as job stressors.

Expanding upon Study 1, the goal of Study 2 was the further validation of the newly developed On-the-Job Recovery scale, as well as the examination of on-the-job

recovery as it relates to need for recovery, job outcomes, and well-being. More specifically, Study 2 sought to determine if the On-the-Job Recovery scale offered unique prediction above and beyond what is accounted for by the Recovery Experiences Questionnaire (Sonnentag & Fritz, 2007). In support of Hypothesis 1, the factor structure proposed in Study 1 was confirmed, providing further evidence of a four-factor model of on-the-job recovery. In support of the remaining Study 2 hypotheses, the results indicated that the OTJR scale accounted for unique variance, above and beyond the REQ, on measures of well-being, need for recovery, affect and general health, affective commitment, job control, control over decision-making, routine, and skill use. These findings suggest that the concept of on-the-job recovery can be considered a distinct and valuable recovery experience that plays an important role in the recovery process. As employees spend a substantial amount of each day at their workplaces, encouraging employees to engage in on-the-job recovery activities should be viewed as a viable strategy through which employees can mitigate the impact of stressors that are experienced during the workday. In this set of studies we see that on-the-job recovery is related to important organizational and individual variables, thus organizations may be able to promote their employees' health and well-being by facilitating on-the-job recovery.

Study 3 consisted of a daily survey designed to determine the impact of daily on-the-job recovery activities on situational well-being and need for recovery. Using hierarchical linear modeling, only partial support was obtained for the hypotheses. The analysis of the baseline levels of situational well-being and need for recovery indicate

that there is a significant proportion of variance that can be attributable to differences within individuals, and that individual levels differ when comparing average levels on Monday. However, the interaction of time or time-varying estimates is very small, suggesting the average situational well-being levels follow a shallow trend over time. When assessing the impact of specific subscales, engaging in Mastery efforts were the only recovery activities that had a significant impact on average levels of situational well-being on Monday; with no evidence of time-varying effects. When reviewing the fluctuations in situational well-being across each individual workday, the analyses provided evidence that average levels of situational well-being decrease over Monday, Tuesday, and Wednesday and then begin to rebound with the highest average levels reported on Friday. Relaxation activities increased average levels of situational well-being on Monday, while interestingly Distraction activities caused a decrease in situational well-being on Tuesday.

Following a similar pattern to that of the situational well-being analyses, average levels of need for recovery did not appear to vary as a function of time, and Mastery was the only recovery subscale to significantly impact average levels of need for recovery on Monday. When comparing the variability of the on-the-job recovery subscales across each workday, not surprisingly, the subscales had a greater impact on average levels of need for recovery in comparison to the findings for situational well-being. All subscales significantly influenced average levels of need for recovery, with each subscale having a positive impact on at least one workday. Similar to the findings for situational well-being, Distraction activities had a negative impact on need for recovery, and this finding

was once again obtained on Tuesday. These results seem to suggest that there is something unique about Distraction activities and their interaction with average levels on Tuesday. Overall the results are in line with existing research that indicates off-job recovery is associated with improved well-being (e.g., Sonnentag & Geurts, 2009; Strauss-Blasche, Ekmekcioglu, & Marktl, 2000; Westmand & Eden, 1997) and that the ability to engage in recovery activities is negatively related to need for recovery (e.g., Sonnentag & Zijlstra, 2006; Sonnentag & Fritz, 2007).

Despite the limited findings in Study 3, taken together the results suggest that on-the-job recovery represents an important expansion of the recovery literature, as well as a viable strategy that can be adopted by organizations to support employee health and work behaviours. Further, the present studies provide evidence that on-the-job recovery can be conceptualized as a distinct concept from that of off-job recovery, and reflects a measurable construct that is predictive of important organizational and individual outcomes. More specifically, across three separate studies the results indicate that on-the-job recovery is influenced by organizational characteristics (e.g., job control, workload) and is related to indicators of well-being (e.g., general health, situational well-being). These results were obtained cross-sectionally and within a daily diary study. Further, on-the-job recovery explains variance both between and within individuals, providing evidence that recovery is a highly individualized process where individual differences will play an important role, which is supported by the transactional model of stress (Lazarus & Folkman, 1984).

The results obtained across all three studies are also supported by the Effort-Recovery Model (Meijman & Mulder, 1998) and the Conservation of Resources Theory (Hobfoll, 1998). I observed that characteristics of the work environment (e.g., job control, skill use) supported participation in on-the-job recovery activities and resulted in a decreased need for recovery at the end of the work day. These findings seem to imply that having the opportunity to engage in recovery activities during the work day allows the recovery process to occur. Further, engaging in recovery activities, during brief respites at work, allowed existing resources to be replenished and allowed new resources to be gained which is evidenced by improved situational well-being and reduced need for recovery at the end of the work day.

Results from the present studies are also in line with research on the Job Demands – Control model that posits that high levels of job demands and low levels of job control are associated with negative outcomes (Karasek & Theorell, 1990). On-the-job recovery was negatively related to measures of workload, and positively related to measures of job control. Further, results from the daily diary study provided evidence that engaging in daily on-the-job recovery activities (Mastery, Control, Distraction) was significantly related to reductions in need for recovery and improved situational well-being despite the negative influence of workload. Thus, engaging in respite activities during the course of the workday appear to have buffering effects against the negative consequences associated with experiencing a high workload.

