Work and Non-Work Activities in Replenishing Workday Energy:

Meetings, Individual Work, and Micro Breaks

by

Chen Zhang

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
(Business Administration)
in the University of Michigan
2018

Doctoral Committee:

Professor Gretchen M. Spreitzer, Chair
Professor Richard P. Bagozzi
Associate Professor David M. Mayer
Professor Victor J. Strecher

Chen Zhang

zhangchn@umich.edu

ORCID iD: 0000-0003-1640-9962

This dissertation is dedicated to all those who strive for the aliveness of life through meaningful work and sincere love.

ACKNOWLEDGEMENTS

Standing on the tail of my five years of PhD endeavors now, I marvel at the mere fact that I actually *did* this. I still remember that when I was struggling through my very first year in this PhD program, some senior students in the department told me two things. One was "If you haven't thought about quitting the program six times in the first year, you might not have lived the program to its fullest." The subtext of it was that, if you feel that PhD study is really hard, it is simply a normal feeling; just hang in there. The other one was "Everyone in their first year in the program can easily come up with a reason why they do not deserve to be here." The subtext of this one was, no matter what success you have had in your previous life, you will be humbled by the PhD journey and by being at such a special place as Michigan, but never undermine yourself because of that.

So here I am, reflecting on those first-year moments and amazed by my almost completion of the program. This has been a journey with so many ups and downs, ranging from big waves at some points and small turbulences all elsewhere. With the academic work set aside, I feel that just the process of persisting through these years and gaining all the learning and personal growth as I did is something I will feel forever proud of for the rest of my life. However, it would not have been possible without many people to whom I am deeply indebted.

First, I am extremely grateful to my three major faculty advisors throughout the PhD program. Gretchen Spreitzer, my dissertation chair and a phenomenal advisor with such a big, caring heart, is the very reason that I have found the dissertation process to be such a

developmental experience. I never came out of a meeting or conversation with Gretchen without feeling encouraged, inspired, and supported, both as a scholar and as a person. Gretchen, I could not be more grateful for having you as my chair. Next, Dave Mayer not only is a member on my dissertation committee but was also a co-author on my very first published paper, guiding me through an exciting process that prepared me well for many of my later endeavors. Even more importantly, Dave was someone I would always think of turning to for advice (or even just a compassionate ear) when I ran into struggles and confusion with all kinds of things, including but not limited to the PhD process, the job market, the mechanics of research projects and publication, or living an academic life in general. Stopping by Dave's office once in a while was one of the things I enjoyed most doing at Ross. I am also very grateful for having Sue Ashford as an advisor. Sue is the person I have worked with for the longest time in the department, starting from the beginning of my program. I cannot say enough about the wisdom Sue has imparted to me from her own scholarly work and academic career, which I will surely carry and continue to benefit from for the many years to come.

Beyond faculty members in the M&O department, I am also very thankful to Rick Bagozzi and Vic Strecher, who not only served on my dissertation committee and provided me with invaluable feedback and support but also inspired me because of their unique life and work journeys. I admire Rick deeply both for his amazing career accomplishments and for his utmost generosity as a scholar, which I shall always look up to. Vic is someone I would always think of when I want to think of an exemplar person who combines research and practice in powerful ways to impact and benefit so many other people. His multi-faceted work on encouraging people to have meaningful purposes in life has empowered me personally in my own work and life.

I am also tremendously grateful to the M&O PhD student group. The PhD student community is one of the things I love most about being at Michigan and in the M&O department. There has been so much mutual caring, help, and support in this community that I never felt on my own even during the biggest struggles. Cassandra Aceves, Ashley Hardin, Lyndon Garret, Chak Fu Lam, Chris Myers, and Maddy Ong, among others, are just a few examples of senior students and alumni who have greatly helped and inspired me during my PhD program. Senior students in our community are always generous in offering their time and help despite the many commitments they have in their own work, which is a value I also made my best effort to live up to when I became an upper-year student myself. Lindsey Cameron and Teddy DeWitt are my cohort mates and have been most wonderful comrades to travel together through all those storms and waves in this adventure. I also feel really lucky to have Eunwoo Kim, Laura Sonday, and Mrudula Nujella as my dearest friends during these years. I feel sad that I will leave Ann Arbor a bit earlier than you do, but I shall always stay connected with you. Overall, I feel that the M&O student group has been my "big family" for these past years, and I cannot say enough thanks to you all.

