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Stress, Need for Recovery, and Ineffective Self-Management

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Abstract

The present study examined the mediating role of need for recovery in the relationship between stress and multiple self-defeating behaviors and cognitions (SDBC). Results from a sample of upper-level undergraduate students ($N = 311$) supported these hypothesized relationships for the outcomes of procrastination, self-handicapping, and impulsivity. Implications for organizations are linked to the relationships between these SDBC and ineffective self-management.

Implications for future stress and recovery research and practice stem from the new set of non-attitudinal outcomes and the proposed mediational role for need for recovery in the stress process.

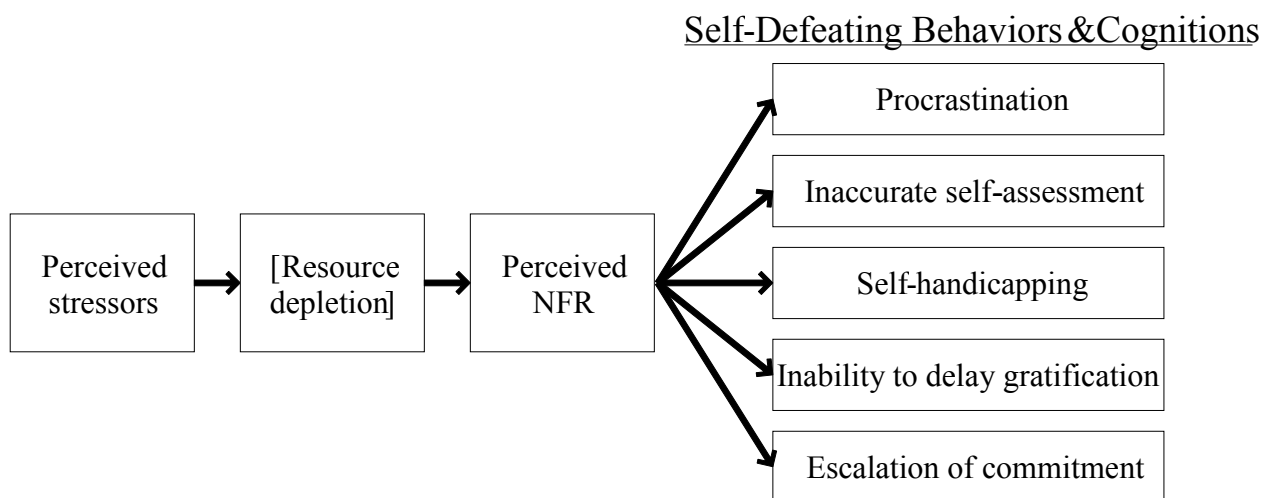
Working provides all of us with many important resources in life, including money, opportunities for affiliation, status and power, and sources of challenge. At the same time, however, exposure to multiple stressors within our work and nonwork environments drains other, equally important resources that help us to maintain overall health and well-being. These types of resources enable us to stay motivated and effective while working and include physical energy, the ability to regulate emotions, and the ability to maintain attention and focus.

Symptoms of resource drain or depletion are increasingly highlighted in the research literature (e.g., Bültmann, Kant, Kasl, Beurskens, & van den Brandt, 2002). Despite this increasing academic awareness of these issues, the typical response from a work organization is, “so what?” It would be convenient and potentially powerful to respond with the message that resource drain results in reduced worker performance. Unfortunately, there is insufficient evidence at this point to support this assertion. Furthermore, identifying a link between fatigue and performance would accomplish almost nothing in the way of explaining possible mechanisms by which resource drain may be having detrimental effects on workers and organizations.

A recent revision to the traditional stress process model suggest that it may be important to focus less on a person’s general perceptions of being “stressed” and more on his/her personal Need for resource recovery (Cunningham, 2008a). Extending from common recovery theories that emphasize the importance of personal resources (e.g., Conservation of Resources and Effort-Recovery theories; Hobfoll, 1989; 2002; Meijman & Mulder, 1998), a Need for resource recovery is hypothesized to develop from our immediate and sustained responses to stressors or demands that we are exposed to within our daily work and nonwork lives. The effectiveness of these responses depends on an available store of these personal resources.

Cunningham (2000b) describes the operationalization of this Need for resource recovery construct and offers an initial measure designed to assess a person's psychosocial resource needs. The present study continues the initial validation of this measure and extends existing occupational stress and recovery research in three important ways. First, it shifts the outcome focus from common attitudinal and affect-based variables to multiple counterproductive cognitions and behavioral patterns. Second, it tests the general hypothesis that the effects of stress on these outcomes are mediated by an individual's need for recovery (as summarized in Figure 1). Third, it applies situational judgment and scenario-based question formats to the measurement of the non-traditional outcome variables. Together these three advances represent a new approach to studying the impact of exposure to work-related stressors and recovery needs, an approach that holds great promise for further development and extension. The following sections detail the necessary background material regarding the hypothesized relationship summarized in Figure 1.

Figure 1. Conceptual Model Linking Need for Recovery with Self-Defeating Behaviors and Cognitions



Note. NFR = Need for recovery; “Resource depletion” is a condition and component of this process not directly measured in the present study, but rather evaluated in terms of a person’s perceived need for recovery. The outcomes (described more in the manuscript) come from Renn, Allen, Fedor, and Davis (2005).

Need for Resource Recovery

Research involving the construct of Need for resource recovery is in its early stages and the development of a nomological network to support this construct is desirable. Linking Need for resource recovery with other measurable elements of employee effectiveness would greatly help to support its validity as a construct relevant to individual functioning within work organizations. This is the first objective of the present study, to extend the initial validation of the Need for resource recovery construct and measure described in Cunningham (2008b) by testing it along with a standard measure of fatigue as a mediator of the relationship between stressor exposure and multiple self-defeating behaviors and cognitions (SDBC).

Until now the tendency has been to assess recovery needs with a measure of fatigue (e.g., Rook & Zijlstra, 2006; Sluiter, Frings-Dresen, van der Beek, & Meijman, 2001; Zijlstra & Sonnentag, 2006). Unfortunately, this operationalization of recovery needs ignores the richness and value of the two dominant theories guiding stress and recovery research. The first of these theories, Effort-Recovery (Meijman & Mulder, 1998) suggests that the effort we expend responding to stressors draws upon our available resources. Over time this process takes a toll, potentially leading to the development of serious strains such as burnout or physical illness,

unless we rebuild or recover these resources by separating ourselves from the resource-draining situation.

The second theory, Conservation of Resources (Hobfoll, 1989; 2001) proposes that we are motivated to gather and prevent the loss of personal resources at all times. From this perspective, exposure to stressors in a work environment signifies a major threat, but when we have sufficient resources we are considered to be more likely to effectively respond. To more fully address individual differences in resource loss and recovery needs, the present study incorporates Need for resource recovery along with a general measure of fatigue to indicate a person's overall need for recovery needs.

Ineffective Self-Management and Need for Recovery

Existing stress and recovery research has not yet demonstrated a strong or consistent relationship between recovery processes and criteria related to employee work performance (with the exception of some preliminary findings by Fritz & Sonnentag, 2005). This is due in part to the newness of this area of research (approximately 10 years), but it is also due to the difficulty inherent in defining and adequately measuring employee job performance and effectiveness (Austin & Villanova, 1992; Ghiselli, 1956; James, 1973). Recent conceptual work by Renn, Allen, Fedor, and Davis (2005) may be especially helpful in this regard, in that it provides a framework of ineffective or self-defeating behaviors and cognitions (SDBC) that can be expected to precede a decline in performance.

Evidence is beginning to mount that a lack of resources (especially ones needed for emotional regulation) may hinder an employee's effectiveness at work. Some of the strongest evidence so far involves the emotional exhaustion component of burnout, which has been found to share a negative relationship with organizational performance (Schaufeli & Enzmann, 1998;

Wright & Bonett, 1997; Wright & Cropanzano, 1998). Burnout, however, is a very serious state and it would be better for employees and organizations if a less serious, preceding condition could be identified and linked to early decrements in performance capabilities. A second issue that needs to be addressed in this type of research is that across studies such effectiveness is defined in very different ways. It would seem, therefore, that effectiveness may simply be too broad a criterion to be of direct utility to researchers and practitioners. A better alternative may be to focus on specific behaviors and cognitions needed for effective functioning or self-management at work.

