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Research Article

A rigorous test of a model of employees' resource recovery mechanisms during a weekend

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Summary Employees' recovery from the effects of occupational stress can be affected by their actions during time away from work. Conservation of resources theory argues that a key to an effective stress recovery process is the replenishment of resources during off-work time (a weekend in the present study). We test a model of the stress recovery process during a weekend whereby two recovery mechanisms (weekend activities and recovery experiences) improve two personal resources (self-regulatory capacity and state optimism), subsequently affecting psychological outcomes (work engagement and burnout) at the start of the next workweek. Employees ($n = 233$) from various jobs responded to online surveys before and after a weekend. Controlling for pre-weekend resource levels and psychological outcomes assessed on Friday, the two weekend stress recovery mechanisms (weekend activities and recovery experiences) contributed to improving or maintaining self-regulatory and optimism resources on Monday. Of note, psychological detachment may result in less rather than more of the resource of state optimism on Monday. Monday resource levels were linked to improved work engagement and burnout. As proposed by conservation of resources theory, employees can benefit from participating in activities that replenish resources necessary to meet work demands upon returning to work after a weekend. Copyright © 2016 John Wiley & Sons, Ltd.

Keywords: weekend recovery; recovery experiences; personal resources; work engagement; burnout

It is widely documented over the years that occupational stressors in the work environment can adversely affect employees' physical or psychological health (with these adverse reactions labeled strain; e.g., reviews by Cooper & Dewe, 2004; Kahn & Byosiere, 1992; Semmer, McGrath, & Beehr, 2005). As applied to the recovery process, resource theories of occupational stress argue that stressful work experiences reduce an employee's resources, and stress recovery entails replenishing them (e.g., conservation of resources theory and the effort–recovery model (ERM); Hobfoll, 1989, and Meijman & Mulder, 1998, respectively). Stress recovery is thus a dynamic process of replenishing resources that had been expended during stressful work experiences and returning psycho-biological systems to pre-stressor levels (Xanthopoulou, Sanz-Vergel, & Demerouti, 2014; Zijlstra, Cropley, & Rydstedt, 2014), thereby ameliorating the detrimental effect of job stressors on employee health and well-being (Geurts & Sonnentag, 2006).

Two mechanisms of the recovery process include the more objective *recovery activities* or behaviors that people do and the more subjective *recovery experiences* that people feel; the assumption is that doing activities results in employees feeling the experiences. There is a growing body of research supporting the beneficial outcomes associated with these two recovery mechanisms (see Sonnentag, Niessen, & Neff, 2012 for review), but research is lacking that links these recovery mechanisms to the actual resources that they are theorized to replenish. Directly testing recovery theories by measuring actual resources over time will help determine which resources are actually replenished (or not) by the recovery process and if this process affects all resources the same way.

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The issue is important because employees who experience strain from their work could direct their weekend activities in ways that will help to replenish their resources, thereby reducing strains.

The purpose of the present study is to discover how employees can best direct their weekend activities to achieve recovery. We empirically test a model of improvements in employees' resources (resource levels on Monday, controlling for Friday baseline) predicted by the two recovery mechanisms (activities and experiences) during the time period of a weekend. The present study contributes to the literature on occupational stress recovery by measuring actual resource improvement as part of the recovery process and testing a rigorous model of that resource replenishment during a weekend. The model is rigorous because it explains the relationships between all parts of the recovery process from previous research and theory: off-work activities, recovery experiences, resources that are replenished, and the employees' outcomes (Figure 1).

Recovery process as resource replenishment

At the end of a work period, employees may feel fatigue or other forms of strain, which can subsequently be reduced by "recharging their batteries" during nonwork time (e.g., Sonnentag et al., 2012; Zijlstra & Sonnentag, 2006). Recent reviews conceptualize the recovery process as involving replenishing resources diminished by work stressors (e.g., Xanthopoulou et al., 2014). Resource replenishment is a key issue in recovery, because the person's resources can help them start out fresh at the beginning of the next work period, with their normal amounts of physical and mental energy available to manage work demands. Two theories commonly used to explain this recovery process are the ERM (Meijman & Mulder, 1998) and conservation of resources theory (COR; Hobfoll, 1989).

According to Zijlstra et al. (2014), ERM suggests that work requires self-regulatory resources that help employees' direct effort and energy toward job demands. This same effort expenditure leads to energy depletion, which requires rest and recovery during off-work time in order for employees to be ready to engage in self-regulation again during the next work period (Meijman & Mulder, 1998). When recovery is incomplete, however, stressors experienced during subsequent work periods require compensatory regulation, and thus further deplete energy resources, resulting in psychological strains (e.g., burnout, depression, or somatic illness; Kahn & Byosiere, 1992).

Similarly, in COR theory, resources help employees deal with stressors (work-related demands), and employees are motivated to protect and replenish them (Hobfoll, 1989). According to Xanthopoulou et al. (2014), recovery provides opportunities during nonwork time (evenings after work, weekends, and work breaks) to replenish these stress-resistant resources. Together, COR theory and ERM point to the recovery process as being a dynamic process of resource replenishment.

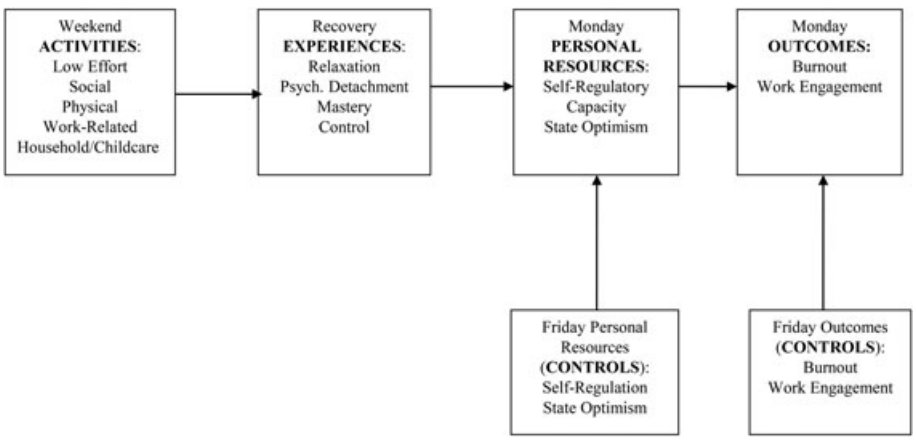

Figure 1. Variables included in the current study

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Research on evening and weekend recovery has demonstrated outcomes such as positive mood (Fritz, Sonnentag, Spector, & McInroe, 2010; Sonnentag, Binnewies, & Mojza, 2008), work engagement (Kühnel, Sonnentag, & Westman, 2009; ten Brummelhuis & Bakker, 2012), reduced burnout (Fritz & Sonnentag, 2005), and improved performance upon returning to work after the weekend (Binnewies, Sonnentag, & Mojza, 2010). Notably, however, none of these studies examined the role of employee's replenishment of their resources (the improvement or increase in specific resources), the primary component of resource recovery theories. Instead, the outcome variables such as strain are usually shown to improve; whether the replenishment of resources is the process through which this happens is not investigated, and therefore, resource recovery theories are not tested directly. To test the assumptions of recovery theories that resources and eventual outcomes change because of weekend recovery, we test changes in resources and other outcomes on Monday by controlling for baseline levels of these variables on Friday.

