

Recovery from work:
The link between work-related rumination,
fatigue and sleep

by

Dawn Querstret



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University of Surrey

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Abstract

The occupational health literature suggests that perseverative cognitions about work in non-work time are damaging for health and wellbeing; however, there is also research suggesting that some thinking about work outside of work may be adaptive. This thesis addressed a current gap in the literature by assessing the impact of two forms of work-related rumination (affective rumination and problem-solving pondering) on recovery processes.

Four studies were carried out. In study 1, a systematic review of the clinical/health literature showed that Cognitive Behaviour Therapy (CBT)-based and mindfulness-based interventions, delivered in both face-to-face and online formats, may prove effective in the reduction of perseverative cognitions. In study 2, results from a quasi-experimental longitudinal study showed that participants who attended a one-day CBT-based intervention (conducted in the workplace; N=102) reported significantly lower levels of affective rumination, problem-solving pondering and chronic fatigue at follow-up (6 months post-intervention) when compared with participants in the control group (N=125). In study 3, results from a randomised waitlist control study showed that participants who completed a 4-week online mindfulness course (N=60) reported lower levels of affective rumination, problem-solving pondering, acute (end-of-day) fatigue and chronic fatigue, and improved sleep quality, when compared with participants in the control group (N=58). In study 4, a longitudinal cross-lagged panel structural equation model was tested, in which questionnaire data was collected from participants (N=218) at two time points - 6 months apart - showed that affective rumination and problem-solving pondering were both implicated in causing chronic fatigue.

In summary, the results from this thesis suggest that work-related rumination is detrimental to recovery from work because it appears to cause work-related fatigue. However, further work is warranted to properly conceptualise (and measure) different forms of work-related perseverative thinking. Both types of interventions appear worthy of future empirical work; however, delivering mindfulness online would probably provide the greatest return on investment for organisational occupational health programmes.

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Publications arising from thesis

Peer-reviewed publications

- Querstret, D., Cropley, M., & Fife-Schaw, C. (in preparation). Assessing the effect of a 4-week online mindfulness course on work-related rumination, fatigue and sleep quality: a randomised waitlist control trial. Paper currently being prepared for submission to the *Journal of Applied Psychology*.
- Querstret, D., Cropley, M., Kruger, P., & Heron, R. (under third review). Assessing a Cognitive Behaviour Therapy (CBT) based workshop to reduce work-related rumination, sleep and fatigue. *European Journal of Work and Organizational Psychology*.
- Querstret, D., & Cropley, M. (2013). Assessing treatments used to reduce rumination and/or worry: a systematic review. *Clinical Psychology Review*, 33, 996-1009.

Conference presentations

- Querstret, D., & Cropley, M. (2014). *Assessing the efficacy of a 4-week Internet-based mindfulness course to reduce work-related rumination and fatigue: A randomised waitlist control study*. Paper presented at the annual British Psychological Society Division of Health Psychology conference, 10 to 12 Sept, York, United Kingdom.
- Querstret, D., & Cropley, M. (2014). *Assessing the efficacy of a 4-week Internet-based mindfulness intervention to reduce work-related rumination and fatigue: A waitlist control study*. Paper presented at the 11th European Academy of Occupational Health Psychology conference, 14 to 16 April, London, United Kingdom.
- Querstret, D., & Cropley, M. (2013). *Assessing the efficacy of a work-place CBT intervention to reduce work-related rumination and fatigue: a quasi-experimental longitudinal study*. Paper presented at Recovery and Restoration: The Interface between the Individual and the Environment. International workshop at Lillehammer University College (HiL), 10 to 12 June, Hamar, Norway.
- Querstret, D., & Cropley, M. (2013). *A longitudinal study examining work-related rumination as a predictor of change in work-related fatigue over time*. Paper presented at the 16th congress of the European Association of Work and Organizational Psychology, 22 to 25 May, Meunster, Germany.