Self-management involves setting standards, checking one's behavior against those standards, and directing oneself and one's environment to achieve those standards (Carver & Scheier, 2000). It is similar to self-control/self-regulation of behaviors and emotions (Logue, 1996; Rachlin, 2000; Vancouver, 2000; Vohs & Baumeister, 2004). Self-management can be seen as a personal ability that requires the presence of certain critical resources to operate.

For the study of self-management, Renn et al. (2005) offer a particularly relevant framework of six SDBC (summarized in Table 1). These behaviors and cognitions have, "counterproductive effects on self or one's projects" (Renn et al., p. 660), and are closely linked to a person's self-control or self-management (cf., Baumeister & Scher, 1988). For occupational health researchers, SDBC represent an important outcome for further integration into future studies of stress, recovery, and strain. If not quickly addressed, the counterproductive behaviors and cognitions outlined in Renn et al.'s (2005) framework can lead to self-management failure, or an inability to effectively coordinate one's behaviors and cognitions toward a desired goal. This in turn could be expected to translate into dramatically impaired work effectiveness.

Table 1. Renn et al.'s (2005) Self-Defeating Behaviors and Cognitions

Behavior	Explanation
Procrastination	Results from motivational states and is influenced by cognitive, affective, and behavioral processes -- may create a self-destructive cycle of putting off negative emotion and delaying of work (p. 662)
Inaccurate self-assessment	Involves gathering information and identifying which behaviors to develop or improve -- may lead to damaging distortions in cognitive structures and self-beliefs that could contribute to misguided actions and negative outcomes (p. 662)
Self-handicapping	Meant to increase a person's ability to blame failure on external causes and successes on internal factors -- may be related to self-obstruction at work, insecurity, and motivation by anxiety/fear of failure (p. 663)
Inability to delay gratification	Reflects an inability to sacrifice immediate rewards for more distant, but larger ones -- may contribute to impulsive behavior/thought and an inability to maintain focus on long-term goals and to delay gratification when necessary (p. 663)
Emotional self-absorption	Excessive focus on one's personal thoughts, feelings, and behaviors -- problematic when results in misallocation of resources needed for other work-related activities (p. 664)
Escalation of commitment	Can be thought of as extreme persistence, even when such continued efforts are misguided -- becomes a problem when withdrawal from a course of action is prevented by this psychological inertia (p. 664)

The development of SDBC equates to the development of barriers to a person's ability to effectively self-manage one's behaviors and cognitions toward a specific goal (Renn et al., 2005). Extending from research that has identified self-regulation or self-control as a limited resource, one likely contributing factor to the development of SDBC (and eventually self-management failure) is a person's inability to draw on sufficient personal resources when

required. Such processes involve actively directing and sustaining resources such as focus, attention, control, and energy, all of which will be depleted as an individual copes with work stress.

As these resources are expended, individuals will experience an increased need for recovery. Until recovery is achieved, these individuals can be expected to be less effective in accomplishing their work-related tasks than other individuals who have met their personal recovery needs. Support for this assertion comes from studies showing decreases in performance for individuals following a period of resource depletion (Baumeister, Bratslavsky, Muraven, & Tice, 1998).

Ineffectiveness in work stemming from resource depletion is unlikely to be identifiable when the criterion of interest is some variant of task performance. Such required performance is regulated by both external and internal agents and is therefore unlikely to vary with fluctuations in need for recovery. In other words, even if you are losing your ability to manage yourself at work, your coworkers or manager will tend to exert external control to make sure required tasks are completed.

Instead, it is more likely that psychosocial resource depletion will impact an individual's work via more personally controlled elements of effectiveness such as the cognitive and behavioral processes by which work gets done. This is the reason for the present focus on SDBC, as potential barriers to a person's ability to be truly effective at work. These barriers are especially likely to develop if a person's need for recovery remains high over an extended period of time, developing into the more severe condition of burnout. Thus, need for recovery can be seen as a pre-condition leading to burnout, with the potential to influence the cognitions and behaviors that guide employee efforts. While need for recovery can be expected to influence a

person's management of cognitions and behaviors, the more severe condition of burnout has been shown to influence the actual quality of a person's work (Leiter, Harvie, & Frizzell, 1998; Maslach, 2006; Schaufeli & Enzmann, 1998).

The Present Study

Successful self-management requires the use of one's available resources, which ebb and flow with efforts to meet physical and emotional demands (e.g., Baumeister et al., 1998; Muraven & Baumeister, 2000; Muraven, Tice, & Baumeister, 1998). These resources include attention and focus, emotional control, and general energy (Hobfoll, 1989; 2002), which are necessary to prevent the enactment of SDBC. Baumeister and colleagues have generated an impressive amount of data suggesting that self-regulatory/management resources may be generic in the sense that they are used for most if not all forms of self-control. If this general self-regulatory or self-control resource is depleted, the effects of this depletion are therefore likely to be widespread and multiply identified, highlighting the potential utility of the present SDBC framework.

Thus, SDBC are important outcomes for stress and recovery researchers and practitioners to consider. Self-management failure is unlikely to directly influence a person's job tasks because coworkers or managers will tend to exert external control to ensure these tasks are completed. Instead, resource depletion is likely to influence employee effectiveness via more personally controlled elements such as the behavioral and cognitive processes underlying self-management efforts. The following sections provide the rationale for applying the following general hypothesis to five of Renn et al.'s (2005) SDBC tested in the present research effort. For each SDBC the following multi-part relationship was expected (summarized in Figure 1):

Hypotheses 1-5. (a) Stressor exposure will be positively related to the particular SDBC and (b) this relationship will be mediated by a person's level of need for recovery.

Procrastination

Procrastination reflects a person's inability to direct his/her fullest attention to the task at hand and the desired outcome of completing that task (Van Eerde, 2003). This involves, "needlessly delaying tasks to the point of experiencing subjective discomfort" (Solomon & Rothblum, 1984, p. 503). Procrastination develops from a person's general motivational state, which involves a combination of cognitive, affective, and behavioral processes linked with task avoidance (Renn et al., 2005).

Although often studied as a personality characteristic, procrastination can also be influenced by situational factors such as: the timing of rewards, task aversiveness, low autonomy, low task significance, and minimal feedback (Lonegan & Maher, 2000; Steel, 2007). Procrastination is self-defeating because it inevitably leads to increased pressure as deadlines approach (Renn et al., 2005) and such pressure may increase performance errors (e.g., Ferrari, 2001; Hammond, 2000; Tice & Baumeister, 1997).

Procrastination also encourages avoidance coping, which is generally less effective than active coping methods (e.g., Koeske, Kirk, & Koeske, 1993; Semmer, 2003). Negative mood, emotional distress, and role stress have all been associated with increased procrastination (Senécal, Julien, & Guay, 2003; Tice, Bratslavsky, & Baumeister, 2001). Related to need for recovery, Senécal, Koestner, and Vallerand (1995) demonstrated that self-regulation accounted for 25% of the variance in students' procrastination, contributing to procrastination over and

above variables associated with fear of failure. These findings underscore the motivational and resource-related connections to procrastination apart from the influence of inadequate time management skills or a defective dispositional characteristic.

Inaccurate Self-Assessment

Self-management requires comparison of one's behaviors and cognitions against some standard. Accurate self-assessment results when these comparisons yield effective choices regarding personal resource allocation to address tasks, goals, or stressors in the environment. Accurate self-assessment is difficult in work settings because of limited access to clear and factual information (Renn et al., 2005). It can become more difficult as a person's resources for cognitive control decline.

This SDBC can be operationalized in terms of work-related time/resource estimation (planning fallacy) and perceived confidence regarding the success of future plans (overconfidence effect). The planning fallacy arises when people underestimate the amount of time and/or resources needed to accomplish a particular task (e.g., Buehler, Griffin, & Ross, 2002; Kruger & Evans, 2004). This error develops from failing to consider all relevant information about factors that might affect a person's ability to finish a task as intended.

The related overconfidence effect refers to a person's systematic mis-estimation of the correctness of his/her predictions. This inaccuracy results in a miscalibration between a person's stated confidence in his/her ability to perform and the actual level of performance eventually achieved (e.g., Dunning, Griffin, Milojkovic, & Ross, 1990; Pallier et al., 2002). In other words, the overconfidence effect reflects a, "discrepancy between expectations and reality" (McGraw, Mellers, & Ritov, 2004, p. 282). These phenomena may also increase as processing effort

increases, such as with resources are low and recovery needs are high (Buehler, Griffin, & MacDonald, 1997; Buehler, Griffin, & Ross, 1994).