Personal resources relevant to recovery

The focus of previous research on indirect indicators of resource replenishment rather than directly testing actual resource replenishment may be due, in part, to the difficulty identifying which resources are actually recoverable. COR theory outlines various categories of resources that may be valued by people (objects, conditions, personal characteristics, and energies). The present study focused on personal (characteristic) resources, which are valued aspects of the self, linked to resilience, that foster peoples' ability to control the environment and obtain goals (Halbesleben, Neveu, Paustian-Underdahl, & Westman, 2014; Hobfoll, 1989). Based on this definition, however, just about anything could qualify as a resource; we suggest that not all resources are necessarily recoverable. In line with applications of COR theory to the recovery process and findings from recovery research, we argue that there are three properties of personal resources that determine their relevance for recovery. First, because the recovery process is dynamic, resources must be amenable to change, or they could not be "recovered." That is, any resources studied based on COR theory must be variable over time so that they can be lost (or reduced) and regained (increased). Second, resources need to be affected by mechanisms of the recovery process. That is, replenishment or gain in a resource could be affected by engaging in specific off-work activities or the recovery experiences resulting from those activities. Third, increases in resources should result in improvements in indicators of well-being (i.e., reduced strains) and effective functioning at work.

The present study focused on two personal resources: self-regulatory capacity and state optimism. These resources are cognitive, emotional, and motivational constructs because they can affect or help regulate employees' emotional states, cognitions and beliefs, and facilitate goal attainment at work (e.g., Kluemper, Little, & DeGroot, 2009; Twenge & Baumeister, 2002). These resources are relevant to the recovery process because they both have the three resource properties outlined earlier: these resources are amenable to change (e.g., Baumeister, Vohs, & Tice, 2007; Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2007) and are associated with indicators of well-being (Kluemper et al., 2009; Nix, Ryan, Manly, & Deci, 1999) and functioning at work (e.g., job performance, Luthans, Youseff, & Avolio, 2007; Porath & Bateman, 2006). Employees should be motivated to engage in protective recovery behaviors during a weekend to replenish these resources that are needed for work on Monday. Other resources that could be relevant to recovery, like the state versions of self-efficacy and self-esteem, have been shown to fluctuate over time and are valuable for functioning at work (e.g., Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2009); however, they were not included in the present study because of their potential overlap with self-regulatory capacity.

The first resource in the present study, *self-regulatory capacity*, is employees' allocation of their cognitive and affective energy resources across tasks (Kanfer, Chen, & Pritchard, 2008). This includes the ability to direct effort and energy to control feelings of anger or prevent outbursts, maintaining concentration and task persistence, impulse control, goal-setting, and achievement (Baumeister et al., 2007; Twenge & Baumeister, 2002). Self-regulation is a limited-capacity resource; after continuous use, self-regulatory resources can weaken (Muraven & Baumeister, 2000) and become depleted over consecutive tasks, and therefore need recovery time before becoming useful again (Baumeister, Bratlavsky, Muraven, & Tice, 1998; Muraven, Tice, & Baumeister, 1998). Recent studies examined

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self-regulatory resources in the recovery process but only by measuring vigor as a proxy variable (Sonnentag & Jelden, 2009; Sonnentag & Niessen, 2008). Vigor is a facet of engagement, which is usually examined as an indicator of being recovered rather than a resource that leads to recovery. The present study uses a direct measure of this resource, the perceived self-regulatory capacity—an employee's perception that he/she can persist on a given task.

State optimism, the other personal resource in the present study, refers to positive judgments about future events and the belief that favorable outcomes result from a combination of one's own behavior and fate, which helps people work toward their future goals (Scheier & Carver, 1985; Seligman, 1991). State optimism, studied here (rather than trait optimism), can fluctuate across days (Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2011; Xanthopoulou et al., 2009) as a function of events such as recovery activities. Replenishing state optimism will affect how employees explain causes of work-related events and how they regulate their actions, which has implications for job attitudes (job satisfaction and commitment), well-being (psychological strain and burnout; Kluemper et al., 2009), and motivation (work engagement; Xanthopoulou et al., 2009, 2011).

The two recovery mechanisms

Recovery mechanisms include off-work *activities* and subjective *experiences* that are theorized to facilitate the replenishment of resources. The activities are more behavioral, because they represent what the person does; the experiences are more psychological, because they represent how the person feels. Research has demonstrated the beneficial effects of having recovery experiences during off-work time. It is assumed that recovery is determined by the degree to which an employee's recovery activities result in recovery experiences (proposed in a model by Xanthopoulou et al., 2014; and previously demonstrated with students in Ragsdale, Beehr, Grebner, & Han, 2011). Their joint effects on resource recovery are not well-understood, however. The present study addresses this gap in the literature by examining recovery experiences as outcomes of off-work activities that explain resource replenishment and improved well-being (Figure 1).

Recovery activities

Simply by not working on Saturday and Sunday, employees might receive some respite from work hassles if they can "switch off" from work by spending time on other activities. Some activities are expected to promote stress recovery simply because they do not continue to tax work-related resources (ERM; Meijman & Mulder, 1998). *Low-effort activities* include non-strenuous behaviors (e.g., watching television) that should not tax energy resources. *Social activities* provide opportunities to build or draw upon one's social support resources (Fritz & Sonnentag, 2005). *Physical activities*, although inherently stressful on bodily systems, have known health benefits including improved energy and mood due to attaining physical fitness (Brown, 1990; Cartwright & Cooper, 2005).

Other activities occurring during off-work time, however, may further diminish resources and reduce well-being (ERM; Meijman & Mulder, 1998). These include some *work-related activities* during nonwork hours, which are associated with a degree of obligation and are assumed to continually tax the same resources utilized during the work days (Sonnentag, 2001). *Household/childcare activities* are not workplace demands, but they are assumed to tax similar resources because they are also obligatory and require sustained concentrated effort (Demerouti, Bakker, Geurts, & Taris, 2009).

We examined the five activities described earlier in the present study because prior research shows they represent off-work activities people commonly engage in that are related to stress recovery (Sonnentag, 2001; Trougakos, Hideg, Cheng, & Beal, 2014), and they include behaviors that require different effort or resources: obligatory, passive leisure, and active leisure (Geurts & Sonnentag, 2006). We assessed these activities by asking the amount of time, in hours, that employees spent on them in order to minimize the overlap with more subjective measures of the subsequent subjective recovery experiences.

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Recovery experiences

Employees' recovery activities or experiences are related to reducing strains. This effect theoretically occurs because of improvements in resources according to COR theory, but this key element of the theory is untested. We expect that recovery experiences are the mechanisms that transmit the effects of off-work activities or behaviors into actual resource replenishment (Figure 1). Recovery experiences include complex feelings and perceptual states, and four core recovery experiences have been investigated in the recovery literature: psychological detachment, relaxation, mastery, and control (see Sonnentag et al., 2012 for review). *Psychological detachment* is the feeling of disengagement from thoughts about work and its stressors (Etzion, Eden, & Lapidot, 1998; Sonnentag & Fritz, 2007); detachment may disrupt prolonged activation of the stress response (Brosschot, Pieper, & Thayer, 2005). Such detachment is the feeling employees have of unwinding or switching off from work (Sonnentag & Bayer, 2005; Sonnentag & Kruel, 2006). *Relaxing* experiences are characterized by low activation and low demands (Stone, Kennedy-Moore, & Neale, 1995; Tinsley & Eldredge, 1995). *Mastery* experiences are perceived challenges offering the possibility to learn new skills. Feelings of c*ontrol* over leisure time may compensate for a lack of the feeling of control during work hours (Sonnentag & Fritz, 2007). These experiences have been linked to well-being (e.g., work engagement, and burnout; Siltaloppi, Kinnunen, & Feldt, 2009)

Although it is assumed off-work activities result in recovery experiences, only a few recent studies have investigated these linkages (Mojza, Lorenz, Sonnentag, & Binnewies, 2010; Mojza, Sonnentag, & Bornemann, 2010; ten Brummelhuis & Bakker, 2012), and the findings are mixed. For example, three studies examined how off-work activities during workday evenings predict two recovery experiences. Two of these studies used the activities in the present study as control variables, but they generally did not predict evening psychological detachment and mastery experiences (Mojza, Lorenz, et al., 2010; Mojza, Sonnentag, et al., 2010). Another study found that social, low effort, and physical activities predicted more psychological detachment and relaxation experiences, whereas work and household activities predicted less psychological detachment and relaxation experiences (ten Brummelhuis & Bakker, 2012).