Last, but definitely not the least, I want to acknowledge some *very* special individuals who are indispensable in the story of me finishing this PhD program. I owe infinite thanks to my husband Wang Xin, the only person in the world who has witnessed and "co-experienced" each and every step of my five years at Michigan. He is always there to give me unconditional love and support no matter whether I am being cheerful and lovable or upset and distressed. You have undoubtedly been a source of my inner strength. Then a person to whom I probably would never say thanks, as the term itself will inevitably fall short of how I feel: Dr. Yang Bin, an all-time best mentor and a most special friend. I cannot imagine how dramatically things would have

been different if I had not had you as a mentor and close friend--I would not have become the person I am today, or come nearly close to where I stand now. Then a huge shout-out to Dr. Zhu Hengyuan, who has never been hesitant to help us during those times when Xin, or I, or both of us, were really desperate, and whose help could range from picking up my phone calls past midnight to throwing parties at his own place to welcome us “home.” We do always feel “at home” when you are around, applauding and cheering for us and caring about us most deeply. Then my dear parents, who probably do not have much idea of all the nitty-gritty of what I am actually doing in this PhD program but always make me feel like I would have a place to go to no matter how things turn out. Finally, Wu Dan, the very friend I have known for fifteen years now. Since day one of our friendship, the two of us have been exploring our course and causes seemingly separately but ultimately side by side, which I believe is a real treasure I should never take for granted. For each and all of you, words will never fully express my gratitude--your whole-hearted support is what has carried me through the toughest times of my PhD journey.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ABSTRACT

With heightened demands in today's workplaces, it has become increasingly challenging for knowledge workers to replenish their energy during the workday to sustain work performance and personal well-being. Prior research suggests that taking small breaks at work, which involves short engagement in non-work activities, is useful for recovering workday energy. However, engagement in small breaks can be constrained at work, including by the time demands of work activities such as meetings. It is thus important to explore possibilities for energy replenishment in work activities themselves, especially in those that might constrain breaks in the first place (e.g., meetings). In this dissertation, I develop and examine a conceptual framework for workday energy replenishment that incorporates both the non-work activity of *micro breaks* and the work activities of *individual tasks* and *meeting events*. I argue that, although micro breaks can benefit workday energy, engagement in micro breaks will be suppressed on workdays when there are greater time demands from meetings (and hence less time available for individual work). More importantly, however, I draw upon two parallel theoretical perspectives of human energy and propose that (1) when a meeting event provides fulfillment of psychological needs beyond that provided in individual work, and (2) when a meeting event provides temporary relief of performance pressure among high-pressure individual work, these experiences themselves will enhance workday energy, thus serving as compensatory pathways for replenishment when micro breaks are constrained. I conducted three studies with knowledge workers using complementary designs, including two experience sampling studies and a multi-source survey study. The study results largely support the hypotheses. I conclude by discussing theoretical and practical implications of this research.

CHAPTER 1

INTRODUCTION

Workers are faced with heightened demands in today's organizations (Mandel, 2005; Michel, 2011; Reid & Ramarajan, 2016). Not only do research studies document professional workers struggling with workload and fatigue in high-intensity workplaces (e.g., Michel, 2011; Perlow, 2012; Reid, 2015), recent consulting surveys also report ninety-five percent of human resource leaders admitting employee burnout problems in their organizations (Kronos Inc., 2017), reflecting substantial challenges with human energy in day-to-day work. For individual workers, it is important to have effective pathways for replenishing their energy during the workday, which critically sustains their work performance and personal well-being (Loehr & Schwartz, 2003; Pfeffer, 2010; Quinn, Spreitzer, & Lam, 2012; Sonnentag, Niessen, & Neff, 2012). As the present research will demonstrate, when energy replenishment through non-work activities (e.g., micro breaks) is constrained by the time demands of work activities (e.g., meetings), it is useful to explore replenishing experiences in the constraining work activities themselves.