Chapter 1. Introduction

1.1. Background to the current research

During the last century, both the global economy and working life has changed, the speed of business processes have increased, and an increasingly '24/7' society has emerged. The nature of work has become more cognitively demanding and the work environment has increased in complexity; characterised by diffuse decision making, increased uncertainty, high levels of responsibility, and demands for employees to be more flexible (Pravettoni, Cropley, Leotta, & Bagnara, 2007; Dawson, Noy, Harma, Akerstedt, & Belenky, 2011; Mohr, Muller, Rigotti, Aycan, & Tschan, 2006). Furthermore, the rhythm of work is much more intense and faster-paced and time pressure has increased (Paoli and Merllie, 2001). In many business sectors, this has resulted in a lengthening of the average working day, shortened recovery times, and increasingly irregular start and finish times. With increasingly demanding workloads, the number of employees experiencing psychological problems related to occupational stress has increased rapidly (Flaxman, Bond, & Livheim, 2013).

Costs associated with psychological ill health are considerable in terms of absenteeism, loss of productivity, and increased health care consumption (Van der Klink, Blonk, Schene, & van Dijk, 2001). In the United Kingdom, in 2011/12, out of the 22.7 million working days lost to work-related illness, 10.4 million days lost were reportedly due to psychosocial stress, depression or anxiety which employees attributed to their work or working conditions (Health and Safety Executive, 2012/13). These types of levels are not only reported in the UK. For example, in workforce surveys from the United States, approximately a third of workers report high levels of stress or stress-related disability (National Institute for Occupational Health and Safety, 2002); and in Europe stress is the second most reported workplace health problem affecting on average 22 percent of workers across 27 different countries (Parent-Thirion, Macias, Macias, Hurley, & Vermeulen, 2007). Taken together, these results suggest that mental health problems are highly prevalent in the workplaces of industrialised countries; with work-related mental ill health accounting for more days lost than any other cause of work-related illness.

There are many dimensions with regards to the cost of work-related mental ill health. For the individual, there are costs regarding increased rates of anxiety, depressed mood, mental fatigue, sleep disturbance, tension, and anger; problems generally referred to in aggregate as *distress* and often classified as neurasthenia, adjustment disorders, or burnout (Van der Klink, et al., 2001). For businesses, costs associated with employee distress -

including impact to productivity, staff turnover and sickness absence – can be substantial. The Sainsbury Centre for Mental Health (2007) estimated that mental ill health costed U.K. businesses in the region of £26 billion in 2006; equivalent to £1,035 for every employee in the U.K. workforce. This annual figure has been further broken down into: £15.1 billion in reduced productivity in the workplace; £8.4 billion in sickness absence; and £2.4 billion in replacing staff who leave their jobs due to mental ill health. Interestingly, the cost associated with impact to on-the-job productivity far exceeded the costs associated with sickness absence which may indicate that employees are attending for work but are unable to perform at full function (or usual capacity) due to ill health, a phenomenon referred to as ‘presenteeism’ (Flaxman, et al., 2013). Employees suffering from mental ill health may be more likely to attend for work because they may fear being stigmatised if they are absent from work due to emotional or psychological difficulties (Sainsbury Centre for Mental Health, 2007).

At a macro level, costs associated with employees’ psychological ill health stem from increased health care and welfare spending. Each year in the U.K., approximately 200,000 adults of working age become dependent on welfare payments (incapacity benefit) due to mental health problems (Black, 2008); in the U.S., health care expenditures for employees with high levels of stress were 46 percent higher than for employees with low levels of stress (Goetzel, Anderson, Whitmer, Ozminkowski, Dunn, Wasserman, et al., 1998); and the cost to member states of the European Union – including treatment costs and output losses - associated with employee absence and low productivity, have been estimated as an average of 3 or 4 percent gross national product (GNP) (Seymour & Grove, 2005).