These mixed findings may be attributed to different study designs (different time lags and measurements used), sample characteristics (occupation and family status), and relevant to the present study, they only looked at short recovery periods of an evening between work days. The one-evening time period allows fewer activities and experiences to occur than a two-day time period, and this may make the results less consistent. For example, if it is the employees' evening for his or her bowling league (or softball, or volunteering at the food pantry), that is probably all he or she would be doing on that evening. If the next night is the employees' night to watch his or her favorite TV shows, to attend a night class, or to take his or her kids to and from their activities, there is probably not much else that will get done that evening. Thus, the activities on one weekday evening are limited and may be different from what happens on another weekday evening, leading to inconsistency. On a weekend by contrast, with a Friday evening and two full days available, it is possible to engage in many different activities. In addition, some recovery activities may need to be given more time or more attention in order for them to help than other activities require, and thus, their effectiveness is not as good on a single evening than some other activities. On a weekend, there is likely to be more time to give to each activity.

Recovery experiences as mediators

The present study tested the model in Figure 1. Mediation is the key feature of the model, and for parsimony, our hypotheses are therefore about mediation, although bivariate relationships are necessarily embedded within mediation models.

Recovery activities should have an effect on replenishing resources to the extent that they result in recovery experiences (feelings of psychological detachment, relaxation, mastery, and control). As Figure 1 illustrates, recovery experiences are closer to the replenishment of personal resources in the causal chain, and if the employees' weekend activities can lead to positive experiences, they will help replenish resources. The experiences should

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facilitate improvement in resources because they offer protection by stopping resource drain or providing opportunities for resource replenishment as described by COR theory (Halbesleben et al., 2014; Hobfoll, 1989) and the ERM (Meijman & Mulder, 1998).

The recovery experiences of psychological detachment and relaxation should facilitate the replenishment of resources because they terminate the mental and physical stress response, and thus stop the need to mobilize resources in response to work demands. That is, relaxation and psychological detachment experiences remove demands placed on resources by switching off mental representations of work during nonwork time (detachment) and helping the body to physically unwind and calm activated systems (relaxation), which gives resources the "break" they need to be restored. Although mastery experiences may require engaging in some effortful activities, the challenges associated with them provide opportunities for employees to build competence and proficiency, which are mechanisms for generating or replenishing resources. Having control experiences suggest that employees can choose to do something favorable for recovery, or they can choose to stop doing something that interferes with recovery. Therefore, employees are giving their resources an opportunity to be replenished by actively pursuing resource-building challenges (mastery) or engaging in preferred, recovery-inducing behaviors (control).

We expect the experiences that follow weekend activities will affect resource levels at work on Monday through a positive spillover process (Hanson, Hammer, & Colton, 2006). In the same way that work-related stressors spillover into the home domain (Repetti, Wang, & Saxbe, 2009), the beneficial effects of recovery that occur outside of work also spill over into the work domain through positive affect, behaviors, or values (Hahn, Binnewies, & Haun, 2012; Hanson et al., 2006).

H1: Recovery experiences mediate the relationship between weekend activities and replenishment of resources on Monday (controlling for Friday resource levels).

Personal resources as mediators

Previous research has shown that the two recovery mechanisms (activities or experiences) are related to psychological outcomes such as work engagement (Kühnel et al., 2009) and burnout (Fritz & Sonnentag, 2005), which indicate the extent to which someone "feels recovered." The present study focuses on work engagement and burnout as outcomes of resource replenishment because they are directly tied to the workplace. Additionally, COR theory maintains that the replenishment of resources is responsible for the effect of the two recovery mechanisms on such outcomes, and the present study tests this theoretical proposition.

Work engagement is a pleasant cognitive, affective, motivational state comprised of vigor (reflecting energy), dedication to work (reflecting involvement), and absorption in tasks (reflecting cognitive focus) (Bakker & Demerouti, 2008; Schaufeli, Salanova, Gonzáles-Romá, & Bakker, 2002). One of the potential drivers of the within-person fluctuations of work-engagement is personal resources (e.g., Llorens, Schaufeli, Bakker, & Salanova, 2007; Xanthopoulou et al., 2007; Xanthopoulou et al., 2009), which help motivate employees to pursue their goals (Bakker & Demerouti, 2008). Thus, the occupational stress recovery process contributes to improving work engagement (Sonnentag et al., 2012).

Burnout is an aversive psychological strain state due to exposure to chronic stressors (Maslach & Jackson, 1986), often resulting from high job demands and low job resources (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001), and it is experienced as a loss of energy associated with negative attitudes and deterioration of performance (Westman & Etzion, 2001; Wright & Cropanzano, 1998). Based on COR theory, burnout, particularly its facet of emotional exhaustion, is assumed to indicate employees' unsuccessful or insufficient recovery (Etzion et al., 1998; Fritz & Sonnentag, 2005, 2006; Westman & Eden, 1997).

Within the context of work, COR theory proposes that personal resources facilitate engaging with and performing work tasks effectively (Halbesleben et al., 2014). Research has shown that personal resources, such as state

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optimism, also predicted work engagement (Xanthopoulou et al., 2009, 2011) and burnout (Kluemper et al., 2009). Optimism can help maintain dedication because employees become less discouraged by setbacks. Similarly, increases in optimism can help reduce emotional exhaustion and withdrawal because employees become more positive about their future and the outcomes of their work-related efforts (Kluemper et al., 2009).

The other resource in the present study, self-regulatory capacity, has not previously been shown to predict work engagement and burnout, but as a personal resource in COR theory, it would have this effect. We expect that self-regulatory resources are necessary to focus attention on work long enough to become engaged during the work day (Baumeister et al., 2007). With replenished self-regulatory capacity, employees will exert less energy trying to fight distractions to maintain focus on work tasks. They will have the capacity to be absorbed and energized by their work, and thus be more engaged. Because self-regulatory capacity indicates the availability of the same kind of resources that are depleted when people experience burnout—especially cognitive and affective resources—any increases in self-regulatory capacity would necessarily be reflected in decreases in burnout. Taken together, the cognitive, affective, and motivational properties of state optimism (COR theory, Hobfoll, 1989) and self-regulatory resources (Baumeister et al., 2007) resulting from recovery experiences are expected to result in more work engagement and less burnout.

H2: Optimism and self-regulatory resource levels mediate the relationship between weekend recovery experiences and improvement of psychological outcomes on Monday (controlling for Friday resource levels and Friday psychological outcomes).

Model of weekend recovery

The previous hypotheses propose that the employees' weekend activities lead to their recovery experiences, that recovery experiences lead to increased resources, and that the resources lead to improved employee outcomes (in burnout and engagement) at the beginning of a next workweek. Put together, these relationships form a theoretical model by combining the model of recovery activities and experiences built by Ragsdale et al. (2011) from recovery research by Sonnentag and colleagues (e.g., Mojza, Lorenz, Sonnentag, & Binnewies, 2010; Mojza, Sonnentag, & Bornemann, 2010) with the proposal from COR theory (e.g., Hobfoll, 1989) that these recovery mechanisms can increase the employee's resources, and thereby improve employees' well-being. Ragsdale et al. (2011) argued that the employee's activities affect outcomes through the subjective feelings resulting from the activities. That is, the behaviors affect outcomes only if they result in favorable subjective experiences. Added to this, COR theory argues that recovery affects employees' outcomes because their resources have been recovered or replenished. Further, research integrating work–family and recovery domains (e.g., Hahn et al., 2012) has supported the positive spillover process of nonwork experiences (here, recovery experiences during a weekend) affecting work-related outcomes (Hanson et al., 2006), completing the model in Figure 1.