The concept of "energy" (or "human energy") is used to refer to individuals' subjective experience of heightened aliveness that enhances their capacity to do work (Owens, Baker, Sumpter, & Cameron, 2016; Quinn et al., 2012; Ryan & Frederick, 1997). As examined in prior empirical studies, energy can manifest as high levels of vigor or subjective vitality (e.g., Carmeli, Ben-Hador, Waldman, & Rupp, 2009; Ryan & Frederick, 1997; Lam, Wan, & Roussin, 2016). Extant research provides rich evidence for the importance of human energy at work, showing its

association with desirable outcomes such as work engagement, task performance, personal initiative, pursuit of learning, and engagement in creative and citizenship behaviors (Binnewies, Sonnentag, & Mojza, 2009; Carmeli et al., 2009; Hunter & Wu, 2016; Kark & Carmeli, 2009; Little, Nelson, Wallace, & Johnson, 2011; Sonnentag, 2003; Sonnentag, Mojza, Demerouti, & Bakker, 2012).

For knowledge workers, or workers whose jobs mainly revolve around intellectual rather than physical activities (Alvesson, 2004; Davenport, 2013), replenishing and enhancing workday energy is an issue particularly worth of attention. Knowledge workers are a population who face intensified workload (Michel, 2011; Reid & Ramarajan, 2016; Society for Human Resource Management, 2009) and at the same time must handle fluid workdays during which time windows for recovery are often ambiguous and can be easily forgone (Bupa, 2011; Fritz, Lam, & Spreitzer, 2011; Wollan, 2016).

One might reasonably assert that, for knowledge workers, an apparent, natural option for energy replenishment during the workday is to engage in break activities. Taking breaks at work has received increasing attention, not only in popular conversations (e.g., Korkki, 2012; Pink, 2018), but also in empirical research in the organizational literature (Sonnentag et al., 2012). Recent studies have pointed to the use of small break activities as energy management strategies (Fritz et al., 2011; Zacher, Brailsford, & Parker, 2014), engagement in relaxation activities during lunch time or between work sessions (Trougakos, Beal, Green, & Weiss, 2008; Trougakos, Hideg, Cheng, & Beal, 2014), and engagement in preferred activities using formal or informal breaks (Hunter & Wu, 2016), suggesting their benefits for energy at work. For knowledge workers, what is particularly relevant is what Fritz and colleagues (2011) call “micro breaks” during the workday—that is, a short period of time when individuals temporarily pause

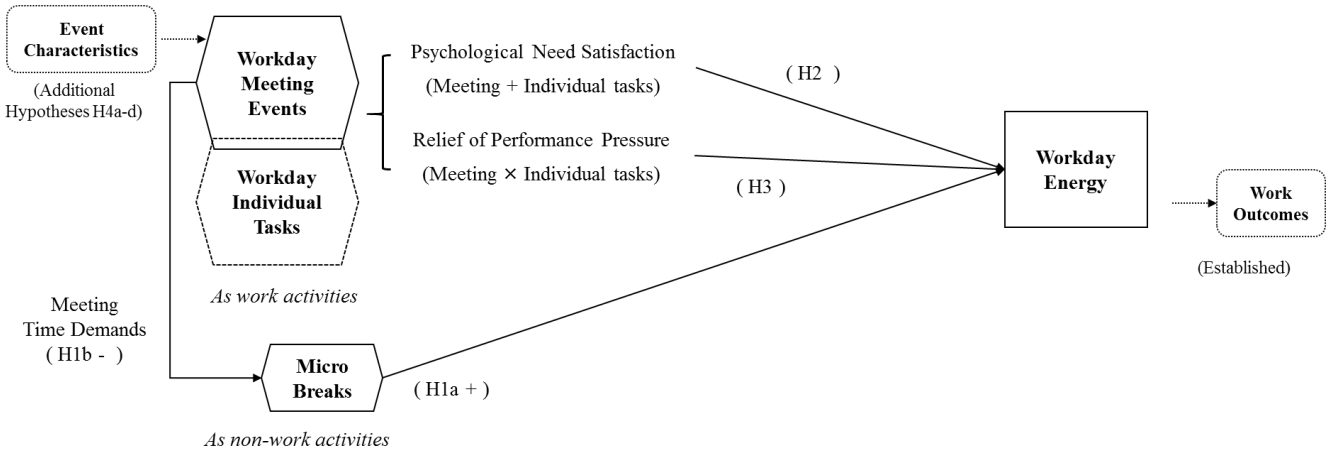
or shift away from work tasks, during which they can engage in activities that reduce their physical and psychological strains (Fritz et al., 2011; Hunter & Wu, 2016; Sonnentag & Fritz, 2015; Trougakos et al., 2008). Examples of micro break activities include taking a short walk around or outside the office, or having a casual conversation with colleagues about common interests (Fritz et al., 2011).