In summary, mental health issues, associated with increasingly demanding work environments, are considered by many to be the predominant health issue facing working-age populations. Many parts of the industrialised world are experiencing higher levels of economic uncertainty and increased job insecurity; furthermore, there is a trend toward greater work intensity (a need to work faster and with fewer resources to meet increasingly stringent deadlines) (Milczarek, Schneider, & Gonzalez, 2009; Seymour, 2010). Together these factors may result in higher levels of stress-related mental health problems in the future. Given that employees spend approximately 60 percent of their waking hours at work, the cost of neglecting work-related mental distress is too high to be ignored; therefore, organisations need to take a proactive approach in helping their employees maintain good psychological health. It has been estimated that organisations, taking simple steps to improve the management of mental health in the workplace (e.g., early identification of problems and investment in preventative interventions), could save somewhere in the region of 30 percent

of the associated costs – at least £8 billion a year (Sainsbury Centre for Mental Health, 2007). Furthermore, research suggests that employers who invest in mental health initiatives (e.g., screening and facilitating help-seeking behaviour) may expect a five-fold return on their investment (Hilton, 2005). It is therefore important to identify mechanisms by which work-related stress is translated into compromised mental health; as in doing so, early intervention could prevent the development of chronic mental health conditions.

1.2. Introducing the main thesis constructs¹

In the context of increasing levels of mental ill health and its cost to the individual, businesses and society; this thesis is primarily concerned with work-related rumination (perseverative thinking about work in non-work time) and its consequences for *recovery from work*. When an individual goes to work, he or she must expend emotional, physical and cognitive effort to meet the demands of the working day. When the individual returns home at the end of the work period, rest is required in order for emotional, physical and cognitive systems to be replenished (Meijman & Mulder, 1998). This process of replenishment is called *recovery* and there is a large, and ever growing, body of literature concerning mechanisms that aid, or interfere with, recovery from work. One mechanism gaining interest is work-related rumination which may interfere with recovery processes (e.g., sleep) by extending the demands of work into non-work time. Work-related rumination is closely linked to other forms of perseverative thinking (e.g., depressive rumination and worry) which are thought to be underpinned by a similar cognitive process (Brosschot, Gerin, & Thayer, 2006); and evidence for the damaging effects of different forms of perseverative thinking is accumulating. In the clinical/health literature, rumination and worry are associated with depression and anxiety (e.g., Lyubomirsky, Caldwell, & Nolen-Hoeksema, 1998; Mellings & Alden, 2000) and an assortment of other poor health outcomes; for example, increased risk of developing cardiovascular disease (Suadicani, Hein, & Gyntelberg, 1993). In the occupational health literature, the construct of work-related rumination is relatively new; therefore, the majority of the research focuses on psychological detachment from work. Sonnentag and Bayer (2005) first introduced the concept of "psychological detachment", suggesting that individuals need to not only gain physical distance from work outside of work time, but they also need to gain psychological distance by not thinking about work in non-work time. Research in this area shows that inadequate psychological detachment from work is associated with negative health outcomes including increased levels of fatigue and emotional

¹ Full definitions of the main thesis constructs are provided in Chapter 2; the definitions here are for the purposes of introduction and to contextualise the theses research aims.

exhaustion (see, e.g., Siltaloppi, Kinnunen, & Feldt, 2009; Sonnentag & Fritz, 2007; Taris, Geurts, Schaufeli, Blonk, & Lagerveld, 2008). However, much of this research is cross-sectional in nature meaning causality cannot be inferred; or employs short-term (e.g., one week) diary study paradigms which do not enable examination of causal relationships over long periods of time. Furthermore, research concerning psychological detachment from work implicitly assumes that *all* thinking about work in non-work time is equally detrimental to health. However, some studies have shown that thinking about work outside of work may be beneficial to health and wellbeing (see, e.g., Gable, Reis, Impett, & Asher, 2004; Seo, Battett, & Bartenuk, 2004; Stajkovic & Luthans, 1998); and can inspire innovation and creativity (Baas, De Dreu, & Nijstad, 2008). Moreover, recent research considering performance at work has shown that individuals perform best when they report moderate levels of psychological detachment from work (Fritz, Yankelevich, Zarubin, & Barger, 2010). Specifically, if individuals are too highly detached they are not properly engaged in their work, negatively impacting performance; and if they are not psychologically detached enough in non-work time performance at work suffers, possibly due to continued high levels of arousal (in non-work time) interfering with the process of recovery.