Thus, burnout and work engagement are eventual outcomes of spending time on weekend activities (Fritz & Sonnentag, 2005; Kühnel, Sonnentag, & Bledow, 2012; Kühnel et al., 2009), but this relationship is explained by the mediating effects from recovery experiences that result from the activities and from the resources replenished by the experiences. Therefore, the final hypothesis is about the joint mediating effects of recovery experiences and resource replenishment in the relationship between weekend recovery activities and Monday outcomes.

H3: Recovery experiences and personal resource levels jointly mediate the relationship between weekend activities and Monday psychological outcomes (controlling for Friday resource levels and Friday psychological outcomes).

The present study advances recovery research by assessing how the cumulative weekend recovery process (the combination of the total weekend activity and experience recovery mechanisms) leads to replenishing

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resources and in turn, to improving outcomes indicating successful recovery at the beginning of the new workweek, Monday, by controlling for Friday's baseline resources and outcomes (Figure 1).

Method

Participants and procedure

Five hundred participants were recruited by communicating with them directly through the Study Response Project, an online participant pool that facilitates academic research, and undergraduate students contacting working individuals in return for extra credit. To be included in the study, participants had to work a traditional workweek, Monday through Friday.

Participants responded to three surveys within one week's time. Surveys were opened and closed at certain times on their respective days so participants could not access surveys beyond the required times. They first received a demographics questionnaire on Wednesday (at 9:00 AM EST) to ensure eligibility. The next survey was administered at the end of the workweek, Friday (at 2:00 PM EST), to assess personal resources and psychological outcomes that were used as baseline controls for these variables after the weekend. The last survey was administered following the weekend, on Monday (at 9:00 AM EST), and asked about the weekend and again assessed personal resources and psychological outcomes. All surveys were closed by 3:00 AM EST to account for anyone taking surveys in other time zones. For paper and pencil surveys, we asked participants to record the time and date that they responded to their surveys. Weekend activities and recovery experiences were assessed, retrospectively, after the weekend to capture the accumulation of the behaviors and experiences.

After demographic measures were obtained on Wednesday, participants received either an email on Friday and Monday with a link to the online questionnaires for that day or a paper-and-pencil survey packet to be returned via mail. Participants were instructed on what days to complete each survey (demographics on Wednesday, the next questionnaire on Friday, and the final one on the following Monday) and were sent reminder emails on the day each survey should be completed. Surveys were matched using codes chosen by the participants. There were no mean differences in study variables associated with the form of data collection (study response, undergraduate recruitment-online, and undergraduate recruitment paper-and-pencil).

Participants were either not invited to subsequent surveys or were removed from the analysis for careless responding if they met any of the following criteria: (i) incorrect responses to bogus items embedded within the surveys (e.g., "I want you to select 'Disagree'"), (ii) or completing the Friday or Monday survey in less than 4 min, or (iii) reporting an excess of 75 h spent across all weekend activities (2 SD above the sample mean for total weekend activity hours [$M = 35.53$ hours]). Although a weekend (roughly defined as Friday 5 PM to Monday 4 AM) includes approximately 58 h, the activities measured in the present study may not be mutually exclusive. That is, people may engage in activities in multiple categories simultaneously (e.g., watching T.V. while exercising, shopping with friends), but participants reported time spent for those activities separately. Therefore, their total time spent on activities may exceed the maximum number of hours in a weekend. Removed participants typically failed multiple careless responding checks (Huang, Curran, Keeney, Poposki, & Deshon, 2012; Meade & Craig, 2012).

Of the 500 respondents who reported their demographics on Wednesday, 337 subsequently responded to the survey on Friday. However, eighteen participants were not invited to answer questionnaires on the following Monday for failing careless responding checks; therefore, 319 participants were invited to the Monday survey. Of the 295 participants who responded to the Monday survey, data for 62 participants were deleted because of careless responding or providing incomplete data. The final sample size with data at all time points was 233 ($n_{\text{Study Response}} = 119$; $n_{\text{Student Recruitment}} = 114$), resulting in an overall response rate of 46.6 percent. Of the total sample, 51.5 percent were women, 87.0 percent were white, the mean age was 41.45 years ($SD = 11.73$), and 62.6 percent had obtained a post-secondary degree. Seventy-two percent of

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participants were married or living with a partner, and 65.2 percent had at least one child. The mean tenure in the participants' current position was 9.22 years ($SD = 8.5$), and participants were employed in a variety of industries, including finance and accounting (12.4 percent), education (14.2 percent), health services (11.2 percent), customer service (10.3 percent), industry and agriculture (9.9 percent), construction (6.0 percent), government (4.3 percent), transportation (3.9 percent), and hospitality (2.6 percent). During the week in which participants responded to the surveys, they worked an average of 41.77 h ($SD = 7.29$).

Measures

Personal resources

Friday and Monday questionnaires measured participants' levels of resources (state of optimism and self-regulatory capacity). Participants were asked to respond based on how they currently felt about themselves and their abilities in relation to their work.

State optimism was assessed with six items from the *Revised Life Orientation Test* (*LOT-R*; Scheier, Carver, & Bridges, 1994) on a 5-point scale from *strongly disagree* to *strongly agree* ($\alpha_{Friday} = .82$, $\alpha_{Monday} = .85$). Example items for state optimism included "Today, while at work, I felt very optimistic about my future" and "While at work, I felt that if something was going to go wrong for me, it would happen today" (reverse scored).

Self-regulatory capacity was assessed with the 10-item scale by Schwarzer, Diehl, and Schmitz (1999), answered on a 5-point scale from *not at all true* to *always true* ($\alpha_{Friday} = .84$, $\alpha_{Monday} = .80$). Examples for self-regulatory items included "Today at work, I felt like I could concentrate on one activity for a long time if necessary" and "Today at work, I felt like if I worried about something, I could not concentrate on an activity" (reverse-scored). This measure addresses the behaviors or actions of self-regulating, which should be associated with an employee's capacity to self-regulate (a personal resource; Baumeister et al., 2007).

Weekend activities and recovery experiences

Recovery variables measured weekend behaviors and psychological experiences. Participants were asked to reflect on the weekend, defined as Friday evening through Sunday evening.

Weekend activities were the hours spent on weekend activities adapted from Sonnentag's (2001) daily procedure, resulting in an index of number of hours spent on each of five activities. The 15 items included three low effort activities (e.g., "Watched television"), three social activities (e.g., "Met up with others"), three physical activities (e.g., "Worked out or exercised"), three household/childcare activities (e.g., "Chores [dishes, laundry, cleaning, etc.]"), and three work-related activities (e.g., "Finishing or preparing for work duties"). These were the activities people pursued most frequently according to the recovery activities scale development study by Sonnentag (2001). For all activities, participants reported how many hours and minutes they spent on the activities within each category during the weekend. Internal consistency reliability was not appropriate for the weekend activities indices, as each activity within a category will not necessarily co-occur (Spector & Jex, 1998).

Recovery experiences were measured using the *Recovery Experiences Questionnaire* (Sonnentag & Fritz, 2007). This 16-item measure assessed subjective experiences of psychological detachment ($\alpha = .87$), relaxation ($\alpha = .91$), mastery ($\alpha = .89$), and control ($\alpha = .88$) during the weekend, with four items each answered on a 5-point scale from *strongly disagree* to *strongly agree*. The following were example items: "I forgot about work," "I did relaxing things," "I sought out intellectual challenges," and "I decided my own schedule," respectively.

Outcomes

Outcomes were assessed on both Friday (used as controls) and Monday (used as criteria), when participants were asked to report how they currently felt. Each was answered on a 5-point scale from *strongly disagree* to *strongly agree*.

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Table 1. Means, standard deviations, correlations, and reliabilities for all study variables.