A challenge in resorting only to micro breaks for energy replenishment, however, is that opportunities for individuals to take small breaks at work can be constrained by the time demands of certain work activities. Engagement in micro breaks is a volitional behavior that depends on the possession of discretionary time and thus can be affected by the time demands of work activities during the day (e.g., many meetings and not enough time for individual work). If that is the case, some important questions surface: What might be some alternative possibilities for replenishing energy from the very work activities that constrain micro breaks (e.g., meeting events)? More specifically, what experiences, if provided in those work activities, might themselves enhance workday energy? An investigation of these questions is important, because, theoretically, it will incorporate additional replenishment possibilities from work activities when non-work activities (e.g., breaks) are being limited; practically, it can provide useful guidance for knowledge workers and managers to improve workday outcomes.

I address these questions in the present research. I start with the premise that knowledge workers' day-to-day work typically involves both *individual tasks* and *meeting events*, which represent continuous, non-event work activities and discrete, event-form work activities, respectively. I propose that in a workday when there are greater time demands from meetings (and hence less time for individual work), an individual will be less likely to engage in micro breaks. More importantly, however, when certain experiences are provided in the meeting events,

these experiences themselves may enhance workday energy, which thus serve as compensatory possibilities when micro breaks are constrained. Drawing upon two parallel perspectives of human energy at work, including an abundance and a scarcity perspective (Quinn et al., 2012), I explore two types of potential replenishing experiences in meeting events and examine both in the context of individual tasks. They include (a) when a meeting event provides satisfaction of psychological needs in addition to that provided in individual tasks, and (b) when a meeting event provides temporary relief of performance pressure amongst high-pressure individual tasks. Figure 1 below presents an overview of the conceptual framework and specific hypotheses, which I test using three studies with complementary designs.

Figure 1. Overview of the Conceptual Framework and Hypotheses



This research makes several theoretical contributions. First, it develops an enriched understanding of potential pathways for replenishing and enhancing workday energy. It reveals the challenges in depending on non-work activities (e.g., micro breaks) but also points to additional possibilities for energy replenishment offered by the constraining work activities themselves (e.g., meetings). Second, this research advances a non-simplistic, "dual" perspective

of how work activities and events may shape energy and well-being at work. Using meeting events as a theoretical example, it demonstrates that some work activities can have limiting aspects (e.g., in their temporal features) but can also offer enabling conditions when they provide the right types of experiences. This way, this research suggests that even obligatory work activities that may not appear attractive (e.g., meetings) can still be turned into opportunities (e.g., for human energy at work) by understanding the relevant experiential conditions. Finally, this research contributes to research on within-workday design. By assessing experiences in meeting events and individual tasks in tandem, this research provides important evidence for an idea previously hinted by researchers such as Elsbach and Hargadon (2006) but rarely studied in the literature—that is, some work activities (e.g., meeting events) can be used as intermittent episodes among other work activities (e.g., individual tasks) to create beneficial effects for workers, especially when those different work activities involve a change in demands (e.g., in terms of performance pressure). In addition to the theoretical contributions, the present research also provides useful practical implications for replenishing workday energy and improving workday outcomes, suggesting solutions that focus on the supply of favorable experiences in discrete events and day-to-day work activities.

The remainder of this dissertation is organized as follows. In Chapter 2, I lay out the theoretical background for this research by reviewing relevant theoretical and empirical literatures and by discussing important terms and concepts. In Chapter 3, I present the conceptual framework and develop specific hypotheses to be tested. In Chapter 4, I present the three empirical studies I conducted to test the hypotheses. In the final chapter, Chapter 5, I discuss theoretical contributions, practical implications, and future directions of this research.