As a result of these seemingly contradictory findings, research exploring the impact of different kinds of perseverative thinking about work seems warranted. Sonnentag, Arbeus, Mahn, & Fritz (2014) have called for research considering the constructs of work-related rumination and worry, suggesting they are distinct from, but related to, psychological detachment; and Flaxman, Menard, Bond, & Kinman (2012) have suggested that rumination is a specific form of psychological detachment and that more research is needed to understand the impact of different forms of thinking about work. This thesis addresses the gap highlighted by Sonnentag, et al., and Flaxman et al., considering two different (but related) facets of work-related rumination: affective rumination and problem-solving pondering (Cropley & Zijlstra, 2011). According to Cropley & Zijlstra, the main difference between these two forms of perseverative thinking about work lies in the amount of emotional response they evoke. When thinking about work-related issues results in a negative emotional response (e.g., frustration, annoyance, feeling emotionally fatigued), people are said to be engaging in affective rumination. Often the focus of this kind of thinking is not about solving issues but is more akin to rumination found in the clinical literature whereby the person is caught up in a negative emotional response loop, unable to arrest the process. In contrast, problem-solving pondering is focused on finding solutions to work-related problems, or planning how to tackle an uncompleted task at work the next day, and the emotional response

is not evoked. Problem-solving pondering could even be a positive experience, especially if a solution is arrived at. Importantly, people don't just think about events or issues that have occurred in the past, they also ruminate anticipatively (or worry), about upcoming work-related events/demands and issues (Cropley & Zijlstra, 2011); therefore work-related rumination may possess elements of both rumination (traditionally characterised as past-focused) and worry (traditionally characterised as future-focused) (Flaxman, et al., 2013). A recent large scale cross-sectional study (N=719; Querstret & Cropley, 2012) showed that these two forms of rumination appeared to operate differently with regards to recovery from work. Specifically, this study showed that affective rumination was significantly predictive for both acute (short-term, end-of-day) work-related fatigue and chronic (long-term, persistent) work-related fatigue; however, problem-solving pondering was not predictive for either form of work-related fatigue. In fact, the results seemed to suggest that problem-solving pondering may confer some benefit.

While affective rumination and problem-solving pondering are the main constructs of interest in this thesis; in order to provide a more holistic view of recovery from work, work-related fatigue and sleep quality are also measured and assessed throughout. Fatigue is one of the most studied outcomes in the recovery from work literature and is often considered a proxy for inadequate recovery; and sleep is one of our most important restorative processes, aiding recovery. Furthermore, research has shown that both fatigue (e.g., Siltaloppi, et al., 2009; Sonnentag & Fritz, 2007; Taris, et al., 2008) and sleep (e.g., Akerstedt, Fredlund, Gillberg, & Jansson, 2002; Geiger-Brown, Trinkoff, & Rogers, 2011, Bugard & Ailshire, 2009) are impacted by work-related rumination; therefore, they are included in order to provide a fuller picture of work-related rumination in the context of recovery from work.

1.3. Research aims

Even though there are some contradictory findings, the majority of research thus far indicates that work-related rumination (or inadequate psychological detachment) is detrimental for recovery, for example, by interfering with sleep and contributing causally to fatigue (see Chapter 2); therefore, developing interventions to reduce rumination may be beneficial for employees' mental health. However, as stated above, it is possible that some thinking about work in non-work time may be adaptive, contributing positively to health and wellbeing. Therefore, this thesis has the following research aims:

- Assess interventions to improve recovery from work by reducing work-related rumination and work-related fatigue, and by improving sleep quality;

- To extend the literature base regarding the impact of work-related rumination on recovery, specifically seeking to understand if affective rumination and problem-solving pondering have different effects;
- Assess longitudinally, and via experimental studies, the causal relationship between work-related rumination and work-related fatigue;
- Explore possible mediation effects between work-related rumination and recovery outcomes, specifically fatigue and sleep.