The findings from all three studies make a valuable contribution to the recovery literature. As individuals may have insufficient opportunities to engage in recovery

activities during their off-work time, on-the-job recovery may represent a feasible alternative. As prior research has provided evidence that the positive impacts of engaging in recovery are subject to fade-out effects (e.g., Rook & Zijlstra, 2006; Fritz, Sonnentag, Spector, & McInroe, 2010), it is imperative that all possible opportunities for engaging in recovery are examined.

Limitations

The studies presented within are not without limitations, and the following should be taken into consideration when evaluating the results. The first is the cross-sectional nature of the data collection in Study 1 and Study 2, and further, that all three studies were based on self-report data. It is plausible that the findings are influenced by common method variance which can lead to the inflation of relationships between study variables (Podsakoff, Mackenzie, Lee, & Podsakoff, 2003). Cross-sectional data also prevents the causal direction of effects to be assessed. The generalizability of the results may also be limited to the occupations and age ranges obtained in each study.

In regards to the potential concerns regarding common method variance, across all three studies a number of low or non-significant correlations were obtained suggesting that the relationships between study variables did not suffer from inflation, which is a byproduct of common method variance (Lindell & Whitney, 2001). If the correlations were in fact inflated as a result of common method variance it is unlikely that I would have obtained a multi-dimensional factor solution in Study 1 and Study 2. Further, the

same pattern of results that were obtained in the cross-sectional studies was observed in the diary study as well where common method variance is less of a concern.

When considering the potential impact of self-report data, it could be argued that individuals are best suited to make evaluations of their work environments, well-being, and need for recovery. The very nature of recovery measurements would require the individual providing the responses to have an in-depth knowledge of which activities were actually being pursued; it is not likely that a third party could accurately capture this information. This limitation could be addressed within future studies by having employers or employees provide comparative data on structural features of the organization, assigned work tasks, and frequency in which the individual capitalizes on work breaks. Further, the daily nature of the data collection should eliminate any concerns over the need for retrospective recall.

There are potential limitations with the approach taken to determine the final items for inclusion in the scale. For example, after the Study 1 data collection, a number of items were removed because of the low frequency with which participants indicated that they performed that activity. Setting the threshold at 50% of participants who engaged in this action may have been too stringent and possibly resulted in the removal of a number of actions that are viable on-the-job recovery activities. That being said, care needed to be taken in choosing items that reflected activities that people use as on-the-job recovery efforts. In that sense, some activities like making to-do lists, smoke breaks, and having a cup of coffee could be viewed as part of daily work tasks or routines, and employees are likely to multi-task while the activities are occurring. For the

recovery process to occur it is plausible that activities need to be performed with the individual disengaged from their work. As such, the removal of items with low endorsement or that can be performed while still completing work tasks is likely warranted.

A related limitation may be that the newly developed four-factor On-The-Job Recovery scale might not comprise all relevant recovery activities or experiences. The percentage of older respondents (55% of Study 1 participants were over 50 years of age) may have also impacted the scale development. Within the initial item set a number of the on-the-job recovery activities that were presented may have reflected activities that an older population of employees would not engage in or that would be viewed as inappropriate based on their opinions as to what constitutes appropriate work place behaviour. For example, older employees may view it as inappropriate to take care of household related activities, watch TV, or use the Internet for personal use during the workday. This theory is supported when you compare the frequency distributions for those in their 50s to those in their 20s: using the internet for social purposes (86% vs. 40%), using the internet for personal activities (67.9% vs. 40%), and making household related to-do lists (73.1% vs. 40%). However, the primary goal of the on-the-job recovery scale was to develop a list of on-the-job recovery activities that would be globally representative across employees, occupations and work environments. Further, although older employees were more likely to indicate that they never or rarely ever engaged in certain activities, a percentage of those employees did in fact indicate that they did engage in those activities.

Age may have also played a role in the initial scale development, as the subject matter experts used were drawn from a younger cohort of participants. It is possible that using older SMEs during this phase would have resulted in the inclusion of different activities. Nevertheless, previous research has suggested that it is not likely a specific activity per se that contributes to the experience of recovery, but rather the underlying attributes of the recovery experience itself (Sonnentag & Fritz, 2007). As such, an activity specific scale may not adequately capture the underlying attributes or the full range of activities that may be performed by all individuals. However, while individuals will likely pursue different activities to aid in the recovery process, the underlying recovery attributes (e.g., mastery, distraction, control, relaxation) should remain the same across all activities. This rationale is supported by the results of Study 1 and Study 2 where a four-factor model, consisting of the aforementioned subscales, was related to organizational and individual outcomes. Further, during a standard work day an individual is likely limited by the confines of the work environment and as such will have a limited range of viable activities available to them. Therefore, the newly developed On-the-Job Recovery scale likely captures a representative range of possible activities that the average employee would have the opportunity to successful complete during the work day.

One might also argue that the data may be biased in terms of socially desirable responding, or that participants may not have responded truthfully due to the sensitive nature of some of the items. However this does not appear to be an issue for any of the aforementioned studies, as variability existed across all items used, and across each of the

individual days in Study 3. An additional concern is that as a result of participating in the study, participants may have been primed to engage in recovery activities during the daily diary study. If the study did in fact motivate individuals to engage in recovery activities, it could be argued that this would serve to strengthen the study results as the goal was to assess the positive impact of engaging in respite activities during the course of the work day. Research has also suggested that when participant motivation is high, and the burden created by the study is low participants will comply with the survey process (Green, Rafaeli, Bolger, Shrout, & Reis, 2006). Further, even if participants increased their engagement in recovery activities as a result of participating in the study each day, the results would further serve to show the benefits of engaging in on-the-job recovery activities.