CHAPTER 2

LITERATURE REVIEW AND CONCEPTUAL ISSUES

Human Energy as a Resource in Work Organizations

Human energy is a significant resource in work organizations. According to Feldman's conceptualization (Feldman, 2004; Feldman & Worline, 2012), a resource is anything that allows an actor to enact a schema. With higher levels of energy, organizational members have greater capacity to carry out work activities, which also enable workgroups and organizations to better achieve their goals (Quinn et al., 2012).

The literature provides evidence that individuals' energy resources are associated with important work behaviors and outcomes. In the work recovery literature, research shows that individuals' feelings of being refreshed in the morning is positively related to work engagement (Sonnentag et al.; Sonnentag, 2003), self-rated task performance (Binnewies et al., 2009), personal initiative and pursuit of learning (Binnewies et al., 2009; Sonnentag, 2003), and organizational citizenship behavior (Binnewies et al., 2009) during a workday. Similarly, feeling recovered at the beginning of a workweek is shown to be positively related to week-level task performance, personal initiative, and citizenship behavior (Binnewies, Sonnentag, & Mojza, 2010). Replenishment of energy *within* a workday is beneficial too. Trougakos and colleagues (2008) show that engagement in relaxing activities during breaks relates to desirable affective display in subsequent service sessions of the workday. Hunter and Wu (2016) demonstrate that

higher energy levels from formal or informal breaks during the workday positively relate to an individual's overall level of citizenship behavior and job satisfaction.

In addition to the work recovery literature, research on vitality and vigor at work also provides evidence for the positive relationships of human energy with work outcomes. Employees' feelings of vigor or vitality are shown to be associated with higher job performance (Carmeli et al., 2009), more citizenship behavior and less deviant behavior (Little et al., 2011), and more engagement in creative behavior (Kark & Carmeli, 2009). Owens and colleagues (2016) developed a construct termed "relational energy" and defined as "a heightened level of psychological resourcefulness generated from interpersonal interactions that enhances one's capacity to do work" (p. 37), which they show relates positively to job engagement.

In summary, evidence from extant research supports human energy as an important resource in the workplace, substantiating the importance of understanding how individuals' energy at work can be replenished and enhanced. I discuss literatures that speak to this issue.

Potential Ways of Replenishing and Enhancing Energy at Work

In this section, I review theoretical perspectives and related empirical research that point to potential ways of enhancing and replenishing human energy resources *at work*, which include both non-work activities and other options that do not depend on non-work activities and might be realized in work activities. I do not focus on theories and studies that suggest ways of enhancing energy outside of work time (e.g., night-time sleep, physical exercise during personal time), which is beyond the scope of the present research. Also, in discussing the relevant literature below, I do not particularly distinguish between "replenishment" and "enhancement" of energy at work, and I generally view factors that are proposed to contribute to higher levels of

vigor and vitality and/or lower levels of fatigue and depletion as potential pathways to enhancing or replenishing energy at work. This is an issue I will in more detail later in this chapter.

Replenishing Workday Energy through Non-work Activities

Research in the work recovery literature sheds light on replenishing workday energy through non-work activities and experiences (e.g., relaxation). This stream of research mainly draws upon the effort-recovery model (Meijman & Mulder, 1998), conservation of resources theory (Hobfoll, 1989, 1998), and ego-depletion theory (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Muraven & Baumeister, 2000).

Theoretical Perspectives that Suggest Replenishment through Non-work Activities

The effort-recovery model (Meijman & Mulder, 1998) argues that expending effort on work demands generates load reactions in human functional systems such as fatigue and arousal, and that when the exposure to work demands is discontinued, load reactions can be reversed and recovery thus occurs. Therefore, an important pathway to workday energy replenishment is to suspend work demands, at least temporarily. From this theoretical perspective, taking a break from work and engaging in non-work activities can serve this purpose and replenish an individual's energy during the workday, especially if the non-work activities are relaxing rather than demanding, or if the activities do not tax the same functional systems as stressful work demands do. Individuals can use formal breaks (e.g., lunch breaks) or informal breaks (e.g., taking a few minutes off the work tasks) to undertake such activities.