Self-Handicapping

To protect self-image, self-handicapping develops when a person purposefully creates barriers to his/her success using external excuses for failures (Baumeister & Scher, 1988). This “attributional shield” (Berglas & Jones, 1978, p. 406) provides a ready excuse if failure occurs, and an enhanced feeling of ability if success is achieved. Situational or state influences on self-handicapping behaviors are not well understood, even though a learning or work environments appear to be especially influential (Urda & Midgley, 2001).

Self-handicapping may lead people to believe their competencies cannot be improved, even when this may not be true. Self-handicapping behaviors can also be directly debilitating (e.g., alcohol consumption) and if chronic, can impede performance and affective well-being (Zuckerman & Tsai, 2005). Finally, self-handicapping may increase one’s negative perception by others (Ferrari & Thompson, 2006) and these negative impressions may even transcend an individual, casting a negative light on the overall organization (Siegel & Brockner, 2005). Although self-handicapping may help a person to avoid negative feedback about his/her performance, it tends to be generated from a fear of demonstrating incompetence (Berglas & Jones, 1978). Thus, this SDBC is intimately connected with feelings of stress and anxiety (Zuckerman & Tsai), as well as resource drain.

Inability to Delay Gratification: Impulsivity in Attention and Action

An inability to delay gratification reflects a tendency toward impulsivity in thought and action and a lack of control over one’s desire for immediate versus delayed rewards (White et al., 1994). Thus, attentional and behavioral impulsivity (inability to delay gratification) were

assessed in the present study. Research suggests that fatigue, poor work environment conditions, and decreased self-management abilities to increase workers' impulsive choice making (Hinson, Jameson, & Whitney, 2003; Reynolds & Schiffbauer 2004a; 2004b).

Maintaining a capacity for change may be the key to avoiding impulsivity and maintaining self-control (Baumeister, 2002). This capacity is often viewed as an inner strength or resource that requires replenishment (Baumeister, Heatherton, & Tice, 1994; Muraven et al., 1998) following active self-regulation/choice/self-control efforts, which reduce a person's capacity for continued self-management (Baumeister et al., 1998; Tice et al., 2001).

Escalation of Commitment

Rational decisions are based upon the best possible expected future returns. Escalation of commitment reflects irrational decision making due to excessive and misguided persistence. It is observed when (Brockner, 1992; Wong, Yik, & Kwong, 2006): (1) resources have been invested in a course of action (sunk costs; Arkes & Blumer, 1985), (2) negative feedback about that course of action (and its potential for future success) is received and weighted heavily (Kahneman & Tversky, 1979; Tversky & Kahneman, 1991), and (3) the decision maker needs to decide whether to invest more resources in continuing (presumably to recover sunk costs) or to disengage at the risk of appearing wasteful (Arkes & Ayton, 1999). Escalation of commitment is also associated with state negative affect (Wong et al., 2006), which is commonly a consequence of work stress (Glomb, Steel, & Arvey, 2002; Spector, Zapf, Chen, & Frese, 2000).

Within a work setting, this is a SDBC because one's "psychological inertia" may prevent him/her from carefully selecting the best course of action (Renn et al., 2005, p. 664). In these situations, people often select the simplest option (the status quo), often resulting in escalation of commitment beyond rationally supported levels (Simonson & Staw, 1992). This is illustrated by

high failure rate of new products to market (40%; Schmidt & Calantone, 2002) and commonly publicized overspending on large-scale organizational projects (Staw, Barsade, & Koput, 1997; Ross & Staw, 1993).

Method

Participants and Procedure

From seven separate in-class recruitment efforts, 407 upper-level undergraduate students expressed a potential willingness to participate. Of the 311 individuals who responded at Time 1 (76%), 35.7% were Male and the overall average age was 21 years. At Time 2, 274 participants responded (67%). All participation was voluntary, though full responses at both time points earned participants a small amount of course credit and a raffle entry for one of several \$25 gift certificates. Surveys were internet-based and data were collected during restricted time windows: within seven days of the initial (Time 1) invitation and within 48 hours of receiving the Time 2 invitation.

Measures

Unless otherwise indicated, measures used in the present study were created for the present purposes (the initial refinement of these measures is described in Cunningham, 2007). This was especially necessary for the measurement of the five SDBC, given that this is the first study to directly test elements of Renn et al.'s (2005) framework in this way. The new SDBC measures are included in the Appendix. Where appropriate, internal consistency reliability estimates are included in the descriptive statistics.

General stress perceptions. Seven items from Cohen, Kamarck, and Mermelstein's (1983) General Stress Scale were adapted for the student sample. Responses were made on a five-point scale of frequency and higher scores reflected a greater Experienced Stress and

perceived Lack of Control (two dimensions). Actual items and details on the revision of this scale are presented in Cunningham (2008b).

Quantitative workload. The five-item Quantitative Workload Inventory (Spector & Jex, 1998) was adapted for students and used to measure the perceived amount of work and the speed with which it must be completed. Responses were on a five-point frequency scale and higher scores reflected a higher prevalence of quantitative workload.

Need for recovery. Participants responded to the 10-item Fatigue Assessment Scale (FAS; Michielson, De Vries, Van Heck, Van de Vijver, & Sijtsma, 2004), indicating the perceived accuracy of each statement. Higher scores reflected greater perceived fatigue. In addition, seven items measured participants' need for resource recovery in terms of Attentional/Cognitive Resource Drain and Need for Detachment. Higher scores reflected a higher degree of need for recovery along both dimensions. Actual items and details on the development and initial psychometric evaluation of this measure can be found in Cunningham (2008b).

Situational procrastination. A tendency toward procrastination was evaluated with four situational items based on Van Eerde's (2003) avoidance reaction scale, Ferrari, Johnson, and McCown's (1995) discussion of academic procrastination, and Schouwenburg's (1995) three dimensions of academic procrastination (lack of promptness, preference for competing activities, and intention-behavior discrepancy). Participants rated the likelihood (five-point scale) that they would engage in a behavior exemplifying procrastination or non-procrastination for four separate situational judgment scenarios. Responses to the non-procrastination options were reverse coded and when summed with the responses to the other options yielded a scale score. Higher values on this scale reflected a greater likelihood of engaging in procrastination.

Inaccurate self-assessment (planning and overconfidence). Adapting Buehler et al.'s (1994) approach, participants were asked to report three schoolwork-related goals that they held for the upcoming week. For each goal, participants predicted expected time requirements and their degree of confidence (0 to 100%) that they could achieve this goal in that time-frame. One week after the primary data collection, participants were contacted with a follow-up survey that asked them to briefly reflect on the three goals they had initially described. The questions in this follow-up survey evaluated whether each goal was reached and how long it took to reach each goal.

Inaccurate planning was calculated as the difference between each person's average predicted time to complete goals at Time 1 and average actual time reported at Time 2 (only for completed goals). The absolute value of this difference score was computed so that higher scores would reflect a higher absolute degree of planning inaccuracy (similar to a technique used by Kruger & Evans, 2004). Following this calculation, a positive score reflected overestimation of needed time, a 0 indicated accurate estimation, and a negative score reflected underestimation (the typically expected form of evidence for the planning fallacy). The absolute value of this difference score was computed so that higher scores would reflect a higher absolute degree of planning inaccuracy. These values were then transformed to better approximate normality (square root transformation).

Overconfidence was measured in terms of the miscalibration between a person's confidence ratings for a prediction and the outcome of that prediction (achieved or not). This calibration score was the mean difference between the average confidence rating for each goal set at Time 1 and the percentage of correct predictions at Time 2 (Pallier et al., 2002). This bias score indicated overconfidence if it was greater than 0, accurate confidence if equal to 0, and

underconfidence if less than 0. Thus, higher scores on this measure reflected a higher degree of overconfidence.

Self-handicapping. Within an academic context, self-handicapping behaviors might take the form of delaying studying or purposefully reducing one's effort with the goal of building a future excuse if later performance evaluation associated with these tasks is unfavorable (e.g., Strube, 1986; Urdan & Midgley 2001). Other forms of self-handicapping behaviors could include allowing other commitments to monopolize study time, not taking good notes despite knowledge of the consequences, or purposefully missing lectures.