There also may have been factors that affected the implementation of the diary study. Daily emails were sent to each participant with a link for the survey posted for that day to ensure that participants completed the survey at the end of their workday. Unfortunately, participants were not isolated to one particular location, and some participants may have completed the survey prior to the end of their workday, or after they arrived home. However, if participants did in fact complete the survey outside the designated time period, it is reasonable to assume that the results were attenuated as a result.

Lastly, and perhaps most importantly, the low reliabilities of the Distraction and Relaxation subscales in Study 1 and Study 2 cannot be ignored. This finding is not completely unexpected as previous attempts to assess the impact of specific recovery

activities have led to inconclusive results (i.e., Winwood et al., 2007; Rook & Zijlstra, 2006; Sonnentag, 2001) suggesting that specific activities are likely only helpful for a subset of individuals. Certainly this remains an issue to be clarified in future research on the scale. Observing that the Distraction and Relaxation subscales offered unique prediction of employee and organizational characteristics and influenced daily levels of need for recovery and situational well-being, this suggests that these are viable recovery factors worthy of further investigation and refinement. As the present studies are believed to be the first to assess the recovery activities that can be completed while on the job, they should be viewed as providing valuable information that can further our understanding of the recovery process.

Future Research

The present studies provided evidence that engaging in on-the-job recovery activities has the same positive effects obtained by engaging in off-job recovery activities. However, the present study did not examine the impact of on-the-job recovery activities as they relate to psychological detachment. As psychological detachment has been studied most extensively in the off-job recovery literature, and further has been identified as having a substantial impact on well-being (Sonnentag, 2012), it may be beneficial to examine if on-the-job recovery impacts psychological detachment. Although it is likely that engaging in on-the-job recovery may be insufficient to allow psychological detachment to occur, as the individual might be unable to completely disengage from the ruminations associated with their work demands, it is plausible that

engaging in daily on-the-job recovery can result in the accumulation of resources. In turn, the daily accumulation may allow an individual to psychologically detach from their work environment. As psychological detachment has been strongly linked to off-job recovery (e.g., Sonnentag & Kruel, 2006; Sonnentag & Bayer, 2005; Siltaloppi, Kinnunen, Feldt, & Tolvanen, 2012) this would represent an important expansion of the present studies.

Future research should also examine the effects of on-the-job recovery activities for other work arrangements beyond a traditional work week, including shift-work, flexible work arrangements, or non-traditional work hours. It will be important to validate the On-the-Job Recovery scale on different working populations as research has shown the recovery process to be more challenging for shift workers (Drach-Zahavy & Marzuq, 2012). As such, it will be important to determine if the on-the-job recovery experience is different for those employees working evenings or performing shift work, and if the nature of on-the-job recovery should be viewed as being more applicable for those working non-traditional work schedules. Relatedly, future research should also examine the impact of participating in on-the-job recovery activities over a time period greater than one work week or at different time points throughout the year. Within the present diary study all participants completed the daily survey during the summer months which may not be reflective of a standard work week if they were preparing for a vacation or just returning from one.

The impact of engaging in daily on-the-job recovery was also limited to the job characteristic of workload. This should be expanded to include other measures of the

work environment and job performance. Additionally, future research should attempt to further tease apart the characteristics of breaks at work to isolate the optimal length and frequency of breaks that facilitate successful on-the-job recovery. This would ensure that job design is structured appropriately to optimize the beneficial effects of engaging in on-the-job recovery activities. Future research should also seek to determine the relationship between *opportunity* to engage in recovery activities and characteristics of the work environment and measures of health and well-being. It is plausible that some individuals may have the opportunity to engage in on-the-job recovery activities but choose not to. It would be beneficial to determine if simply having the opportunity to engage in respite activities while on the job has the same beneficial effects as actually engaging in on-the-job recovery activities.

An examination of the opportunity to engage in recovery should also be viewed in light of those individuals who have a high level of demands both at home and in the workplace. It is likely that those individuals who have high demands at home may have less opportunity to pursue recovery activities during their off-work time. As such, they may require more on-the-job recovery experiences to maintain their health and well-being. However, at the same time those individuals with a high level of home demands may also feel the need to compress their work day to ensure they have adequate time to meet the demands of their home life. Future research should attempt to explicate this relationship by including measures of home life demands, and the availability of both on and off-job opportunities for recovery. To ensure health and performance in both home and work-life, it will be important that individuals recognize the importance of pursuing

recovery activities and isolate ways to include respite activities as part of their daily routines.

Practical Implications

The findings from all three of the present studies suggest that the work day should be structured to accommodate participation in on-the-job recovery activities. Organizations can implement a number of simple policy changes that foster an environment where the health and well-being of its employees can flourish. For example, employees can be permitted to use the internet for personal use, within reason, and be encouraged to engage in physical exercise. Additionally, organizations may want to consider having a designated space that encourages respite activities. Further, employers and supervisors should encourage employees to maximize the respite opportunities available to them and ensure that breaks can be taken without work-related interruptions. The present studies also provide initial information regarding the types of activities that organizations should encourage to maximize the short nature of the respites available.