Conservation of resources theory (Hobfoll, 1989, 1998) holds that individuals are driven to retain existing resources and to acquire new resources, with resources referring to a broad range of things that individuals may value, including objects, states, and internal strengths (Halbesleben, Neveu, Paustian-Underdahl, & Westman, 2014; Hobfoll, 1988). Stress occurs

when resources are threatened and lost, and recovery occurs when individuals restore those resources or gain new ones. From this theoretical perspective, what can affect energy replenishment is the conservation and acquisition of resources. Given that non-work activities can suspend some depleting work demands that drain individuals' personal resources, engaging in non-work activities should facilitate replenishment. In addition to suspending resource loss, non-work activities can also help individuals develop internal strengths as new resources (Sonnentag & Fritz, 2007), such as feelings of efficacy and proficiency (e.g., when a person learns to master something new in a hobby activity) or feelings of control (e.g., when a person designs and undertakes some fun activities). The conservation of resources theory thus points to two mechanisms-- prevention of resource loss and construction of new resources—for why non-work activities can be beneficial for replenishing and enhancing energy at work.

Ego-depletion theory (Baumeister et al., 1998; Muraven & Baumeister, 2000) is another theory often invoked in work recovery research (e.g., Trougakos et al., 2008, 2014). It argues that individuals have a limited resource for self-regulation, and that engaging in acts and behaviors that require self-regulation (e.g., focusing one's attention, resisting a temptation) will deplete that limited resource, making it harder exercise self-control and perform well on subsequent tasks. Meta-analytical evidence supports this idea (Hagger, Wood, Stiff, & Chatzisarantis, 2010). Importantly, this theory argues that depletion worsens when there are no opportunities for restoration, whereas a rest and recovery period following the exercise of self-control should recharge the energy resources needed for self-regulation (Muraven & Baumeister, 2000). As such, ego-depletion theory similarly suggests the value of non-work activities: when work tasks require the exertion of self-regulation, taking a short break to engage in non-work

activities that involve low levels of self-control (e.g., listening to music, reading a blog post for fun) can enable energy replenishment during the workday.

In summary, all three theories point to non-work activities as valuable means for replenishing energy at work. They suggest that individuals can use formal breaks (e.g., scheduled lunch breaks) or informal breaks (e.g., volitionally shifting away from work for a brief period of time) to do things that do not need high levels of self-control (e.g., listening to some music, having a casual conversation with colleagues), or do not involve the same type of effort as work activities (e.g., meditating, reading something for fun), or build internal strengths and resources (e.g., a fun activity that creates feelings of mastery and efficacy).

Drawing upon these theoretical perspectives, empirical research in the work recovery literature provides support for the benefits of non-work activities.

Empirical Research on Replenishment through Non-work Activities

The work recovery literature focuses on investigating recovery activities and experiences. The majority of this stream of work has focused on off-work occasions (Demerouti, Bakker, Geurts, & Taris, 2009; Sonnentag et al., 2012), including evenings (e.g., Bakker, Demerouti, Oerlemans, & Sonnentag, 2013; Bennett, Gabriel, Calderwood, Dahling, & Trougakos, 2016; Sonnentag, 2001; Sonnentag & Natter, 2004; Sonnentag & Zijlstra, 2006; Ten Brummelhuis & Bakker, 2012; Ten Brummelhuis & Trougakos, 2014), weekends (e.g., Binnewies et al., 2010; Fritz & Sonnentag, 2005; Fritz, Sonnentag, Spector, & McInroe, 2010), vacations (e.g., Fritz & Sonnentag, 2006; Kühnel & Sonnentag, 2011; Westman & Eden, 1997), and sabbaticals (e.g., Davidson et al., 2010; Flaxman, Ménard, Bond, & Kinman, 2012). Although not directly relevant to the present research, these studies together support that recovery activities and experiences

during off-work periods relate to less fatigue and more positive affect and vigor and are beneficial for human energy resources.