In the present study, this SDBC was assessed in two ways. The first measurement approach involved a series of three performance evaluation scenarios (adapted from Rhodewalt, 1990) for which participants rated their likelihood (on a five-point scale) of engaging in either a self-handicapping or non-self-handicapping behavioral or cognitive response. Reverse coded non-self-handicapping options were summed with self-handicapping option responses to yield a score for which higher values reflected a greater likelihood of self-handicapping. A total score was the sum across the coded responses to each scenario. The second measure asked participants also indicated their likelihood of engaging in five additional self-handicapping behaviors (on a five-point scale) given a single impending performance situation (i.e., upcoming test). Higher scores on this measure also reflected a greater likelihood to engage in self-handicapping.

Inability to delay gratification: Impulsive attention and action. A person's inability to delay gratification was measured in three ways. First, I developed a four-item scale to address attentional impulsivity (focus and concentration), adapting content from the well-established Barratt Impulsiveness Scale Version 11 (BIS-11), a revision of Barratt's (1959) original scale by

Patton, Stanford, and Barratt (1995). Participants rated their agreement with each descriptive statement such that higher scores reflected a higher degree of attentional impulsivity.

Second, I assessed behavioral impulsivity with a scenario-based item adapted from Rook and Fisher's (1995) Buying Impulsiveness Scale and Baumeister's (2002) description of impulsive behavior as, "not regulated and...[resulting] from an unplanned, spontaneous impulse" (p. 670). Participants rated the likelihood (on a five-point scale) that they would engage in both an impulsive and non-impulsive behavioral response to a scenario regarding food choice. Responses to the non-impulsive option were reverse coded and summed with responses to the impulsive options, yielding a score for which higher values reflected a greater likelihood of behavioral impulsivity.

Third, to assess impulsivity in cognition and behavior, I presented participants with five choices between a smaller, immediate lottery prize and a larger, but more distal lottery prize (adapting a technique used by Leith & Baumeister, 1996). All pairings were constructed so that the second choice (Option B) had a higher expected value than the first choice (Option A). Expected value is defined as the probability or chance of winning multiplied by the amount of money in the final prize (it is denoted in the appendix for each option). In other words, for each of the modified five items, Option A reflected a smaller, more immediate award and Option B reflected a larger, but more distal reward. Summing the number of Option A's selected resulted in a scale score such that higher values indicated a stronger inability to delay gratification. The total score on this measure was the sum of the Option A choices, such that higher scores reflected a greater inability to delay gratification (i.e., a stronger preference for immediate, albeit smaller rewards).

Escalation of commitment. Escalation of commitment is identified when an individual decides to continue with a course of action that is likely to be headed for failure. The commitment is believed to be connected to the previous investment of resources into that course of action and also the desire to not appear wasteful. Two situational items were included to measure this self-defeating behavior and cognition, adapting the classic “blank radar plane” scenario from Arkes and Blumer (1985) and more recent stimuli used by Moon (2001), Thames (1996), and Wong et al. (2006). Participants rated the likelihood (on a five-point scale) that they would quit/change course or continue a project as originally planned; continuing as originally planned reflected escalation given the negative feedback present in each scenario. Higher scores reflected a greater tendency toward escalating commitment.

As a means of checking the validity of this measurement approach for escalation of commitment, participants also reported the degree to which they would be willing to continue as planned (i.e., escalate) for each of these scenarios. The correlation between the average percent willingness to continue as planned and scores on the two scenario-based questions was significant, $r = .59, p < .01$, suggesting that the scenario-based question score could be used to reflect escalation. To avoid redundancy in outcomes only the scenario-based scores were included in the analyses.

Demographics and personality. Single items assessed participants’ gender and age. Neuroticism, extraversion, and conscientiousness were assessed with 30 items from the International Personality Item Pool (2006) mini-marker scale. Participants rated each item on a five-point scale of agreement. Higher scores reflected a higher level of each trait. Gender and these three traits served as covariates in all analyses to be consistent with previous research and to allay possible concerns about the influence of underlying dispositions on the SDBC.

Gender and negative affectivity (neuroticism) have been shown to covary with fatigue-based need for recovery scores (Jansen, Kant, & van den Brandt, 2002; Sonnentag & Zijlstra, 2006). Gender is particularly salient because self-regulation strategies may differ between males and females (women may stop tasks earlier than males to avoid failure; Murtagh & Todd, 2004; Nolen-Hoeksema & Corte, 2004). Neuroticism may represent a general tendency to experience and report distress and negative mood (akin to the influence of negative affectivity; Watson, Clark, & Tellegen, 1988). Such a personality characteristic can be expected to influence perceptions of need for recovery and potentially the negative SDBC. Finally, extraversion and conscientiousness may overlap with impulsive behavioral tendencies (Verplanken & Herabadi, 2001) and tendency toward procrastination (Ferrari et al., 1995).

Results

Descriptive statistics and intercorrelations for all study variables are summarized in Tables 2 and 3. No variables demonstrated serious positive or negative skewness or kurtosis. Table 4 summarizes the results from the separate hierarchical regression analyses testing the general hypothesis with respect to each of the outcomes. Main effects between stress-related predictors and SDBC were identified by significant regression weights. Mediation testing followed widely accepted guidelines (Baron & Kenny, 1986; Judd & Kenny, 1981), which suggest that each of the following conditions be met: (1) predictor and outcome are related, (2) predictor and mediator are related, (3) mediator and outcome are related, and (4) entering the mediator into the model reduces the strength of the original relationship between predictor and outcome. If entry of the mediator reduces the relationship in condition (1) to nonsignificance then full mediation is assumed; if the strength of this relationship decreases, but remains significant it is common to note partial mediation.

Table 2. Descriptive Statistics for All Study Variables

Variable	# of items	α	<i>M</i>	<i>SD</i>	Min	Max
1. Gender (Female)	1	n/a	0.64	0.48	0	1
2. Neuroticism	10	.88	26.93	8.01	11	50
3. Extraversion	10	.91	33.47	8.71	12	50
4. Conscientiousness	10	.85	35.71	7.14	14	50
5. Experienced stress	4	.76	8.76	3.16	0	16
6. Lack of control	3	.74	4.82	2.11	0	12
7. Quant. Workload	5	.80	11.82	3.55	0	20
8. Fatigue	10	.85	26.74	8.27	10	47
9. Attn./cognitive resource drain	3	.72	6.47	3.00	3	14
10. Need for detachment	4	.87	9.18	4.38	4	20
11. Procrastination	4	.71	22.58	6.44	8	40
12. Planning fallacy	3	n/a	1.04	0.84	0	5.8
13. Overconfidence	3	n/a	0.20	0.28	-0.68	1
14. Self-handicapping (scenario)	3	.59	9.79	2.72	6	23
15. Self-handicapping (scale)	5	.71	9.30	3.71	5	25
16. Attentional impulsivity	4	.92	11.46	3.99	4	20
17. Inability to delay gratification	5	n/a	3.38	1.29	0	5
18. Behavioral impulsivity	1	n/a	5.84	2.38	2	10
19. Escalation of Commitment	2	n/a	10.51	3.19	4	20

Note. $N = 311$ except for 12 (254), 13 (274), and 20 (310); Alpha not reported for single item measures. Low alphas for several of the SDBC measures may be due to the fact that these were measured with situational judgment items. There is some uncertainty whether alpha is an appropriate estimate for internal consistency when using situational judgment measures as it assumes the relevance of a domain-sampling model (Nunnally & Bernstein, 1994), which may or may not apply to situational judgment measures. This is evidenced in the tendency for alphas to be low within situational judgment measures (e.g., Ployhart & Ehrhart, 2003). Gender was coded 1 = Female, 0 = Male