The results of the present studies also showed the important role that characteristics like workload, job control, and control over decision-making have on an individuals' recovery process. Organizations may want to consider offering flexible work schedules whereby employees have a greater say in how they structure their work days. The results of Study 3 also provided evidence that engaging in on-the-job recovery activities can mitigate the negative consequences of workload and lead to a reduced need for recovery and improved situational well-being. Many employees may choose to

continue working through their breaks, or attempt to complete work tasks during designated lunch periods. Given we know that how employees utilize their breaks has an important impact on their health and well-being, simple structural changes can be implemented that emphasize the valuable nature of respites during the work day.

Conclusions

The results from the present studies provide evidence that on-the-job recovery represents an important expansion of the recovery literature, and offers unique prediction beyond that of traditional conceptualizations of off-job recovery. More specifically, the results suggest that on-the-job recovery is associated with positive well-being and affect, a reduced need for recovery, and is related to important job characteristics such as job satisfaction and commitment.

It has been suggested that simple management practices can be implemented to facilitate successful recovery, including: encouraging employees to take vacations, understanding that employees will likely differ in their average levels of need for recovery, and encouraging employees to utilize their lunch and shorter breaks to engage in recovery activities (Fritz, Ellis, Demsky, Lin & Guros, 2013). Given that the structure of the work environment is continually changing with increased demands being placed on employees, it is imperative that all potential recovery opportunities are capitalized on to help mitigate the negative impact of the stressor, stress, and strain relationship. The present studies provide further evidence that individuals, as well as organizations, should care and have a vested interest in recovery practices. The state of being recovered can no

longer be viewed within a non-work related lens or only with respect to health-related outcomes (Binnewies, Sonnentag, & Mojza, 2009). On-the job recovery can be viewed as a cost effective way for organizations to reduce the impact of stressors experienced by their employees during the workday.

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Appendices

Appendix A

Subject Matter Expert Sort Task

ITEM REVIEW INSTRUCTIONS

Status (Working, Student, etc): _____

Age: _____ Gender: _____

Instructions: Below you will find a list of activities that you may engage in **while you are at work**. They should reflect activities that you find relaxing or that you use to take a "break" from your work activities. Therefore they should not be activities that are considered part of your required work tasks. Please indicate whether or not you engage in these activities, by placing an X in the appropriate column. You will also be asked to list any other activities you engage in, **while at work**, that allows you to take a break from your work tasks.

Additionally, you will be provided with a list of activity categories and will be asked to indicate which category you feel best reflects each activity. If you feel that an activity is represented by more than one category please list all the relevant categories you feel apply. If you feel that an activity does not fit into any of the categories please write NONE in the space provided.

You will also be provided with a list of recovery constructs/categories and will be asked to indicate which construct you feel best reflects each activity. Again, if you feel that an activity is represented by more than one construct please list all the relevant constructs you feel apply. If you feel that an activity does not fit into any of the constructs please write NONE in the space provided.

Please refer to the definitions as you complete the task.

Lastly, please feel free to provide any additional comments you may have about the activities (e.g. wording problems, items that should be added/deleted) in the comment space. **Your input is greatly appreciated. Thank you for taking the time to help me with my study!**

Activity Categories

1) work-related activities
2) household and child-care activities

3) low-effort activities (e.g. watching television, surfing the Internet)
4) social activities
5) physical activities

Recovery Constructs

1) psychological detachment: to disengage oneself mentally from work
2) relaxation: engaging in pleasurable activities
3) mastery: engaging in experiences that are challenging and provide learning opportunities
4) control: perceiving that one has the ability to choose between two or more options

	While at work do you…	I **DO** engage	I **DO NOT** engage	Activity Category	Recovery Construct
1	take time to talk with co-workers socially				
2	make phone calls just to chat				
3	take time to engage in physical activities during breaks (e.g. go for a walk)				
4	use the Internet for personal use (e.g. Facebook, online shopping)				
5	read a magazine or book				
6	make to do lists				
7	watch something on TV or the Internet				
8	meditate				
9	take time to kick back and relax				
10	go out for lunch with family or friends				
11	play games				
12	listen to music				
13	decide for yourself what to do				
14	take time while at work to do relaxing things				
15	decide my own schedule				
16	determine for myself how I will spend my time while at work				
17	take care of things the way that I want them done while at work				
18	take smoke breaks				
19	take time while at work to relax				
20	seek out intellectual challenges				
21	do things that challenge you				
22	do something to broaden your horizons				
23	get a break from the demands of work				
24	have a cup of coffee				
25	take a nap				
26	participate in a team sport				
27	use break time for leisure				
28	learn new things not related to your job				

Appendix B

Full On-the-Job Recovery Item Set

Never	Rarely	Sometimes	Quite Often	Extremely Often or Always
1	Take time to talk with co-workers socially.			
2	Make phone calls just to chat.			
3	Take time to engage in physical activities during break (e.g., go for a walk).			
4	Use the Internet for personal use (e.g., pay bills, online shopping).			
5	Use the Internet for social activities (e.g., Facebook, Twitter).			
6	Read a magazine or book.			
7	Make work-related to-do lists.			
8	Make household-related to-do lists.			
9	Watch something on TV or the Internet.			
10	Mediate/stretch.			
11	Go out for lunch with family or friends.			
12	Play games (e.g., crossword puzzles, online, etc.).			
13	Listen to music.			
14	Decide for myself what to do.			
15	Take time while at work to relax, or do relaxing things.			
16	Decide my own schedule.			
17	Determine for myself how I will spend my time while at work.			
18	Take care of things the way that I want them done while at work.			
19	Take smoke breaks.			
20	Seek out intellectual challenges.			
21	Do things that challenge me.			
22	Do something to broaden my horizons.			
23	Get a break from the demands of work.			
24	Have a cup of coffee or other beverage.			
25	Take a nap.			
26	Participate in a team sport.			
27	Use break time for leisure.			
28	Learn new things not related to my job.			
29	Make plans to meet with friends/family after work or on the weekend.			
30	Use time to take care of my household activities (e.g., make doctor's appointments, provide support to loved ones).			
31	Clean or organize my desk or work space.			