Variable	*M*	*SD*	1	2	3	4	5	6	7
1 Self-regulation (F)	3.72	.58	*.84*						
2 Optimism (F)	3.44	.71	.28**	*.82*					
3 Burnout (F)	2.43	.75	−.42**	−.25**	*.94*				
4 Work engagement (F)	3.21	.77	.43**	.31**	−.56**	*.91*			
5 Low effort activities (h)	14.35	11.52	.08	.07	−.11	.05	—		
6 Social activities (h)	7.77	6.39	.05	.13*	−.08	.13*	.19*	—	
7 Physical activities (h)	2.62	3.26	−.03	.04	−.04	.24**	.10	.40**	—
8 Work-related activities (h)	3.71	5.59	−.10	−.05	.14*	.03	−.01	.11	.13
9 Household activities (h)	8.05	10.37	−.01	.06	.10	−.12	−.07	.07	−.01
10 Detachment experiences	3.44	.96	.07	.06	−.06	−.01	−.02	.04	−.06
11 Relaxation experiences	3.90	.85	.22*	.17*	−.23**	.26**	.21*	.13*	−.01
12 Mastery experiences	3.29	.85	.01	−.05	−.07	.29**	−.02	.09	.22*
13 Control experiences	3.94	.70	.19*	.17*	−.22*	.21*	.16*	.25**	.15*
14 Self-regulation (*M*)	3.71	.55	.75**	.29**	−.38**	.46**	.11	.06	.00
15 Optimism (*M*)	3.71	.73	.42**	.53**	−.41**	.47**	.22*	.22*	.10
16 Burnout (*M*)	2.24	.82	−.42**	−.30**	.68**	−.49**	−.07	−.08	−.06
17 Work engagement (*M*)	3.35	.76	.35**	.24**	−.44**	.71**	.04	.13*	.21*

Note: $N = 233$. Cronbach's alpha reliability coefficients are italicized and on the diagonal. F = Friday, M = Monday, h = hours.
*$p < .05$, **$p < .01$.

Burnout ($\alpha_{Friday} = .94$, $\alpha_{Monday} = .96$) was measured as the mean of 11 items from the *Shirom-Melamed Burnout Measure* (*SMBM*; Shirom & Melamed, 2006). The Shirom-Melamed Burnout Measure assesses three components of burnout with four items for the physical fatigue subscale (e.g., "I have no energy for going to work in the morning"), four items for the cognitive weariness subscale (e.g., "I feel I'm not thinking clearly"), and three items for the emotional exhaustion subscale (e.g., "I feel I am not capable of being sympathetic to coworkers/customers").

Work engagement ($\alpha_{Friday} = .91$, $\alpha_{Monday} = .91$) was assessed as the mean of the 9-item form of the *Utrecht Work Engagement Scale* (Schaufeli & Bakker, 2004; Schaufeli, Bakker, & Salanova, 2006). It assesses three components of work engagement with three items for vigor (e.g., "At work, I feel bursting with energy"), three items for dedication (e.g., "My job inspires me"), and three items for absorption (e.g., "I am immersed in my work").

Results

Means, standard deviations, correlations, and reliabilities are in Table 1. Path analysis of manifest variables using LISREL v8.5 (Jöreskog & Sörbom, 1996) tested the model of the weekend recovery process (Figure 1) with maximum likelihood estimation to analyze the covariance matrix. Figure 2 expands upon Figure 1 by placing each measured variable into a separate box and provides the coefficients for each significant path. Although not shown in the figure, all paths were freed from each recovery activity to each recovery experience, from each recovery experience to each resource, and from each resource to each outcome. Nonsignificant path coefficients were not shown in Figure 2 to simplify the presentation of the results, but they are available upon request.

Because previous research has shown that recovery experiences are related to each other (e.g., Sonnentag & Fritz, 2007; Sonnentag et al., 2012), we allowed their residuals to be correlated. To examine the potential influence of weekend recovery mechanisms on changes in personal resources and psychological outcomes after the weekend, Friday baseline scores for self-regulatory capacity, state optimism, burnout, and work engagement were controlled

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Table 1. (Continued)

Variable	8	9	10	11	12	13	14	15	16	17
1 Self-regulation (F)										
2 Optimism (F)										
3 Burnout (F)										
4 Work engagement (F)										
5 Low effort activities (h)										
6 Social activities (h)										
7 Physical activities (h)										
8 Work-related activities (h)	—									
9 Household activities (h)	.12	—								
10 Detachment experiences	−.34**	.07	*.87*							
11 Relaxation experiences	−.21*	−.12	.41**	*.91*						
12 Mastery experiences	.06	−.13*	.08	.21*	*.89*					
13 Control experiences	−.14*	−.10	.42**	.56**	.19*	*.88*				
14 Self-regulation (*M*)	−.08	.05	.03	.21*	.07	.25**	*.80*			
15 Optimism (*M*)	−.02	.04	−.04	.17*	−.05	.21*	.49**	*.85*		
16 Burnout (*M*)	.19*	.08	−.13*	−.30*	.01	−.34**	−.53**	−.51**	*.96*	
17 Work engagement (*M*)	−.01	−.04	−.04	.26*	.33**	.20*	.44**	.44**	−.46**	*.91*

by including them as exogenous predictors with single direct paths to their corresponding endogenous Monday outcomes.

The hypothesized model yielded good fit to the data, χ^2 (94, $N = 233$) = 167.45, $p < .001$, $\chi^2/df = 1.78$, $RMSEA = .06$, $CFI = .95$, supporting the model's overall tenets. The specific mediation tests were then based on comparing the fit of the fully mediated model to some alternative partially mediated models and examining the significance of the total effects, direct effects, and total indirect effects. A total indirect effect is the sum of unique indirect effects across all mediators (e.g., low effort activities ➔ all four recovery experiences ➔ state optimism). Bias-corrected bootstrap confidence intervals were examined to determine significance of the total indirect effects (Hayes, 2013; Lau & Cheung, 2010). These effects were examined based on the recommendations of Rucker, Preacher, Tormala, and Petty (2011) and Zhao, Lynch, and Chen (2010). Indirect-only mediation occurs when only the indirect effect is significant. Complementary mediation occurs when both the direct and indirect effects are significant and have the same sign, whereas opposite signs suggest competitive mediation. Direct-only non-mediation occurs when the direct effect is significant, but the indirect effect is not.

To test Hypothesis 1, that recovery experiences mediate the relationships between weekend activities and Monday resources, an alternative model was tested with direct paths added from all five weekend activities to both Monday resources (10 additional paths). The addition of these paths resulted in adequate fit (χ^2 [84, $N = 233$] = 173.71, $p < .001$, $\chi^2/df = 2.06$, $RMSEA = .06$, $CFI = .95$), but not significantly better than the proposed fully mediated model ($\Delta\chi^2[10] = 6.26$, $p = .76$). As seen in Table 2, recovery experiences were indirect-only mediators for the relationship between low effort activities and self-regulatory capacity. Recovery experiences were complementary mediators for the relationship between low effort activities and state optimism. Recovery experiences were competitive mediators for the relationship between household/childcare activities and self-regulatory capacity. All other effects were nonsignificant. Hypothesis 1 was partially supported.