1.4. Theoretical contributions

Theoretically, this thesis aims to contribute to the literature in a number of ways. Firstly, it may advance our understanding of the multi-faceted nature of work-related rumination, exploring differences between affective rumination and problem-solving pondering. Secondly, it will extend the current research on perseverative cognitions by considering those which are work-related. Thirdly, it will extend the research base regarding the causal relationship between work-related rumination and recovery (operationalised as work-related fatigue). Finally, with respect to the broader literature on job stress interventions (for review, see, Richardson & Rothstein, 2008), this thesis adds to the knowledge on person-oriented interventions, specifically considering the impact of CBT-based and mindfulness-based interventions on recovery from work via work-related rumination, sleep and fatigue.

1.5. Practical contributions

Practically, the programme of research presented in this thesis aims to contribute to the development and assessment of interventions to improve recovery from work, specifically for the reduction of work-related rumination and work-related fatigue, and for the improvement of sleep quality. This could confer considerable benefits for employee health and wellbeing, with consequent positive effects on performance at work. In addition, assessing different forms of work-related rumination may enable a deeper understanding of the types of work-related thinking that are damaging to recovery (e.g., by maintaining psychophysiological arousal) versus those that are less damaging, or that may even have positive consequences. This would enable an exploration of factors (in future research) which may foster the different forms of work-related rumination, thereby enabling the development of targeted interventions.

1.6. Thesis outline

This thesis is set in the broad context of the recovery from work literature. While affective rumination and problem-solving pondering are the main constructs of interest; in order to provide a more holistic view of recovery from work, work-related fatigue and sleep

are also measured and assessed throughout. In some studies it has also been possible to consider the mediation effects between these constructs.

Chapter 2. Presents a literature review of the research landscape concerning recovery from work, specifically discussing and evaluating existing research regarding work-related rumination and its impact on mechanisms associated with recovery (sleep and fatigue). As mentioned above, work-related rumination is a new construct; therefore, the majority of research covered in this chapter considers findings with regards to psychological detachment from work and its impact on health and wellbeing. While *work-related rumination* and *psychological detachment from work* are distinct constructs, they are also closely related, and this is expanded on within the chapter. Research from the clinical/health literature is also reviewed as it pertains to the impact of perseverative thoughts (e.g., depressive rumination and worry) on health and wellbeing. Overall, findings from both the occupational health and clinical literature converge and suggest that perseverative thoughts (e.g., rumination and worry) have a negative impact on health. In particular, research in the clinical literature supports the position that perseverative thoughts maintain the psychophysiological effects of stress (e.g., increased heart rate & blood pressure, reduced heart rate variability, compromised immune function) beyond the period of exposure to the source of stress. Therefore, work-related rumination may extend the demands of work into non-work time, interfering with recovery processes (e.g., sleep) because psychophysiological arousal remains high. The major limitation in the current occupational health literature, considering the construct of psychological detachment from work is that there is an implicit assumption that all thinking about work outside of work is detrimental to recovery. However, research also shows that some thinking about work outside of work can be a positive experience which may suggest that different forms of thinking about work in non-work time need to be differentiated.

Chapter 3. Following on from the findings in chapter 2 suggesting that perseverative thoughts may be detrimental to recovery, and are associated with a multitude of negative health outcomes; this chapter presents the results of a systematic review assessing interventions used to reduce rumination and/or worry. The systematic review focussed on depressive rumination and worry because there were no intervention studies assessing change in work-related rumination. Because these different forms of perseverative thoughts may be underpinned by a shared cognitive process (Brosschot, et al., 2006); it seems feasible that interventions effective in the reduction of depressive rumination and/or worry may also be effective in the reduction of work-related rumination. The systematic review showed that

Cognitive Behaviour Therapy (CBT)-based and mindfulness-based interventions may be effective in the reduction of rumination and/or worry.