Recovery Experiences Questionnaire (Sonnentag & Fritz, 2007)

		Strongly Disagree	Disagree	Slightly Disagree	Neither Disagree/Agree	Slightly Agree	Agree	Strongly Agree
1	Psychological Detachment	I forget about work.						
2		I don't think about work at all.						
3		I distance myself from work.						
4		I get a break from the demands of work.						
5	Relaxation	I kick back and relax.						
6		I do relaxing things.						
7		I use the time to relax.						
8		I take time for leisure.						
9	Mastery	I learn new things.						
10		I seek out intellectual challenges.						
11		I do things that challenge me.						
12		I do something to broaden my horizons.						
13	Control	I feel like I can decide for myself what to do.						
14		I decide my own schedule.						
15		I determine for myself how I will spend my time.						
16		I take care of things the way that I want them done.						

General Health Questionnaire (Banks et al.,1980)

Not at All	Rarely	Once in Awhile	Some of the Time	Fairly	Often	All of the Time
1	…been able to concentrate on whatever you're doing?					
2	…lost sleep from worry?					
3	…felt you were playing a useful part in things?					
4	…felt capable about making decision about things?					
5	…felt that you couldn't overcome your difficulties?					
6	…been able to enjoy normal day to day activities?					
7	…been about to face up to your problems?					
8	…been feeling unhappy and/or depressed?					
9	…been losing confidence in yourself?					
10	…been thinking of yourself as a worthless person?					
11	…felt under strain?					
12	…been feeling happy, all things considered?					

Job Stressors (Kelloway & Barling, 1994)

Strongly Disagree	Disagree	Slightly Disagree	Neither Disagree/Agree	Slightly Agree	Agree	Strongly Agree

1	I have too much work to do.
2	There is never enough time to finish all of my work.
3	I have to work very quickly to finish all of my tasks.
4	It is hard for me to keep up with the workload.
5	I work in the evenings or on weekends.
6	I often have to work extra hours without advance notice.
7	My work schedule changes frequently.
8	I work rotating shifts.
9	I am often asked to do more than one task at the same time.
10	To do my job well I have to do different things for different people at the same time.
11	It is difficult to balance conflicting demands at work.
12	I am usually given clear directions.
13	It is not clear what my superiors expect from me.
14	I know the performance standards for my job.
15	I know what to expect from my supervisor(s).
16	At work, I often do the same thing over and over.
17	Nothing ever changes in my job.
18	Sometimes it seems as though I could do my job “in my sleep”.
19	My job allows me to learn new things.
20	My job allows me to use my skills and abilities.
21	My job requires the use of many skills.
22	I have enough influence on my job.
23	I have a say in how my work gets done.
24	I have the opportunity to make my own decisions.
25	I have control over my work schedule.
26	I decide how to spend my time at work.
27	I decide what tasks I work on each day.
28	My work conflicts with my family/personal life.
29	Because of work, I am frequently away from home.
30	Because of work, I have had to miss family functions.
31	It is difficult to balance my work and family demands.
32	There is not enough recognition for good work in my organization.
33	Nobody in authority appreciates my work.
34	I usually hear if I’ve done a good job.
35	Overall, I am satisfied with my job.

Need For Recovery (Sonnentag & Zijlstra, 2006)

Strongly Disagree	Disagree	Slightly Disagree	Neither Disagree/Agree	Slightly Agree	Agree	Strongly Agree
1	I need more time for relaxing and recovering from work.					
2	Considering the total of all activities that I pursue at work, I have enough time to relax and to recover from work.					

Situational Well-being (Sonnentag, 2001)

Strongly Disagree	Disagree	Slightly Disagree	Neither Disagree/Agree	Slightly Agree	Agree	Strongly Agree
1	I feel tense when I get home from work.					
2	I am in a good mood when I get home from work.					
3	I am in a good mood at the end of the workday.					
4	I am in a good mood during my commute home from work.					

PANAS (Watson, Clark, & Tellegen, 1988)

Very Slightly or Not at All	A Little	Moderately	Quite a Bit	Extremely

1	Interested	11	Distressed
2	Excited	12	Upset
3	Strong	13	Guilty
4	Enthusiastic	14	Scared
5	Proud	15	Hostile
6	Alert	16	Irritable
7	Inspired	17	Ashamed
8	Determined	18	Nervous
9	Attentive	19	Jittery
10	Active	20	Afraid

Affective Commitment (Allen & Meyer, 1990)

Strongly Disagree	Disagree	Slightly Disagree	Neither Disagree/Agree	Slightly Agree	Agree	Strongly Agree

1	I would be very happy to spend the rest of my career with this organization.
2	I enjoy discussing my organization with people outside it.
3	I really feel as if this organization's problems are my own.
4	I think that I could easily become as attached to another organization as I am to this one.
5	I do not feel like 'part of the family' at my organization.
6	I do not feel 'emotionally attached' to this organization.
7	This organization has a great deal of personal meaning for me.
8	I do not feel a strong sense of belonging to my organization.