What is more relevant to the present research is a nascent body of research in this literature that examines recovery *at work*, particularly through *within-workday* breaks, including both formal breaks (e.g., scheduled lunch breaks) and informal ones. These studies, as discussed below, are still small in number, but they provide some early evidence that non-work activities during breaks at work facilitate energy replenishment.

Trougakos and colleagues (2014) studied activities that employees engage in during lunch breaks. They found that engaging in relaxation during the lunch break is associated with less fatigue at the end of a workday, whereas engaging in work and social activities is only associated with less fatigue when individuals have high autonomy in choosing what to do during the lunch break. In another study, Trougakos and colleagues (2008) studied the breaks between scheduled work sessions with a sample of cheerleading camp instructors. They conceptualized two types of activities during the breaks, including "chore activities," which involve continuing to work or require higher effort (e.g., preparing for future sessions, practicing materials), and "respite activities," which involve lower effort and are viewed as more preferred (e.g., relaxation, socializing). They found that engaging in chore activities during a break was related to more negative emotions during the break, and engaging in respite activities was related to more positive emotions and a greater display of positive emotions in subsequent customer interactions.

The two studies above are both focused on relatively formal breaks scheduled within a workday. Hunter and Wu's (2016) study, on the other hand, mixed formal and informal breaks in their investigation. Their study examined a range of characteristics of the activities employees undertook during formal or informal breaks, such as the extent to which the activities were

effortful or preferred, or whether they took place inside or outside of the office. The study shows that engaging in more preferred activities during a break was associated with higher levels of energy, concentration, and motivation after the break.

Fritz and colleagues (2011) explicitly focused on knowledge workers and explored strategies that knowledge workers use to manage their energy at work. They categorized some of the energy management strategies as "micro breaks," such as listening to music, reading something for fun, or doing some form of physical activity including taking a walk. A further diary study by Zacher and colleagues (2014), using Fritz et al's (2011) measure of micro breaks, found that the use of micro breaks as energy management strategies is related to less fatigue and higher vitality at the within-person level.

It is worth noting that, in this emerging body of research on within-workday recovery, different studies on have examined rather different hypotheses and used divergent conceptual models and empirical designs, thus making it challenging to integrate the implications of their findings at this point. However, taken together, they do provide some evidence that engaging in non-work activities using workday breaks benefit energy resources at work, especially when the non-work activities have certain desirable characteristics (e.g., less effortful, more preferred).

Other Options for Enhancing Energy at Work Not Depending on Non-work Activities

Although non-work activities are useful for replenishing individuals' energy resources, opportunities to engage in non-work activities at work (e.g., in the form of work breaks) can be limited (e.g., due to time situations or normative pressure). It is thus useful to explore other options that do not depend on non-work activities, particularly those that lie in work activities themselves. I review theoretical perspectives that point to such options.

Self-determination Theory and Satisfaction of Psychological Needs

Self-determination theory (Ryan & Deci, 2000) holds that individuals have innate and fundamental psychological needs, including the need for competence (Harter, 1978; White, 1963), relatedness (Baumeister & Leary, 1995; Reis, 1994), and autonomy (deCharms, 1968; Deci, 1975). Competence refers to when people feel that they are efficacious and capable in an activity (Ryan & Deci, 2000; Ryan & Frederick, 1997); relatedness refers to when people feel that they socially belong and are connected with other people (Ryan & Deci, 2000; Baumeister & Leary, 1995); autonomy refers to when people feel that they themselves are the locus of causality, and that their behaviors are self-determined rather than externally controlled (deCharms, 1968; Deci, 1975; Ryan & Frederick, 1997). According to this theory, when individuals' psychological needs for competence, relatedness, and autonomy are met, they are more likely to realize optimal human functioning and experience personal well-being.