Chapter 4. Chapter 3 showed that CBT interventions can be useful in the treatment of rumination and/or worry; therefore, this chapter presents the results of a quasi-experimental longitudinal study assessing the effect of a one-day workplace CBT-based workshop on work-related rumination (affective rumination and problem-solving pondering), chronic (long-term) work-related fatigue and sleep quality. It was hypothesised that the intervention would reduce affective rumination, problem-solving pondering and chronic work-related fatigue; and that it would improve sleep quality. As is discussed in this chapter, there are inherent design issues which made assessing mechanisms of change (e.g., through mediation analysis) difficult. The limitations have been highlighted in the chapter and enabled a more robust research design for the next chapter which presents another intervention study.

Chapter 5. As highlighted in Chapter 3, mindfulness-based interventions have also been shown to be effective in the reduction of rumination and/or worry. This chapter presents results from a randomised waitlist control study designed to assess the impact of a 4-week online mindfulness course on affective rumination, problem-solving pondering, acute (end-of-day) work-related fatigue, chronic work-related fatigue, and sleep quality. The design of this study allowed for assessment of the mediators of change, specifically enabling isolation of mindfulness facets involved, and an exploration of the impact of rumination on recovery.

Chapter 6. Much of the existing research, in both the clinical/health and occupational health literature concludes that rumination (whether it be clinical or work-related [predominantly operationalised as inadequate psychological detachment]) appears to cause fatigue or emotional exhaustion (often interpreted as indicators of inadequate recovery). However, much of this research is cross-sectional in nature meaning that causality cannot be established; furthermore, the research on psychological detachment assumes that *all* thinking about work outside of work is equally detrimental and, as mentioned previously, there is research that calls this position into doubt. For example, the study mentioned previously by Querstret and Cropley (2012) showed that affective rumination was predictive for fatigue but problem-solving pondering was not which supports a contention that not all work-related perseverative thought is equally detrimental; and other researchers have shown that positively reflecting on work-related material and events in non-work time may be beneficial (e.g., Gable, et al., 2004; Seo, et al., 2004; Stajkovic & Luthans, 1998). In addition, in a recent longitudinal study Sonnentag and colleagues reported that emotional exhaustion may appeared to cause reduced levels of psychological detachment over the course of 4 weeks

(Sonnentag, et al., 2014), suggesting that the causal relationship between work-related rumination and fatigue may work in the other direction. In light of these contradictory findings, this final study employed a longitudinal design and sought to explore the causal relationships between the two forms of work-related rumination (affective rumination and problem-solving pondering) and work-related fatigue.

Chapter 7. This final chapter presents a general discussion of the thesis. Specifically, it includes: a summary of main study findings; a discussion of contribution of the research theoretically, practically and methodologically; a discussion with regards to research limitations; ideas for future research; and provides an overall conclusion.

PREVIEW

Chapter 2. Literature review

2.1. Recovery from work

The relationship between work-related stress and ill health is undoubtedly underpinned by many contributing factors; however, perhaps the most critical mechanism is inadequate psychological and physical *recovery from work* (Fritz, Sonnentag, Spector & McInroe, 2010). When people go to work, they are confronted with many different kinds of physical, cognitive and emotional demands. In order to deal with these demands people must expend physical, emotional and cognitive energy (Zijlstra & Sonnentag, 2006). Using energy in this way results in fatigue at the end of the working day and people's 'resources' (physical and mental) become depleted (Meijman, Mulder, & van Dormolen, 1992). Rest is then required in order for those depleted resources to be replenished. This process of replenishment is called 'recovery' (often referred to as 'recharging one's batteries'), and the anticipated effect of this recovery process is the reduction of fatigue and associated health complaints (Zijlstra & Sonnentag, 2006).