To test Hypothesis 2, that resources mediated the relationships between recovery experiences and Monday psychological outcomes, an alternative model was tested with direct paths added from all four weekend recovery experiences to both Monday psychological outcomes (eight additional paths). The addition of these paths resulted in adequate fit (χ^2 [86, $N = 233$] = 159.93, $p < .001$, $\chi^2/df = 1.84$, $RMSEA = .05$, $CFI = .96$), but not significantly better than the proposed fully mediated model ($\Delta\chi^2[8] = 7.52$, $p = .48$). As seen in Table 3, Monday resources were indirect-only mediators for the relationship between psychological detachment and burnout. Monday resources were complementary

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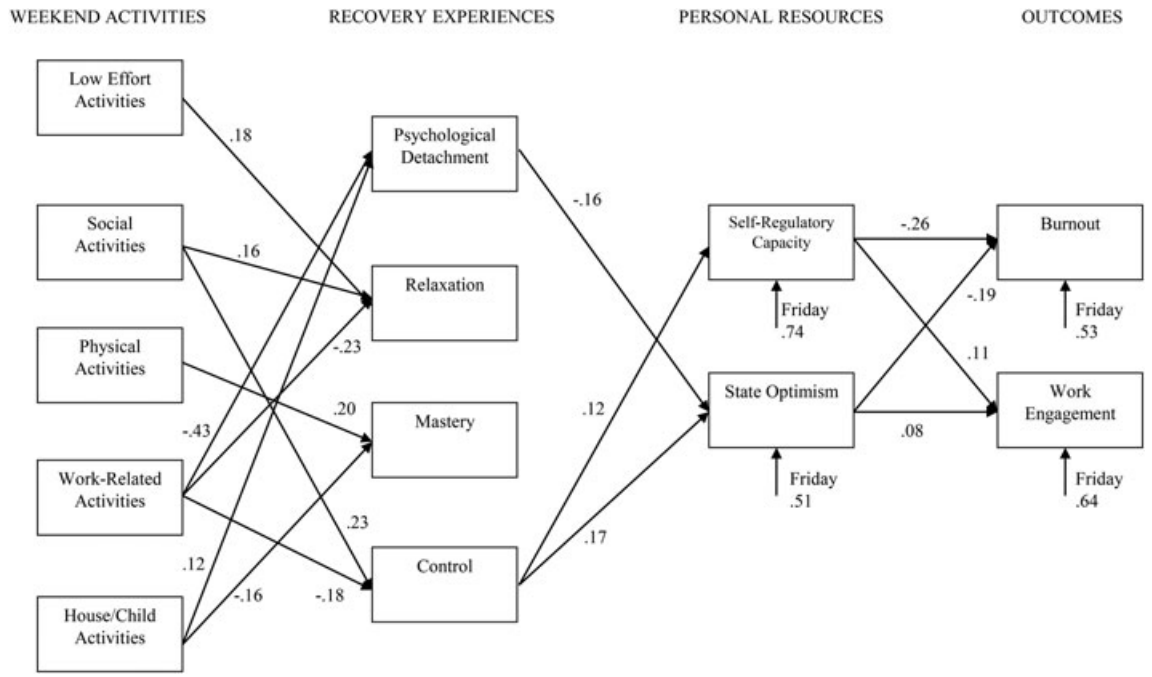

Figure 2. Results for Weekend Recovery Model χ^2 (94, $N = 233$) = 167.45, $p < .001$, $\chi^2/df = 1.78$, $RMSEA = .06$, $CFI = .95$. All hypothesized paths were tested and retained; however, only the significant path coefficients are shown for simplification and ease of interpretation

mediators of the relationship between control and burnout. Monday resources were indirect-only mediators for the relationships of psychological detachment and control with work engagement. Mastery had direct-only, non-mediation effects on burnout and work engagement. Relaxation had no effect on burnout or work engagement. Hypothesis 2 was partially supported.

Finally, Hypothesis 3 stated that both weekend recovery experiences and Monday personal resources would mediate the relationships between weekend activities and psychological outcomes on Monday. To test this hypothesis, an alternative model was tested with direct paths added from each weekend activity to each psychological outcome on Monday (10 new paths). Overall, the fit of this partially mediated model was adequate (χ^2 [84, $N = 233$] = 157.21, $p < .001$, $\chi^2/df = 1.87$, $RMSEA = .06$, $CFI = .92$) but not significantly better than the fully mediated model ($\Delta\chi^2[10] = 10.24$, $p = .42$). As seen in Table 4, weekend recovery experiences and resources were indirect-only mediators for the relationships of low effort activities with burnout and work engagement. Indirect-only mediation was found for the relationship of social activities and household/childcare activities with work engagement. Work-related activities had a direct-only non-mediation effect on burnout. No other effects were significant. Hypothesis was partially supported.

Taken together, the proposed fully mediated model (Figure 2) was supported both by the fit of the proposed model and by testing the alternative partially mediated models and comparing them with the original model. Because none of the alternative models resulted in significantly better fit, we conclude that there is good evidence that both recovery experiences and resource replenishment mediate the relationships between potential recovery activities of employees on the weekend and outcomes on the following Monday. For some activities (e.g., social and work-related), however, the specific recovery experiences matter, as only a couple of them accounted for these effects.

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Table 2. Effects decomposition for weekend recovery experiences as mediators of the relationships between weekend activities and Monday resources.

	Self-regulatory capacity				Optimism			
Weekend activities	Total effect	Direct effect	Total indirect effect	95% bias corrected CI	Total effect	Direct effect	Total indirect effect	95% bias corrected CI
Low effort	.06	.04	.02*	.016; .033	.17*	.14*	.03*	.018; .062
Social	.01	−.01	.02	−.011; .057	.12	.10	.02	−.036; .070
Physical	.02	−.01	.03	−.031; .066	.03	.03	.00	−.120; .111
Work-related	−.03	−.06	.03	−.038; .093	−.01	−.04	.03	−.084; .123
Household/ cchildcare	.06	.10*	−.04*	−.097; −.024	.00	.03	−.03	−.095; .006

Note: Effects are unstandardized estimates.
*$p < .05$

Discussion

It has been understood for a long time that, although recovery from strain due to work stressors can be achieved through respites like vacations, the recovery is usually short-lived (e.g., Westman & Eden, 1997). Recovery that occurs more frequently (e.g., every weekend) might be more beneficial than recovery that occurs once per year (e.g., an annual vacation) however, simply because the person experiences the recovery more often. The present study focused on the recovery process that occurs during a weekend. Consistent with the proposed model, spending time on weekend activities eventually results in reduced burnout and increased work engagement (e.g., Fritz & Sonnentag, 2005; Kühnel et al., 2009, 2012); this recovery process occurs through the mediating effects of recovery experiences and resource replenishment, as proposed by COR theory. A previous study demonstrated recovery experiences mediate this relationship between activities and strain outcomes during a weekend, but that was for college students doing their academic work (Ragsdale et al., 2011). The present study extended this research not only by studying a sample of actual employees, but also by more directly testing actual resource replenishment specified by COR theory.

The proposed process of resource replenishment developed in line with recovery theories was broadly supported by the comparisons of model fit. That is, weekend activities seem to predict various recovery experiences, which

Table 3. Effects decomposition for Monday resources as mediators of the relationships between weekend recovery experiences and Monday outcomes.

	Burnout				Work engagement			
Weekend recovery experiences	Total effect	Direct effect	Total indirect effect	95% bias corrected CI	Total effect	Direct effect	Total indirect effect	95% bias corrected CI
Psychological detachment	.00	−.05	.05*	.101; .029	−.11*	−.08	−.03*	−.096; −.015
Relaxation	−.07	−.06	−.01	−.054; 035	.10	.09	.01	−.016; .045
Mastery	.09*	.09*	.00	−.029; .029	.17*	.17*	.00	−.019; .019
Control	−.17*	−.11*	−.06*	−.011; −.104	−.02	.02	.04*	.012; .086

Note: Effects are unstandardized estimates.
*$p < .05$

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Table 4. Effects decomposition for weekend recovery experiences and Monday resources as mediators of the relationships between weekend activities and Monday resources.