Table 3. Intercorrelations Between All Study Variables

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
1. Gender																		
2. Neuroticism	.16 **																	
3. Extraversion	-.03	-.28 **																
4. Conscientiousness	.12 *	-.07	.00															
5. Experienced stress	.20 **	.45 **	-.06	-.09														
6. Lack of control	.00	.25 **	-.06	-.39 **	.21 **													
7. Quant. Workload	.24 **	.32 **	-.13 *	.08	.55 **	.07												
8. Fatigue	.08	.47 **	-.17 **	-.26 **	.45 **	.38 **	.34 **											
9. Attn./cognitive resource drain	.06	.32 **	-.02	-.13 *	.42 **	.22 **	.37 **	.48 **										
10. Need for detachment	-.01	.32 **	-.18 **	-.13 *	.38 **	.19 **	.33 **	.55 **	.69 **									
11. Procrastination	-.14 *	.00	.05	-.35 **	-.07	.27 **	-.17 **	.18 **	.00	.03								
12. Planning fallacy	.04	.01	.00	.06	.03	-.04	.15 *	.01	.05	.04	.04							
13. Overconfidence	-.01	.03	.12	-.07	-.01	.01	-.03	-.04	-.07	-.12 *	.06	.02						
14. Self-handicapping (scenario)	-.06	.06	.01	-.16 **	.08	.20 **	-.02	.18 **	.22 **	.19 **	.09	.03	-.04					
15. Self-handicapping (scale)	-.14 *	.22 **	.06	-.24 **	.30 **	.23 **	.15 **	.36 **	.31 **	.33 **	.22 **	.03	.02	.27 **				
16. Attentional impulsivity	.16 **	.21 **	.03	-.10	.22 **	.19 **	.09	.33 **	.34 **	.23 **	.18 **	.04	.00	.12 *	.17 **			
17. Inability to delay gratification	.10	.00	-.12 *	.05	-.10	-.04	-.02	.02	-.06	.00	-.02	-.01	-.05	.04	-.02			
18. Behavioral impulsivity	.09	.09	-.04	-.12 *	.13 *	.09	.05	.21 **	.09	.14 *	.24 **	-.02	.02	.09	.15 *	.14 *	.00	
19. Escalation of Commitment	-.19 **	-.09	-.11	-.05	-.08	.10	-.13 *	.00	-.03	.00	.24 **	-.16 *	-.15 *	.16 **	.17 **	.01	.01	.06

Note. *N* is 311 except for correlations involving 12 (254) and 13 (274), ** $p < .01$, * $p < .05$.

Table 4. Hierarchical Regression Analyses for SDBC's Predicted by Stress and Need for Recovery

Predictors	Procrastination			Inaccurate Planning			Overconfidence		
	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3
Gender	-0.10	-0.07	-0.07	0.03	0.00	0.01	-0.01	0.00	-0.02
Neuroticism	0.00	0.02	-0.03	0.01	-0.01	-0.01	0.06	0.09	0.11
Extraversion	0.04	0.04	0.06	0.01	0.02	0.02	0.14 *	0.14 *	0.13
Conscientiousness	-0.34 **	-0.27 **	-0.24 **	0.05	0.02	0.02	-0.07	-0.08	-0.09
Experienced stress		-0.06	-0.08		-0.05	-0.06		-0.03	-0.01
Lack of control		0.18 **	0.14 *		-0.03	-0.03		-0.03	-0.02
Quant. Workload		-0.12	-0.13 *		0.18 *	0.18 *		-0.02	0.01
Fatigue			0.22 **			-0.02			-0.02
Attn./cognitive resource drain			-0.05			0.01			-0.03
Need for detachment			-0.03			0.03			-0.12
ΔR^2	0.13	0.04	0.03	0.00	0.02	0.00	0.02	0.00	0.02
ΔF	11.84 **	5.22 **	3.14 *	0.27	1.95	0.07	1.53	0.20	1.49
Adjusted R ²	0.12	0.16	0.18	0.00	0.00	0.00	0.01	0.00	0.00
F	11.84 **	9.28 **	7.58 **	0.29	0.71	0.52	1.53	0.07	1.12
Self-handicapping (scenario)									
Self-handicapping (scale)									
Attentional Impulsivity									
β									
Predictors	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3
Gender	-0.05	-0.05	-0.03	-0.04	-0.10	-0.08	0.14 *	0.13 *	0.14 *
Neuroticism	0.07	0.02	-0.03	0.30 **	0.13 *	0.06	0.21 **	0.14 *	0.05
Extraversion	0.03	0.02	0.02	0.11 *	0.10	0.12 *	0.10	0.09	0.07
Conscientiousness	-0.15 **	-0.08	-0.06	-0.18 **	-0.13 *	-0.09	-0.10	-0.05	0.00
Experienced stress		0.07	0.01		0.24 **	0.17 *		0.14 *	0.05
Lack of control		0.15 *	0.12		0.12 *	0.07		0.12	0.05
Quant. Workload		-0.06	-0.11		0.14 *	0.08		-0.05	-0.13 *
Fatigue			0.07			0.17 *			0.22 **
Attn./cognitive resource drain			0.16			0.07			0.27 **
Need for detachment			0.05			0.12			-0.06
ΔR^2	0.03	0.02	0.04	0.12	0.10	0.06	0.08	0.02	0.09
ΔF	2.53 *	2.47	4.24 **	10.81 **	13.39 **	7.95 **	6.86 **	2.72 *	10.54 **
Adjusted R ²	0.02	0.03	0.06	0.11	0.21	0.26	0.07	0.09	0.17
F	2.53 *	2.53 *	3.10 **	10.81 **	12.67 **	11.86 **	6.86 **	5.15 **	7.11 **

Table 4. Hierarchical Regression Analyses for SDBC's Predicted by Stress and Need for Recovery (continued)

Predictors	Inability to Delay Gratification			Behavioral Impulsivity			Escalation of Commitment		
	β			β			β		
	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3
Gender	0.10	0.12 *	0.13 *	0.10	0.09	0.10	-0.18 **	-0.16 **	-0.16 **
Neuroticism	-0.06	0.01	-0.01	0.06	0.02	-0.03	-0.10	-0.12	-0.13
Extraversion	-0.13 *	-0.12 *	-0.11	-0.02	-0.02	0.00	-0.15 *	-0.15 **	-0.15 *
Conscientiousness	0.03	0.01	0.02	-0.13 *	-0.12	-0.09	-0.04	0.02	0.03
Experienced stress		-0.14	-0.15 *		0.10	0.06		0.04	0.03
Lack of control		-0.02	-0.03		0.02	-0.01		0.13 *	0.12
Quant. Workload		0.01	0.01		-0.03	-0.06		-0.11	-0.12
Fatigue			0.08			0.17 *			0.03
Attn./cognitive resource drain			-0.07			-0.06			0.00
Need for detachment			0.06			0.08			0.00
ΔR^2	0.03	0.01	0.01	0.03	0.01	0.03	0.06	0.02	0.00
ΔF	2.19	1.50	0.70	2.52 *	0.70	2.76 *	4.90 **	2.34	0.08
Adjusted R^2	0.02	0.02	0.02	0.02	0.02	0.03	0.05	0.06	0.05
F	2.19	1.90	1.54	2.52 *	1.74	2.07 *	4.89 **	3.83 **	2.68 **

Note. $N = 311$ for all except Inaccurate Planning ($n = 254$) and Overconfidence ($n = 274$); * $p < .05$, ** $p < .01$.

The first objective in the present study was to provide additional validation support for the Need for resource recovery construct and measure proposed by Cunningham (2008a/b). The present study represents one of the first attempts to broaden the conceptualization of need for recovery beyond physical fatigue. The following results provide some evidence for the utility of this research strategy when trying to determine a person's need for recovery. It is important to note that all results presented here were identified after controlling for gender and personality covariates (neuroticism, conscientiousness, and extraversion). Because of this, the results of the regression analyses are used as the primary tests of the hypotheses rather than the zero-order correlations.

Hypothesis 1 was partially supported, as procrastination was positively associated with perceived lack of control and this relationship was partially decreased upon entry of need for recovery variables. Fatigue and quantitative workload also emerged as predictors of this SDBC, suggesting that stress and need for recovery may jointly influence procrastination. Procrastination did not demonstrate a relationship with either dimension of the Need for resource recovery scale.

Hypothesis 2 was not supported, neither in terms of Inaccurate planning, nor with respect to Overconfidence. Although quantitative workload was significantly and positively associated with inaccurate planning, this relationship was not influenced by need for recovery.

Hypothesis 3 was supported, as stress was positively related with self-handicapping and this relationship was partially mediated by inclusion of need for recovery variables into the regression model. This was demonstrated with two separate self-handicapping measures (a scenario-based measure and a rating-style scale). The

strongest support for this hypothesis is seen in the results involving the scale-based measure of self-handicapping, where the significant relationships between three measures of stress and self-handicapping were all reduced by the entry of need for recovery variables.