Recovery from work is often conceptualised by two distinct, but compatible theories: conservation of resources theory (COR; Hobfoll, 1998) and the effort-recovery theory (Meijman & Mulder, 1998). According to Hobfoll's COR theory, people are motivated to retain, protect and replenish various personal resources which are characterised as external (e.g., financial, material, social support) and internal (e.g., energy levels, perceptions of self-worth). When these resources are under threat, are lost, or fail to be replenished after a period of resource investment the individual may experience stress; and resources that are lost or diminished during work time then need to be replenished during periods of rest (Demerouti, Bakker, Geurts, & Taris, 2009; Eden, 2001; Fritz & Sonnentag, 2006; Sonnentag, 2011). The effort-recovery theory suggests that in order for resources - which have been diminished through the demands of work - to be replenished, the individual must refrain from placing further demands on systems which were taxed during work time (Meijman & Mulder, 1998). For example, if the individual has a job which is very cognitively demanding (e.g., complex computer modelling), according to the effort-recovery theory they should avoid engaging in activity (when they get home) which is also cognitively demanding; instead, they should engage in activities that use different resource systems (e.g., physical exercise) or that do not require much cognitive effort (e.g., watching television).

If individuals cannot adequately recover when they are not working, they will be operating with reduced psychological and physiological resources and will need to make more

effort in order to maintain their performance in their next work shift. As a consequence they will have an even greater need for recovery, resulting in 'recovery debt' (Geurts & Sonnentag, 2006); with a spiral of resource loss resulting in burnout, fatigue and other health complaints (Eden, 2001; Hobfoll & Shirom, 1993). These two theories complement one another in that the COR theory suggests people are motivated to retain and replenish their resources; and the effort-recovery theory purports that in order for this replenishment to take place, people should refrain from taxing the same systems they use at work when they are at home.

Inadequate recovery may in part be due to the increasing difficulty individuals have in separating work from non-work time. Over the past decade management practices have led to an intensification of work; and this, paired with technological advances, means that many employees are 'taking their work home with them' (e.g., with constant connectivity and access to emails at home) (Park, Fritz, & Jex, 2011). This may make the boundary between work and non-work time much more difficult for individuals to establish resulting in compromised space for recovery activities and processes to take place (Park, et al., 2011; Cropley & Millward, 2009). Furthermore, some aspects of the work environment threaten or deplete an individual's personal resources. For example, if employees are working considerably longer hours they will not only face a depletion of resources whilst at work, they will also have less time for recovery, and fewer opportunities to invest in valuable sources of social support outside of the workplace (Flaxman, et al., 2012). In many occupations demands associated with work are primarily of a cognitive nature (e.g., responsibility, information processing, project management, etc.), and approximately half of the working population complains of increasing levels of 'work pressure' (Paoli & Merllie, 2001).

Optimising recovery is an important accomplishment because research has shown that inadequate recovery from the demands of work is associated with poor health outcomes including: elevated risk of cardiovascular disease (Suadicani, et al., 1993); negative mood states (Pravettoni, et al., 2007); compromised sleep (Akerstedt, et al., 2002; Nylen, Melin, & Laflamme, 2007); and increased levels of fatigue (Cropley, Dijk, & Stanley, 2006; Querstret & Cropley, 2012). Periods of respite from the demands of work are particularly important because they represent the main avenue for the replenishment of resources which have been depleted through work (Demerouti, et al., 2009; Eden, 2001; Fritz & Sonnentag, 2006; Sonnentag, 2001). Some recovery from stress and fatigue can occur at work, for example, during meal breaks, while waiting for task reassignment, or during other spontaneous work breaks (Sluiter, Frings-Dresen, Meijman, & van der Beek, 2000); however, the majority of recovery from work-related stress and fatigue takes place during non-work time, between