	Burnout				Work engagement			
Weekend activities	Total effect	Direct effect	Total indirect effect	95% bias corrected CI	Total effect	Direct effect	Total indirect effect	95% bias corrected CI
Low effort	−.01*	.06	−.01*	−.028; −.002	.01	−.02	.01*	.009; .017
Social	−.01*	.02	−.01	−.051; .001	.01	−.01	.01*	.003; .028
Physical	−.01	−.06	−.01	−.040; .031	.00	.05	.00	−.032; .008
Work-related	−.01	.13*	−.01	−.047; .032	.00	.02	.00	−.026; .011
Household/ childcare	−.02*	.03	.02	−.008; .022	−.01*	.00	−.01*	−.034; −.004

Note: Effects are unstandardized estimates.
*$p < .05$

affect changes in resource levels and eventually psychological outcomes upon returning to work on Monday. However, the results of the specific tests of indirect effects were varied and have implications for future research. Because this is the first study to test a model of employees' recovery and resource replenishment, the present findings will be useful for guiding future model building. First, findings of indirect-only mediation were consistent with the theoretical framework and proposed model, and such relationships should be modeled again. For example, both resources mediated the relationships between psychological detachment with burnout and work engagement. Second, direct-only non-mediation or complementary and competitive mediation results suggest that omitted mediators should be considered (e.g., Zhao et al., 2010). For example, resources were complementary mediators of the relationship between control and burnout, meaning that control had both a negative direct and indirect effect on burnout. The direct effect suggests that some other resource was potentially not accounted for in the proposed model. By following the significant pathways through the model, we can differentiate which variables are likely to be important for recovery (especially for self-regulatory capacity and state optimism) and where there is opportunity for future research to explore omitted variables.

Because detachment and control were the only recovery experiences with significant unique paths both from the weekend activities to them and from them to the replenishment of resources on Monday, they are the most likely experiences responsible for the mediation findings. If relaxation and mastery experiences are effective as mechanisms for replenishing resources, their specific effects were either masked by examining recovery experiences together as mediators (e.g., the indirect effect of low effort activities on self-regulatory capacity), or it may be for some resources other than the two measured in the present study (state optimism and self-regulatory capacity). This possibility awaits future research. Experiencing control during the weekend worked exactly as prior research and theory would expect (e.g., Ryan, Bernstein, & Brown, 2010). Subjective control experiences may be positively affected by the resource-providing social activities and negatively affected by the resource-consuming work-related activities, and control positively predicts Monday's replenishment of both resources in the study, self-regulatory capacity, and state optimism.

Work-related activities and household/childcare activities are sometimes assumed to have deleterious effects to the recovery process (Sonnentag, 2001). Following the signs on the paths, however, work-related activities prevent psychological detachment, but less detachment during the weekend is actually beneficial, because it predicts better state optimism on Monday. We interpret this as meaning that the employees who engage in work-related activities during the weekend are more optimistic on Monday because they have accomplished enough to be ready for work on Monday. In other words, if some employees do not work on the weekends, they will be overwhelmed by even more work waiting for them on Monday; that would make it hard to be optimistic about getting everything done in the coming workweek. The effects of household/childcare activities on resources are less clear because they show

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a positive direct effect and a negative indirect effect (competitive mediation) on self-regulatory capacity. Household/childcare activities during the weekend have a weaker and positive relationship with detachment, suggesting engaging in household and childcare duties is a way to disengage; but it may actually be detrimental because of detachment's negative prediction of Monday's optimism.

Therefore, psychological detachment experience's effect may actually be harmful. The harm comes because of detachment's negative relationship with the resource of state optimism, which mediates its relationship with both outcomes in a direction suggesting that detachment leads to less optimism and therefore greater burnout and less engagement. These findings are further supported by the psychological detachment's positive indirect effect on burnout and negative indirect effect on work engagement. Many employees may be better off if they experience less rather than more psychological detachment during weekends. We speculate that this effect applies especially to those employees who really do need to work during the weekend in order to avoid falling behind in their work. If we could identify those workers with a moderator variable, the negative relationship of detachment with optimism might be even stronger for them.

At the same time, however, the negative relationship of control with optimism and self-regulatory capacity may cancel out the beneficial effects of not detaching from work during the weekend. People perceive they have less control over the weekend as they spend more time on work-related activities, and a lack of perceived control over the weekend will interfere with replenishing both self-regulatory capacity and state optimism. This is especially important because changes in self-regulatory resources have a stronger impact on burnout and work engagement than changes in state optimism do. Further, the indirect effects of control on burnout and work engagement are slightly stronger than the indirect effects of detachment on the same outcomes. Even though employees may return to work feeling more optimistic, that may not offset the costs of limited self-regulatory capacity. Thus, recovery experiences may have both strong favorable mediated effects and also weaker unfavorable mediated effects on outcomes, through resources as mediators, showing the complexity of the resource replenishment process that is a main tenet of COR theory.

Thus, our findings on psychological detachment are inconsistent with previous literature that suggests detachment is generally important for recovery (e.g., Sonnentag & Bayer, 2005; Sonnentag & Kruel, 2006). Recent research seems to present psychological detachment as being particularly important, because it continues to receive the most research attention independent of other recovery experiences (e.g., Fritz, Yankelevich, Zarubin, & Barger, 2010; Sonnentag, Arbeus, Mahn, & Fritz, 2014; Sonnentag & Fritz, 2015). Psychological detachment seems to be at odds with control experiences with respect to their relationships with specific resources from COR theory: state optimism and self-regulatory capacity. Control seems to protect these resources as COR theory would suggest, but psychological detachment does not. However, the potential costs of psychologically detaching from work on optimism may be less problematic when compared with the potential benefits to resources that result from perceived control over leisure time. Previous studies have not, however, examined the whole process of resource replenishment from activities to experiences to resource replenishment to outcomes. It is necessary to take into account all of these factors in order to discover the unique effects of any one recovery mechanism in relation to another.

Our results show that resource replenishment after a weekend of recovery contributes to increased work engagement and decreased burnout at the beginning of the next workweek on Monday, as expected by COR theory (Hobfoll, 1989). These results are also consistent with research on the job demands–resources model establishing relationships between personal resources and work engagement (Xanthopoulou et al., 2007, 2009). Previous research has established that weekend recovery helps prevent or reduce burnout (Fritz & Sonnentag, 2005), but this is the first study to demonstrate that replenishing cognitive, affective, and motivational resources—self-regulatory capacity and state optimism—may be responsible for this process. The resource replenishment occurring during the weekend was a better predictor of burnout than of engagement, however. Burnout is a psychological strain, historically a more prototypical outcome of work stressors than engagement is. That is, as noted earlier, strains are adverse psychological (and physical) states due to stressors (reviews by Cooper & Dewe, 2004; Kahn & Byosiere, 1992; Semmer et al., 2005). The stress recovery process, with its emphasis on resource replenishment described by COR theory, may be more applicable to the

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outcomes that most clearly fit the traditional definition of strains. Again, future research should further examine different outcomes and different resources in order to provide more evidence about this possibility.

Overall, our results provide some suggestions for which activities are important for replenishing resources in the present study. Spending time especially on social activities and their associated control experiences replenish state optimism and self-regulatory capacity, which, in turn, demonstrate effects on improved work engagement and burnout on Monday (Figure 2). Spending weekend hours on work-related activities may not be all bad, because even though it leads to less experience of detachment, the resulting mediation through state optimism predicts less burnout and more engagement.

Strengths and limitations

The present study developed and tested a model integrating two recovery mechanisms—weekend activities and recovery experiences—with personal resources. This is the first time actual resource replenishment has been integrated into a study of weekend recovery, even though major occupational stress-recovery theories are based on resources and resource replenishment (e.g., COR and ERM; Hobfoll, 1989; Meijman & Mulder, 1998), making this a major substantive contribution. Examining data collected at different measurement times helped to better illustrate the improvement in personal resources and psychological outcomes at the start of a new work week as a function of potential recovery activities and experiences during off-work time (a weekend). This supports propositions of COR theory, and the ERM that engaging in certain activities during the weekend may be a factor in replenishing resources and improving psychological outcomes for the next workweek.