Hypothesis 4 was partially supported. Experienced stress was significantly associated with attentional impulsivity, and this relationship was fully mediated by the inclusion of fatigue and need for resource recovery variables. Contrary to the hypotheses, however, stress was not significantly and positively associated with either an inability to delay gratification or a tendency toward behavioral impulsivity from the scenario-based measure. Thus, no mediation by need for recovery was possible regarding these two indices of behavioral impulsivity.

Hypothesis 5 was partially supported in that lack of control was positively associated with a decision to engage in escalation of commitment. However, this relationship was not mediated by a person's need for recovery.

Discussion

The present study represents a novel approach to studying the effects of work-related stress and recovery. Integrating occupational health and judgment and decision making psychology literatures, I developed and tested new measurement techniques for evaluating the impact of work stress and need for recovery on individuals' self-management capabilities. The theoretical underpinnings for this study involved Effort-Recovery and Conservation of Resource theories, as well as a recent model self-defeating behaviors and cognitions from Renn et al. (2005).

I developed and utilized measures of several self-management impairing (i.e., self-defeating) behaviors and cognitions, including procrastination, inaccurate planning and overconfidence, self-handicapping, impulsivity, and escalation of commitment. In most cases, these outcomes were assessed using scenario-based, situational judgment measures, to which participants responded by indicating their likelihood of engaging in specific behavioral responses to situational cues. Participants responded based on how they were feeling at the time they completed the surveys, thereby reflecting any negative effects of resource depletion. Linking these responses with self-reported ratings of stress, and need for recovery (fatigue and need for resource recovery), I was able to evaluate the impact of work-related stress on an individual's ability to effectively self-manage critical work-related behaviors and cognitions. Although the results did not perfectly match initial expectations, the findings do merit careful discussion.

Viewing procrastination as a motivational phenomenon, I expected the resource drain associated with stress and increased recovery needs to reduce a person's motivation to actively engage a challenging task. Hypothesis 1 seemed reasonable given indirect support from studies that have linked multiple stress-related work environment features such as feelings of frustration and boredom, perceptions of low autonomy, and task aversiveness with procrastination (e.g., Ackerman & Gross, 2005; Blunt & Pychyl, 2000; Lonergan & Maher, 2000). Additional research with students has also shown that self-regulatory capabilities may be a significant predictor of procrastination tendencies (e.g., Senécal et al., 1995).

Results partially supported this hypothesis, as a higher level of perceived lack of control (stressor) was associated with a stronger tendency toward procrastination. The negative relationship between conscientiousness and procrastination supported the validity of the present measure of procrastination as it mirrors existing findings (Ferrari et al., 1995; Steel, 2007). Entry

of the need for recovery variables did not greatly reduce the significance of the lack of control-to-procrastination relationship, though it did significantly improve the amount of variance accounted for in the outcome. Thus, although mediation was not fully supported, it does appear that procrastination may be jointly affected by stress and fatigue. This is an important finding that establishes a link between stress, fatigue, and procrastination. Extending from Conservation of Resources theory (Hobfoll, 1989), the lack of resources that accompanies a need for recovery may be sufficient to increase the perceived aversiveness of new tasks (Steel, 2007), increasing the likelihood that highly fatigued individuals will procrastinate.

Interestingly, the regression analyses also revealed that participants reporting higher levels of quantitative workload were less likely to demonstrate a tendency toward procrastination in their responses to the situational judgment items. The stressor of quantitative workload may reduce a person's procrastination because of its relationship with an increased perception of pressure. Procrastination develops more when demands are distal and can be easily avoided; it ceases when pressure increases and meeting a demand becomes more desirable than avoiding it (Schouwenburg & Groenewoud, 2001; Steel, 2007; Strongman & Burt, 2000). In the present study, these scenarios tended to include very short time frames (less than one day). It is possible that this may have limited the amount of procrastination that would emerge with situational judgments about scenarios with more distal deadlines.

The second SDBC evaluated in the present study was a person's inability to make accurate self-assessments. Borrowing from judgment and decision making research literatures, I operationalized this form of precursor to ineffective self-management in terms of inaccurate time planning (i.e., the planning fallacy; Buehler et al., 2002; Kruger & Evans, 2004) and overconfident estimation of personal goal achievement (i.e., the overconfidence effect; Dunning

et al., 1990; Pallier et al., 2002). Although both of these phenomena have been shown to be rather widespread, some evidence suggests their prevalence will increase as processing effort increases.

No support was identified for the link between need for recovery and inaccurate or overconfident planning (Hypothesis 2). However, the observed positive association between quantitative workload and inaccurate planning was in line with this hypothesis, and in the present case suggests that higher levels of work demands may predict a higher degree of inaccuracy when planning the time needed to complete a work-related task. Interestingly, extraversion was the only significant predictor of overconfidence. Although this did not support the hypothesis, these findings did, however, support the validity of the overconfidence measure, mirroring similar research findings linking this personality characteristic with this form of SDBC (Pallier et al., 2002; Schaefer, Williams, Goodie, & Campbell, 2004).

Self-handicapping was the third SDBC incorporated into the present study. This phenomenon emerges when one desires to protect one's self-image. The relationship between stress and self-handicapping comes from the inherently stressful nature of impending performance evaluation situation. In addition, perceptions of ambiguous expectations (Berglas & Jones, 1978) or anxiety and/or perceived threat (Zuckerman & Tsai, 2005) have also been shown to predict the development of self-handicapping behavior. These are common elements to the occupational stress experience. Thus, the expectation in Hypothesis 3 was that a positive relationship would be identified between stress and self-handicapping and this relationship would be mediated by need for recovery.

Results of the tests of this hypothesis were supportive, using both a scenario- and scale-based measure of self-handicapping. Stress predicted self-handicapping and this relationship was partially mediated by need for recovery. It is also important to note that the full predictive model including demographic covariates, and stress and need for recovery predictors accounted for a fairly impressive 26% of the variance in the scale-based score of self-handicapping tendencies. These findings are among the first to demonstrate that self-handicapping may be influenced at least in part by situational (stressors) and dispositional (need to recover and personality) factors. These results confirm expectations by other self-handicapping researchers that these types of factors, which are present in learning and work environments, are likely to influence self-handicapping behavior (Urda & Midgley, 2001).

The fourth SDBC considered was a person's impulsivity (in attention and behavior). The expectation, as stated in Hypothesis 4, was that stress would be positively associated with impulsivity and that a person's need for recovery would mediate this relationship, given that self-regulatory resource depletion has already been shown to reduce a person's general self-control (e.g., Baumeister, 2002; Baumeister et al., 1998; Vohs & Heatherton, 2000). Results supported this hypothesis with respect to attentional impulsivity, but not regarding behavioral impulsivity. In terms of the latter, it is important to note that fatigue was significantly and positively related to a tendency toward behavioral impulsivity over and above covariates and the stress variables. Also, it is interesting that an inability to delay gratification was negatively predicted by experienced stress. These findings are in line with research showing decisional impulsivity to increase as a person's self-management abilities decrease (Hinson et al., 2003) and impulsive

choice making to increase with employee fatigue and difficult work environment conditions (Reynolds & Schiffbauer 2004a; 2004b).

Escalation of commitment was the fifth SDBC outcome in the present study. Escalation requires a person to go against rational decision making norms and to continue the pursuit of a specific plan or course of action despite feedback that suggests that particular plan will fail. The negative consequences of escalation of commitment within a work setting and for an individual are clear, but little is known about factors that might trigger this type of self-defeating action.

Although the hypothesized mediational effect of need for recovery was not demonstrated, it is important to note that escalation of commitment was positively associated with a perceived lack of control and negatively related to being female and highly extraverted. Research suggests that a negative affective state (such as that accompanying stressor exposure; Spector et al., 2000) may lead to escalation of commitment (Wong et al., 2006). Though better methods for measuring escalation may facilitate future research on this relationship, the present findings do not indicate a direct link between stress and need for recovery, and escalation of commitment. The finding regarding gender is in line with other research on self-regulation, which suggests that women are more likely to stop tasks than males in the face of impending failure (Murtagh & Todd, 2004; Nolen-Hoeksema & Corte, 2004). Although there is no established literature on the relationship between extraversion and this SDBC, this appears to be another area for future research and extension.

It is also important to discuss the battery of SDBC outcome measures which received their preliminary testing in this study. Importantly it must be noted that this is the first attempt to operationalize Renn et al.'s (2005) framework of SDBC. In addition, although measures for some of the SDBC constructs existed in other domains of psychology, few if any applications

had been made of these constructs within the context of work-related performance and occupational health. It is hoped that the present efforts can will be extended and refined with future research.