Job-Related Affective Well-Being Scale (Van Katwyk, Fox, Spector, & Kelloway, 2000)

Never	Rarely	Sometimes	Often	All of the Time

1	At ease.	16	Ecstatic.
2	Angry.	17	Enthusiastic.
3	Annoyed.	18	Fatigued.
4	Anxious.	19	Frightened.
5	Bored.	20	Frustrated.
6	Cheerful	21	Furious.
7	Calm.	22	Gloomy.
8	Confused.	23	Happy.
9	Content.	24	Intimidated.
10	Depressed.	25	Inspired.
11	Disgusted.	26	Miserable.
12	Discouraged.	27	Pleased.
13	Elated.	28	Proud.
14	Energetic.	29	Satisfied.
15	Excited.	30	Relaxed.

PHQ (Schat, Kelloway, & Desmarais, 2005)

Not at All	Rarely	Once in a While	Some of the Time	Fairly Often	Often	All of the Time
1	How often have you had difficulty getting to sleep at night?					
2	How often have you woken up during the night?					
3	How often have you had nightmares or disturbing dreams?					
4	How often has your sleep been peaceful and undisturbed?					
5	How often have you experienced headaches?					
6	How often did you get a headache when there was a lot of pressure on you to get things done?					
7	How often did you get a headache when you were frustrated because things were not going the way they should have or when you were annoyed at someone?					
8	How often have you suffered from an upset stomach (indigestion)?					
9	How often did you have to watch that you ate carefully to avoid stomach upsets?					
10	How often did you feel nauseated ('sick to your stomach")?					
11	How often were you constipated or did you suffer from diarrhea?					
0 Times	1-2 Times	3 Times	4 Times	5 Times	6 Times	7+ Times
12	How many times have you had minor colds (that made you feel uncomfortable but didn't keep you sick in bed or make you miss work)?					
13	How many times have you had respiratory infections more severe than minor colds that "laid you low" (such as bronchitis, sinusitis, etc.)?					
1 Day	2 Days	3 Days	4 Days	5 Days	6 Days	7+ Days
14	When you had a bad cold or flu, how long did it typically last?					

Appendix C

Study 2: Informed Consent

Informed Consent/Information Letter
Cross-Sectional
REB File # 12-210
Researchers:
Danielle Durepos, Dr. Lori Francis
Psychology Department
Saint Mary's University, 923 Robie Street, Halifax, NS B3H 3C3

INTRODUCTION

I am currently completing my PhD at Saint Mary's University. As part of my PhD dissertation, I am conducting research under the supervision of Dr. Lori Francis. This research project is funded by the Nova Scotia Health Research Foundation.

PURPOSE OF THIS RESEARCH

You are invited to participate in a study examining on-the-job recovery activities and their relationship with health and well-being among employed individuals. The purpose of this research study is to gain a more in depth understanding of the on-the-job activities you engage in that help you manage the stressors you experience, and to determine the relationship they have with other important organizational variables (e.g. job satisfaction).

WHO IS ELIGIBLE TO TAKE PART?

Individuals who previously completed the Atlantic Province Workplace Study and who indicated they would be interested in participating in additional research projects will be eligible to participate.

OR WHAT WILL I HAVE TO DO?

You will be asked to complete a short online survey that will take approximately 15 minutes to complete.

WHAT ARE THE POTENTIAL BENEFITS OF THIS RESEARCH?

As a result of participating, you will gain a better understanding of the stressors that you may experience. By asking you to reflect on the stressors you encounter on a day-to-day basis you may realize that you are being negatively impacted by stressors that you may not have acknowledged or been aware of before. Additionally, by asking you to reflect on activities that currently help you relax you may become aware of activities that you can pursue while at work that may help you manage the stressors you experience.

Further, the concept of On-the-Job-Recovery (activities pursued at work) has yet to be thoroughly investigated but represents an important area of psychological research. On-the-job recovery may be a cost effective way for organizations to reduce the impact of stressors experienced at work. As a thank you for participating in the study you will also be entered into a draw for a chance to win one of two cash prizes of $250.00.

WHAT ARE THE POTENTIAL RISKS FOR PARTICIPANTS?

There are minimal risks involved in the study. The questions on this survey deal with your health and well-being. If responding to these items causes you to experience negative emotions we encourage you to contact your Employee Assistance Program should your organization offer one or seek the advice of your family physician.

HOW CAN I WITHDRAW FROM THIS STUDY?

Your participation is completely voluntary and you may withdraw from this study at any time without penalty. You may also choose not to answer any questions that you do not feel comfortable answering. All information obtained in this study will be kept strictly confidential and anonymous. Given that your responses are anonymous, once you submit the online survey we will be unable to match individual participant responses and therefore we will be unable to delete survey responses once they have been submitted. This information will be kept in a secure location and will be viewed only by the researcher.

WHAT WILL BE DONE WITH MY INFORMATION? All responses will be kept confidential and anonymous. Data will be reported as group totals only, individuals will not be identified and individual responses will not be reported. Only the primary researcher (Danielle Durepos) and the research supervisor (Dr. Lori Francis) will have access to the data. Please be assured, that although we ask for your name and address to enter your name in the cash prize draw, this information will be replaced with an identification code when you submit the survey. A separate file will be created that links identification codes to names, and this file will be stored in a separate secure location that will be seen only by the researchers. Further, the file containing names and addresses will be deleted once the winners of the cash prizes have been contacted.

HOW CAN I GET MORE INFORMATION ABOUT THIS STUDY?

Your participation in this project is very important to us. If you have any questions about the research, please contact us.