As the goal of the study was to assess improvements in the levels of personal resources and psychological outcomes after a weekend of potential recovery activities and experiences, we selected state optimism and self-regulatory capacity, two personal resources that are amenable to change over time (e.g., Baumeister et al., 2007; Xanthopoulou et al., 2007); we note that some other resources cited in COR theory are more trait-like, and therefore should be more difficult to change in spite of the theory's arguments that they ebb and flow (e.g., personality traits or cognitive ability; Halbesleben et al., 2014).

Overall, the model predicted changes in state optimism better than in self-regulatory capacity. State optimism and self-regulatory capacity are cognitive, motivational, and emotional resources (e.g., Kluemper et al., 2009; Twenge & Baumeister, 2002), but the self-regulatory capacity measure in the present study was more behavioral, asking employees the extent to which they were self-regulating at work recently. Although self-regulating actions likely indicate available self-regulatory resources (Baumeister et al., 2007), weaker prediction of self-regulatory capacity may be due to the measure used. Future research could be aimed at identifying other measures of the self-regulation resource using experimental tasks (e.g., persistence on unsolvable tasks, attention regulation tasks, or inhibition tasks; see Baumeister et al., 2007 for review). As internet-based survey technology continues to develop, experimental tasks could be embedded in online questionnaires as well.

The present study proposed a long causal chain; however, the methodology does not permit strong causal inferences. Specifically, the weekend recovery variables and the Monday resources and psychological outcomes were assessed at the same time, on Monday. However, participants were asked in the Monday survey to retrospectively report about the weekend for the recovery variables, and they were asked about their current (Monday) states for the Monday resources and outcomes. Although they were assessed at the same time, the time referent as well as the use of Friday controls helps disentangle the resource and outcome variables.

A potential problem could be the data were self-reported, which may result in artificially inflated relationships among the variables due to response biases. The only credible way to measure a person's psychological experiences, resources, and outcomes is using self-report; however, some features of the study reduced the potential for common-method problems. Data collection was carried out at more than one point in time, so that transient response biases would have been lessened. Monday's scores on self-regulatory capacity, state optimism, burnout, and work engagement were examined while controlling their Friday scores, and weekend activities were measured as

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number of hours spent on the activity, which made the measure more objective than a more subjective method such as Likert-type rating scales indicating extent of agreement used for recovery experiences. These are recommended strategies to lessen effects of common method bias (Podsakoff, Mackenzie, & Podsakoff, 2012; Spector, 2006).

The eligibility criteria for a traditional, structured work schedule may prevent these results from being generalizable to employees who work non-traditional shifts (e.g., third shift and shiftwork), or do not work a five-day work-week. Some employees have condensed work schedules (four 10-hour days per week), whereas others may work six to seven days a week without structured opportunities for recovery (e.g., a two-day weekend). It would be useful to compare the effectiveness of recovery across different work-recovery schedules.

Future research

One recommendation for future research already noted is to study an expanded list of personal resources that may be replenished through recovery. Two personal resources were examined here, self-regulatory capacity and state optimism, but there are other types of resources that may be diminished during the work week and be replenished due to the two recovery mechanisms of weekend activities and experiences. These include other personal resources that have been shown to be malleable and fluctuate across days (e.g., self-efficacy and self-esteem; Xanthopoulou et al., 2007). Even though the overall model is well-supported, each specific weekend activity does not lead to all recovery experiences, and each specific experience does not lead to all resources. The variables in the study cover the activities and experiences from previous literature quite well, but the two resources studied do not encompass all of the potential resources as well. Dozens of resources have been named in writings on COR theory (Halbesleben et al., 2014), and they probably cannot all be examined in one study, but future research can advance our knowledge by focusing on additional sets of resources.

Although the activities in the present study encompass a number of potential weekend activities, one specific activity has been understudied in the context of occupational stress recovery: sleep (e.g., Sonnentag et al., 2008). As noted in a review by Akerstedt, Nilsson, and Kecklund (2009), sleep has beneficial effects on subjective and objective alertness and cognitive performance and mood. However, it is not always restorative. Because of the potential detrimental impact of occupational stress (e.g., high job demands and rumination about them) on sleep, recovery activities and their associated recovery experiences (e.g., psychological detachment and relaxation) should make sleep more likely. Future research should investigate these links.

Although some research has shown that emotional exhaustion (Sonnentag et al., 2014) or work factors affect how well people psychologically detach from work (stressor-detachment model; Sonnentag & Fritz, 2015), little is understood regarding why individuals choose particular off-work activities and how that affects different experiences. Personality affects not only the situations individuals choose but also how they react to situations (Funder, 2010), and there may be better fit of some personality types with specific recovery activities. For example, we propose that employees with extraverted personalities would be more likely to choose and be more favorably affected by social off-work activities, and conscientious employees would be likely to engage in further work-related activities during nonwork hours. Aside from stable variables like personality, pre-weekend conditions like Friday well-being or personal resources, and situational contingencies like the previous week's work demands also might alter recovery effects in the model. As suggested earlier, employees who are behind on their work might benefit from doing more work activities on the weekend and from experiencing less detachment than other employees. People who are more depleted at the end of the work week (i.e., lower self-regulatory capacity, higher burnout) may spend more time on low effort activities because they do not have enough resources available to engage in physical activities. Future recovery research should investigate the role of individual difference and moderators in the model.

A major issue regarding work stress interventions is whether to focus on reducing the causes (stressors) of the strains or to focus on reducing strains directly. The present study's focus was testing a central tenet of COR theory (Hobfoll, 1989), that resources could be and need to be recovered to help reduce strains, which is closer to the second of these two approaches. It appears that this resource recovery proposal of the theory actually can occur

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and that such resource recovery can be aided by some activities and experiences commonly advocated in occupational stress recovery research (e.g., Sonnentag, 2001; Trougakos et al., 2014; review by Sonnentag et al., 2012). Future research should also address the other approach to occupational stress treatments (i.e., treatments that reduce work stressors; Beehr & O'Driscoll, 2002).

Implications

Along with the previously noted implications our results have for future model building, our findings have implications for practice. In addition to stressful working conditions being harmful to the employee's well-being, they can result in lowered job performance (meta-analysis by Gilboa, Shirom, Fried, & Cooper, 2008). Some of that effect on performance is likely due to the employees' lowered readiness to exert energy and concentration if they cannot recover from their strains. The present study helps to determine likely paths to recovery. Research on weekend activities is more open to practical implications than research on recovery experiences and personal resources separately, because it is easier to recommend which behaviors or activities employees should engage in rather than trying to directly manipulate the more subjective experiences or resources. That is, it would be more clear to recommend that employees take "a five-hour dose" of socializing with friends during the weekend than to recommend that they "feel control" during the weekend. Unfortunately, however, present knowledge of efficacious recovery activities is nowhere near such precision.

Control experiences predicted resource replenishment and favorable outcomes better than the other recovery experiences, and working backward in the model's results in Figure 2, spending more weekend hours on social activities and less on work-related activities were the best predictors of those control experiences. Therefore, in order for employees to rebuild resources and have better outcomes, the most direct recommendation from the results is to increase their social activities and decrease their work-related activities on weekends. A caveat about reducing work-related activities noted earlier, however, is that work-related activities' effects on replenishment of state optimism may actually be favorable. There are probably employees who need to accomplish some work on the weekends in order to feel optimistic about their work on the following Monday.

Weekends allow enough time for employees to do many different things; some have beneficial effects on resource replenishment (and ultimately effects on outcomes) through recovery experiences, but also, some do not. Before we know more about additional resources besides state optimism and self-regulatory capacity, the findings suggest that employees should consider the effects of their engagement in different weekend activities (especially social, work-related, and household/childcare activities), because each is associated with different recovery effects.

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