Limitations

The present study was not without limitations. First, concerns could be raised about the generalizability of the findings given the student sample. Given the general nature of the phenomena studied, however, a certain degree of wider applicability is still expected. Indeed, the present findings may well underestimate the impact of stress and need for recovery on self-defeating behaviors and cognitions, given that the severity of consequences associated with all the scenarios was mild compared to what would be the case in a working adult population (where the consequences could include lost wages or a job). Student participants were not confronted with these potential consequences though every attempt was made to tailor the scenarios so they would adequately represent academic and social pressures common to a college environment. I expect to translate several of the present measures to a working adult format for additional research in the near future.

Second, in terms of measurement error limitations, common method variance may be an issue in the present study given that all scores used in the analyses came from self-reported responses to the various measures. Several steps were taken to minimize the influence of this complex form of bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). For example, data for several of the measures were collected at two time points. Multiple measurement formats were used for most of the self-defeating behaviors and cognitions. Respondent's confidentiality was assured through all phases of the study (to reduce bias entering into response patterns). All items were carefully pilot tested to maximize clarity and reduce the likelihood of any social

desirability. All analyses also controlled for multiple demographic characteristics that have been identified as possible influences on stress-related variables in other research. Thus, although it is impossible to prevent all measurement error from influencing the data and results, many steps were taken to minimize its impact in the present study (efforts supported by the absence of inflated intercorrelations among all the study variables).

Third is the issue of the low observed internal consistencies among most of the situational judgment items used to measure the SDBC outcomes. The internal consistency estimates were somewhat disconcerting, but not out of the ordinary for situational judgment measures (e.g., Ployhart & Ehrhart, 2003). In the present study there are several likely explanations for these low reliability estimates. First is that the measures may have been too brief to establish an adequate estimate of internal consistency.

Second is that when using situational judgment tests, it is very difficult to isolate a single construct for measurement. In other words, it is difficult to know whether participants' responses to specific items reflect a specific SDBC or a more complex combination of self-management failure. Reliability is indeed an important feature of good measurement methods, especially when they are newly developed (Nunnally & Bernstein, 1994). The Cronbach α , however, is based on a domain-sampling theory of test development, which may not be appropriate when situational judgment or scenario-based items are being. In part this is because α is based on observed correlations among items, and between items and the overall test score.

A domain-sampling model implies that all items should come from the same domain and have the same distributions, but this may not be the case when the items are encapsulated into a situational judgment type measure. If α is low, it may be due to items having different distributions from one another, but still being relevant to the underlying construct being

measured (Nunnally & Bernstein, 1994, p. 265). Thus, the appropriateness of an internal consistency reliability estimate for certain types of scales (especially situational judgment items) can be debated. They were reported here to be consistent with other research.

Certainly it would be worthwhile to try to improve the reliabilities of the situational self-defeating behavior and cognition measures for future research. One option is to develop additional scenarios to lengthen the shorter situational measures. Given the present observed α levels, I estimate that these situational measures in particular would need to be lengthened to the following number of items (using the Spearman-Brown prophecy formula): escalation of commitment (10 items) and self-handicapping (five items). While the benefits of increasing these measures to these lengths might not outweigh the costs (e.g., extended completion time), it does seem reasonable to create two or three additional situational items for the self-handicapping measure and at least three more scenarios each for the other situational measures.

Future Research

The present melding of occupational health and judgment and decision making psychology opens a number of doors for future research. One of the first major next steps is to revise the situational self-defeating behavior and cognition measures taking into account the various issues of reliability, time frame, and consequence severity discussed in the preceding section on limitations. A second important step is to then adapt the revised measures for use in a full-time working adult population. This adaptation will require the changing of item stems and contextual information, but the bulk of these measures should remain the same, especially the measures of the stress-related and need for recovery variables. With these tools in place it will be possible to conduct replication and extension studies within non-student populations.

Future research may be able to extend the study of stress, need for recovery, and self-handicapping to shed light on the increasing poor lifestyle choices (e.g., drug use, inactivity, unhealthy eating) associated with a cycle of perceived incompetence and deflating confidence that is common among chronic self-handicappers (Zuckerman & Tsai, 2005). Also, few attempts have been made to link physiological and psychological states to decision making processes. Future recovery research may be able to extend into this arena, focusing on how cognitive and decisional processes are affected. Understanding these relationships may help us to better understand the impact of stress on worker performance and well-being at a level on which interventions could be adequately targeted and evaluated.

Need for recovery is an important, but often ignored element in the occupational stress process. The present research lays the foundation for continued research into the behavioral and cognitive impacts of need for recovery. Such research should help to better clarify the true impact of occupational stress on personal and organizational outcomes. Although Renn et al. (2005) and many other organizational researchers might argue that leisure and relaxation are nothing more than distractions from the task, it is very true that successful or effective self-management, “often depends on individuals’ ability to muster the strength to overcome unwanted impulses driven by thoughts and feelings of immediate pleasures when employees cannot gather the strength to ward off such impulses or become exhausted from counteropposing strength, delay of gratification can fail and often so does operating and monitoring” (Renn et al., 2005, p. 672). This latter point seems to highlight the importance of self-control as a limited resource needed for effective self-management. Such a perspective is closely in line with psychological

research on self-control and self-regulation of emotions and behaviors (e.g., Baumeister et al., 1998; Muraven & Baumeister, 2000; Muraven et al., 1998).

Conclusion

The present study, although preliminary, highlights a new set of predictors and outcomes that can be considered when studying the impact of work stress and recovery needs on the functioning of workers. The observed relationships between stress, need for recovery and the specific self-defeating behaviors and cognitions of procrastination, self-handicapping, and impulsivity illustrate a complex web of relationships by which stress may lead to negative outcomes for people working in organizations.

The present findings have clear implications within work organizations in that these SDBC have potentially serious implications for individuals and their organizations and it is important to understand the factors that contribute to their enactment. In the work stress literature, the relationship between occupational stress and job-related performance has been difficult to isolate and this may be due to individual differences in need for recovery as a mediating factor left out of these previous models. It may well be that instead of chasing stress as the culprit for employee health problems we should instead be focusing on improving employees' recognition of and response to personal perceptions of need for recovery. It is also possible that instead of linking stress directly to performance, attention should be paid to intermediary self-management capabilities.

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Appendix: SDBC Measures

Items used to evaluate participants' SDBC tendencies are included in this appendix. Scoring details can be found in the Method section of this manuscript or by contacting Dr. Chris Cunningham (chris-cunningham@utc.edu). Please note that material between brackets, [], was not visible to actual participants, but is included here for additional clarity.

SITUATIONAL PROCRASTINATION

Instructions: As you read each of the following scenarios, try to clearly visualize each situation. With each situation in mind, respond *honestly* to all questions, selecting the most accurate response for you *right now*.

You have an exam tomorrow that you need to study for, but your favorite television shows are on until you usually go to sleep.

Based on how you are feeling right now, if you were in this situation, how likely would you be to do each of the following?

Not likely	Somewhat likely	Moderately likely	Very likely	Completely likely
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A) Focus on studying and plan on talking to my friends about what I missed on television later

B) Watch all my regular television shows like normal and then try to study afterwards

[Procrastination = B, Non-procrastination = A]

You are behind in your reading for one of your toughest classes and you know you need to start catching up soon (the next test is only five days away). You have finally finished all of your work that is due tomorrow.

Based on how you are feeling right now, if you were in this situation, how likely would you be to do each of the following?

Not likely	Somewhat likely	Moderately likely	Very likely	Completely likely
------------	-----------------	-------------------	-------------	-------------------

A) Make a mental note of my reading plan and intend to start reading later

B) Pull out the textbook for that class and start reading while I was still focused on getting work done

[Procrastination = A, Non-procrastination = B]

In two weeks you have an important writing assignment due in your least favorite class. You have been meaning to start this assignment for several days now, but you have not made any progress yet. In class your professor reminds everyone that they should be working on this paper already if they hope to finish it on time and to a high degree of quality.

Based on how you are feeling right now, if you were in this situation, how likely would you be to do each of the following?