Certification: This research has been reviewed and approved by the Saint Mary's University Research Ethics Board. If you have any questions or concerns about ethical matters, you may contact the chair of the Saint Mary's University Research Ethics Board at ethics@smu.ca or (902) 420-5728. I understand that by completing the online survey and submitting my responses that I understand what this study is about and appreciate the risks and benefits. I have had adequate time to think about this and have had the opportunity to ask questions. I understand that my participation is voluntary and that I can end my participation at any time. If you agree to participate please enter your name and contact information below and continue to the survey items.

We would like to thank you in advance for you participation. Your contribution is sincerely appreciated.

Appendix D

Study 2 Feedback Letter

SAINT MARY'S UNIVERSITY SINCE 1802
One University. One World. Yours.

Dear Participant,

I would like to thank you for your participation in this study. The purpose of the present study was to gain a more accurate and complete understanding of the on-the-job recovery activities that individuals engage in during the work day that help them deal with the stressors they experience. The data collected during the study will contribute to a better understanding of how on-the-job recovery activities can positively impact an individual's health and well-being.

Please remember that any data pertaining to you as an individual participant will be kept confidential and anonymous. All data obtained from this study will be reported as group totals only. Once all the data are collected and analyzed for this project, I plan on sharing this information with the research community through conferences, presentations and journal articles.

If you are interested in receiving more information regarding the results of this study, or if you have any questions or concerns, please contact me at either the phone number or email address listed at the bottom of the page.

If you would like a summary of the results, please provide me with your email address. When all of the data has been collected and analyzed I will provide you with a summary of the results. The study is expected to be completed by October, 2012.

If responding to the survey items causes you to experience negative emotions we encourage you to contact your Employee Assistance Program should your organization offer one or seek the advice of your family physician.

As with all Saint Mary's University projects involving human participants, this project was reviewed and approved by the Saint Mary's University Research Ethics Board (REB File # 12-210). Should you have any comments or concerns about ethical matters, please contact the chair of the Research Ethics Board at ethics@smu.ca or (902) 420-5728.

Appendix E

Study 2: E-mail Script

Subject line: Atlantic Province Workforce Survey

Dear Participant,

Approximately a year ago you participated in the Atlantic Province Workforce Survey and indicated that you would be interested in participating in future research projects of a similar nature. You are invited to participate in a study examining the on-the-job recovery activities that you engage in during the work day that help you deal with the stressors you experience.

Your participation in this study is completely voluntary, and you are under no obligation to participate in the current research project. The survey should take approximately 15 minutes to complete. Should you choose to participate, simply go to:

"link will be provided"

As a thank-you for participating in the study you will be entered into a draw for a chance to win one of two cash prizes of $250.00. Please refer to the first page of the web survey for further details about the study including more information about the draw.

If you have any questions about this research study, please do not hesitate to contact the principal researcher of the study.

Thank-you again for your interest in our project.

Sincerely,

Danielle Durepos
PhD Candidate
Saint Mary's University

This research has been reviewed and approved by the Saint Mary's University Research Ethics Board (REB File #12-210). If you have any questions or concerns about ethical matters, you may contact the chair of the Saint Mary's University Research Ethics Board at ethics@smu.ca or (902) 420-5728.

Appendix F

Study 3: Informed Consent

Informed Consent/Information Letter Daily Survey
REB File # 12-210
Researchers:
Danielle Durepos, Dr. Lori Francis
Psychology Department
Saint Mary's University, 923 Robie Street, Halifax, NS B3H 3C3

INTRODUCTION

I am currently completing my PhD at Saint Mary's University. As part of my PhD dissertation, I am conducting research under the supervision of Dr. Lori Francis. This research project is funded by the Nova Scotia Health Research Foundation.

PURPOSE OF THIS RESEARCH

You are invited to participate in a diary study examining *daily* on-the-job recovery activities and their relationship with daily measures of health and well-being among employed individuals. The purpose of this research study is to gain a more in depth understanding of the *daily* on-the-job activities you engage in that help you manage the daily stressors you experience, and to determine the relationship they have with other important variables (e.g. need for recovery). Further, this research will allow us to determine if there are certain days where engaging in recovery articles are more important.

WHO IS ELIGIBLE TO TAKE PART?

Individuals who completed Study 2 of the On-the-Job-Recovery study and indicated that they were willing to participate in Study 3.

OR WHAT WILL I HAVE TO DO?

You will be asked to complete a short survey following each work day, upon returning from work, for 5 consecutive days. The survey will take approximately 5 minutes to complete each day. You will receive a daily e-mail remainder from the researcher to complete the survey. You will be provided with a link to the survey that contains a unique ID code matched to each participant; this will ensure that we can match your survey responses over the 5 days.

WHAT ARE THE POTENTIAL BENEFITS OF THIS RESEARCH?

As a result of participating, you will gain a better understanding of the daily stressors that you may experience, and as a result a better understanding of the stressors that require you to engage in recovery activities. Further, the concept of daily On-the-Job-Recovery (activities pursued at work) has yet to be thoroughly investigated but represents an important area of psychological

research. On-the-job recovery may be a cost effective way for organizations to reduce the impact of stressors experienced at work.

As a thank you for participating in the study for each daily survey you complete you will receive an entry ticket for a chance to win one of two cash prizes of $250. If you complete all five surveys you will also be entered into an additional cash prize draw of $500.

WHAT ARE THE POTENTIAL RISKS FOR PARTICIPANTS?