Not likely	Somewhat likely	Moderately likely	Very likely	Completely likely
------------	-----------------	-------------------	-------------	-------------------

A) Get started on that paper right away

B) Think about the paper, but plan on starting the actual writing over the next few days

[Procrastination = B, Non-procrastination = A]

You have an assignment to finish today and hand in first thing tomorrow morning. You know this assignment will take you at least three hours to finish. This assignment needs to be your priority right now, but you know it will take a lot of effort to finish it well.

Based on how you are feeling right now, if you were in this situation, how likely would you be to do each of the following?

Not likely	Somewhat likely	Moderately likely	Very likely	Completely likely
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A) Chat with friends for awhile or work on something else first that was more enjoyable

B) Work on that assignment and finish it before moving on to other things

[Procrastination = A, Non-procrastination = B]

INACCURATE SELF-ASSESSMENT

Time 1 Instructions: In the following items, “schoolwork” refers to any tasks or responsibilities you have related to your classes and general progress toward your college degree.

(1) Please type in one schoolwork-related goal that you intend to finish, complete, or reach within the next week (7 days): _____

a) How much time (round to nearest hour) do you think it will take you to reach this goal? _____
 b) How confident are you (between 0 and 100%) that you will achieve this goal within this amount of time? _____

(2) Please identify a second schoolwork-related goal that you intend to finish, complete, or reach within the next week (7 days): _____

a) How much time (round to nearest hour) do you think it will take you to reach this goal? _____
 b) How confident are you (between 0 and 100%) that you will achieve this goal within this amount of time? _____

(3) Finally, please identify a third schoolwork-related goal that you intend to finish, complete, or reach within the next week (7 days): _____

a) How much time (round to nearest hour) do you think it will take you to reach this goal? _____
 b) How confident are you (between 0 and 100%) that you will achieve this goal within this amount of time? _____

[At Time 2, participants were reminded of their individual goals that they had set one week earlier. For each of those goals they completed the following (pertaining to their first, second, then third goal)]

Time 2 Instructions: To access this survey you followed a link that was sent to you in an email. Please have that email with you as you respond to the following questions.

Please type in the first goal you set (listed first in the email that guided you to this survey):

a) Did you finish this goal within the last seven days as you had predicted? Yes No
 b) How much time (round to nearest hour) did you actually spend working toward this goal over the last week/seven days? _____

SELF-HANDICAPPING

Instructions: Before you begin each of the following scenarios, try to clearly visualize each situation as you read it. Once you have the situation in your mind, respond *honestly* to all items by selecting the most accurate response for you *right now*.

1) You are working on a paper for a class and your computer starts freezing up on you repeatedly. You have spent at least five hours on this paper, but are still trying to make sure your points are clear before you hand it in tomorrow. You are very concerned that your grade on this paper will not reflect the amount of time you have spent on it.

Based on how you are feeling right now, how likely would you be to do each of the following?

Not likely	Somewhat likely	Moderately likely	Very likely	Completely likely
------------	-----------------	-------------------	-------------	-------------------

A) Save my files and try to finish on a different computer

B) Call it quits, hand in what I could print, and blame the unfinished product on "technical difficulties"

[Self-handicapping = B, Non-self-handicapping = A]

2) Grades have just been posted for the exam you took yesterday morning. You notice you did not do nearly as well as you had hoped.

Based on how you are feeling right now, how likely would you be to do each of the following?

Not likely	Somewhat likely	Moderately likely	Very likely	Completely likely
------------	-----------------	-------------------	-------------	-------------------

A) Blame my poor performance on a lack of sleep the night before

B) Realize that I truly need to study more for the next exam

[Self-handicapping = A, Non-self-handicapping = B]

3) You are giving a presentation in front of your class and you start to forget the points you are supposed to make. You know this is going to reduce your score on this presentation.

Based on how you are feeling right now, how likely would you be to do each of the following?

Not likely	Somewhat likely	Moderately likely	Very likely	Completely likely
------------	-----------------	-------------------	-------------	-------------------

A) Set my pride aside and look at my notes

B) Start clearing my throat and apologize to the audience about "not feeling well today," hoping that this would reduce their eventual criticism

[Self-handicapping = B, Non-self-handicapping = A]

Assume you have to prepare for a very difficult test that you will be taking tomorrow morning. Your plan is to study for this test after you are done with this questionnaire, but you are worried you may not perform as well on the test as you would like to when the time comes.

Based on how you are feeling right now, how likely is it that you might use each of the following behaviors to explain your eventual test performance?

	Not likely	Somewhat likely	Moderately likely	Very likely	Completely likely
I missed an important lecture and this made it difficult to study fully.					
I do not get enough sleep to study well or take the test well.					
My roommate(s) and neighbors are so loud it prevents me from studying.					
I usually study the wrong material for the test, and I was not sure where to start studying for this one.					
I did not take good notes in the class since the last exam.					

INABILITY TO DELAY GRATIFICATION: IMPULSIVE ATTENTION

Instructions: The following items require you to evaluate your thoughts and behaviors at the present moment. Please answer each item honestly. The only "right" response is the one that accurately reflects how you are feeling right now.

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
1) It is difficult for me to stay focused on these questions right now.					
2) My thoughts are wandering a great deal as I try to finish this survey.					
3) I am having difficulty concentrating on this survey.					
4) I feel restless right now.					

INABILITY TO DELAY GRATIFICATION: IMPULSIVE ACTION/BEHAVIOR

Instructions: Before you begin each of the following scenarios, try to clearly visualize each situation as you read it. Once you have the situation in your mind, respond *honestly* to all items by selecting the response that is most appropriate for you based on how you are feeling *right now*.

Picture for a moment that you have been given enough money to purchase five lottery tickets. To purchase each ticket you must make a choice between an Option A (awarded tonight) and Option B (not awarded until the end of next month). You are told your chances of winning the amount for each Option.

For each of the 5 following pairings, please select whether you would pick Option A (the first one) or B (the second one) if you needed to buy these five tickets right now:

	Option A (drawing is tonight)	Option B (drawing is next month)
(1) 65% chance of \$500 vs. 61% chance of \$550	[EV = \$325]	[EV = \$335.50]
(2) 55% chance of \$25 vs. 50% chance of \$30	[EV = \$13.75]	[EV = \$15]
(3) 40% chance of \$1000 vs. 35% chance of \$1500	[EV = \$400]	[EV = \$525]
(4) 75% chance of \$700 vs. 70% chance of \$800	[EV = \$525]	[EV = \$560]
(5) 10% chance of \$10,000 vs. 6% chance of \$20,000	[EV = \$1000]	[EV = \$1200]

You are trying to cut back on the amount of sugar you eat every day because it makes you cranky when you are working with other people. Tonight you are heading to a group work meeting for one of your difficult classes. You are bringing some pretzels, but you know there will be plenty of your favorite candy and soda (or pop) at the meeting as well.

Based on how you are feeling right now, if you were in this situation, how likely would you be to do each of the following?

	Not likely	Somewhat likely	Moderately likely	Very likely	Completely likely
A) Eat at least some candy or drink at least one can of soda (or pop)					
B) Ignore the candy and remember my diet					

[Behavioral Impulsivity = A, Non-impulsivity = B]

ESCALATION OF COMMITMENT

Imagine you started working on a class project for your most difficult, but favorite class about two weeks ago. You are looking forward to finishing this project soon. The night before it is due you discover that the argument you are making in your written summary of the project does not make logical sense and is likely to earn a low grade.

If you faced this situation right now, how likely would you be to do each of the following?

	Not likely	Somewhat likely	Moderately likely	Very likely	Completely likely
A) Finish the paper the way I started it and hope the professor will understand					
B) Start over from scratch and hand in an entirely new paper when finished, even if I were to lose a few points for lateness					

[Escalation = A, Non-escalation = B]

To what degree (between 0 and 100%) would you be willing to continue this project as initially planned? _____

You are leading a group project and you just recently received some negative feedback from your professor about an initial draft of your group’s proposed project. You know that everyone in the group put a lot of effort into the original proposal, and they were excited about finishing it as initially planned. You professor says that based on the current work your group has only a 45% chance of getting a good grade on the project when it is finished.

If you faced this situation right now, how likely would you be to do each of the following?

	Not likely	Somewhat likely	Moderately likely	Very likely	Completely likely
A) Share the feedback with my team and suggest it is time to start over with a new idea					
B) Share the feedback with my team, but suggest that we continue with our initial idea and work extra hard to pull it off well					

[Escalation = B, Non-escalation = A]

To what degree (between 0 and 100%) would you be willing to continue this project as your team had initially planned? _____