There are minimal risks involved in the study. The questions on this survey deal with your health and well-being. If responding to these items causes you to experience negative emotions we encourage you to contact your Employee Assistance Program should your organization offer one or seek the advice of your family physician.

HOW CAN I WITHDRAW FROM THIS STUDY?

Your participation is completely voluntary and you may withdraw from this study at any time without penalty. You may also choose not to answer any questions that you do not feel comfortable answering. All information obtained in this study will be kept strictly confidential and anonymous. Given that your responses are anonymous, once you submit the online survey we will be unable to match individual participant responses and therefore we will be unable to delete survey responses once they have been submitted. This information will be kept in a secure location and will be viewed only by the researcher.

WHAT WILL BE DONE WITH MY INFORMATION? All responses will be kept confidential and anonymous. Data will be reported as group totals only, individuals will not be identified and individual responses will not be reported. Only the primary researcher (Danielle Durepos) and the research supervisor (Dr. Lori Francis) will have access to the data. Please be assured, that although we ask for your name and address to enter your name in the cash prize draw, this information will be replaced with an identification code when you submit the survey. A separate file will be created that links identification codes to names, and this file will be stored in a separate secure location that will be seen only by the researchers. Further, the file containing names and addresses will be deleted once the winners of the cash prizes have been contacted.

HOW CAN I GET MORE INFORMATION ABOUT THIS STUDY?

Your participation in this project is very important to us. If you have any questions about the research, please contact us.

Certification: This research has been reviewed and approved by the Saint Mary's University Research Ethics Board. If you have any questions or concerns about ethical matters, you may contact the chair of the Saint Mary's University Research Ethics Board at ethics@smu.ca or (902) 420-5728. I understand that by completing the online survey and submitting my responses that I understand what this study is about and appreciate the risks and benefits. I have had adequate time to think about this and have had the opportunity to ask questions. I understand that my participation is voluntary and that I can end my participation at any time. If you agree to participate please enter your name and contact information below and continue to the survey items.

We would like to thank you in advance for you participation. Your contribution is sincerely appreciated.

Appendix G

Study 3: Feedback Letter

Dear Participant,

I would like to thank you for your participation in this study. The purpose of the present study was to gain a more accurate and complete understanding of the daily on-the-job recovery activities that individuals engage in during the work day that help them deal with the daily stressors they experience. The data collected during the study will contribute to a better understanding of how daily on-the-job recovery activities can positively impact an individual's health and well-being. More specifically, it is likely that there are certain days where having the opportunity to engage in recovery activities is more important.

Please remember that any data pertaining to you as an individual participant will be kept confidential and anonymous. All data obtained from this study will be reported as group totals only. Once all the data are collected and analyzed for this project, I plan on sharing this information with the research community through conferences, presentations and journal articles.

If you are interested in receiving more information regarding the results of this study, or if you have any questions or concerns, please contact me at either the phone number or email address listed at the bottom of the page.

If you would like a summary of the results, please provide me with your email address. When all of the data has been collected and analyzed I will provide you with a summary of the results. The study is expected to be completed by October, 2012.

If responding to the survey items causes you to experience negative emotions we encourage you to contact your Employee Assistance Program should your organization offer one or seek the advice of your family physician.

As with all Saint Mary's University projects involving human participants, this project was reviewed and approved by the Saint Mary's University Research Ethics Board (REB File #12-210). Should you have any comments or concerns about ethical matters, please contact the chair of the Research Ethics Board at ethics@smu.ca or (902) 420-5728.

Appendix H

Study 3: E-mail Scripts

Subject line: Atlantic Province Workforce Survey

Dear Participant,

A few weeks ago you completed Study 1 of the On-The-Job Recovery study and indicated that you would be willing to participate in Study 2. You are invited to participate in a series of short daily surveys upon returning home from work each day. The surveys examine the daily relationships between the on-the-job recovery activities that you engage in during the work day and the stressors you experience. Specifically, we ask you to complete a short electronic survey that takes approximately 5 minutes every day for 5 consecutive days. We will send you a daily e-mail reminder, when you arrive home from work, to complete the survey.

Your participation in this study is completely voluntary, and you are under no obligation to participate in the current research project. Should you choose to participate, simply go to:

"link will be provided"

As a thank you for participating in the study you will receive one entry ticket for each daily survey you complete for a chance to win one of two cash prizes of $250. Participants who complete all five days will also be entered into an additional cash prize draw of $500. Please refer to the first page of the web survey for further details about the study including more information about the draw.

If you have any questions about this research study, please do not hesitate to contact the principal researcher of the study.

Thank-you again for your interest in our project.

Sincerely,

Danielle Durepos
PhD Candidate
Saint Mary's University

This research has been reviewed and approved by the Saint Mary's University Research Ethics Board (REB File #12-210). If you have any questions or concerns about ethical matters, you may contact the chair of the Saint Mary's University Research Ethics Board at ethics@smu.ca or (902) 420-5728.

Daily E-mail Reminder:

Dear Participant,

This is a reminder to please complete the daily survey upon returning home from work. Please remember that your participation in this study is completely voluntary, and you are under no obligation to participate. The daily survey will take approximately 5 minutes to complete.

Thank you for your time,

Danielle Durepos
PhD Candidate
Saint Mary's University

This research has been reviewed and approved by the Saint Mary's University Research Ethics Board (REB File #12-210). If you have any questions or concerns about ethical matters, you may contact the chair of the Saint Mary's University Research Ethics Board at ethics@smu.ca or (902) 420-5728.