One important, specific outcome theorized is the enhancement of subjective vitality, a positive feeling of aliveness and energy (Ryan & Frederick, 1997). Ryan and Frederick (1997) argue that subjective vitality is fostered by conditions that support, rather than thwart, the psychological needs of competence, relatedness, and autonomy, and that when these needs are met, individuals are more likely to feel vital in their life and work. Empirical research using both experimental and experience sampling methodology provides evidence that individuals have stronger feelings of vitality when they engage in activities that are autonomous rather than controlled, and whey they engage in activities in which they feel a sense of competence and social belonging (Nix, Ryan, Manly, & Deci, 1999; Reis, Sheldon, Gable, Roscoe, & Ryan, 2000; Ryan & Deci, 2000; Sheldon, Ryan, & Reis, 1996). Self-determination theory thus suggests

when some work activities satisfy individuals' fundamental psychological needs, they should help replenish individuals' energy during the workday.

The Job Demands-Resources Model and Attainment of Job Resources

The job demands-resources model (Bakker & Demerouti, 2007; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; for a recent review, see Bakker et al., 2014) posits that job factors can generally fall into two categories, job demands and job resources. Job demands are factors in a job that require sustained physical, cognitive, or emotional effort (Bakker et al., 2014; Demerouti et al., 2001), such as workload and stressful events at work. Job resources are factors in a job that are helpful for achieving work goals, reducing job demands and their associated costs, or fostering personal growth and development (Bakker & Demerouti, 2007; Bakker et al., 2014), such as social support from colleagues and useful performance feedback. The job demands-resources model holds that, while job demands are the most important predictors of burnout, job resources are the most important predictors of work engagement (Bakker & Demerouti, 2007; Bakker et al., 2014). Meta-analyses support these ideas (Christian, Garza, & Slaughter, 2011; Halbesleben, 2010). Researchers have also argued that work engagement can be viewed as a manifestation of energy in-use at work (Christian et al., 2015). Although the job demands-resources model places more emphasis on *general features* in a job or job context rather than specific *activities* at work, it does imply that work activities that provide job resources might benefit individuals' energy.

Interaction Ritual Chain Theory and Positive Social Interactions

Interaction ritual chain theory (Collins, 1993, 2004) emphasizes the power of positive social interactions. This theory proposes that "emotional energy", a term that describes how energized and activated a person feels and can range from enthusiastic to apathetic, is an

important mechanism that underlies individuals' social behaviors and the formation of social structures (Collins, 1981, 1993). Examples of high emotional energy are what one might feel as part of a sports game audience or in a fascinating face-to-face conversation (Goffman, 1967). Several conditions in a social interaction are argued to produce high emotional energy (Collins, 1993, 2004), including high levels of presence by the interacting parties, the boundedness of the interaction that limits extra interactions with outsiders, the same focus of attention, and the experience of shared emotions. This theory implies that work activities that provide positive social interactions can help enhance energy during the workday.

Attention Restoration Theory and Contact with the Natural Environment

Attention restoration theory (Kaplan, 1993, 1995; Kaplan & Kaplan, 1989) was originally developed in environmental psychology and suggests that exposure to restorative environments, particularly exposure to the natural environment, is useful for energy recovery. In connecting this theory to the workplace, Kaplan (1993, 1995) contends that the restorative function of the natural environment does not necessarily entail travelling into the wilderness (e.g., going into the mountains for a vacation), and that even just the availability of nature near the workplace can be helpful for restoration. For example, Kaplan (1993) studied a sample of desk workers and found that those participants who had a view of natural elements from their workplace (e.g., trees, vegetation) reported fewer ailments in the prior months than those who did not have an outside view or those who had a view without natural elements. This theory implies that work activities that afford contact with the natural environment can be helpful for energy replenishment during the workday. As this condition depends on the physical settings of a job, it might not be easily changed and implemented in day-to-day work, though.

In summary, the theoretical perspectives above suggest that work activities that (1) fulfill fundamental psychological needs, (2) provide useful job resources, (3) afford opportunities for positive social interactions, or (4) allow exposure to natural environments should potentially replenish and enhance individuals' energy during the workday, which can be alternative options that do not entail non-work activities. Work activities such as meetings (or individual tasks) may fulfill these conditions to varying degrees in individuals' day-to-day work.

Prior Studies Suggesting Ways in which Work Activities can Enhance Workday Energy

Some empirical studies have looked into ways in which work activities may enhance workday energy. A few studies I discuss below hint at potential options. The extant literature, however, provides a limited understanding of this issue, possibly because of a predominant view that work activities represent demands.

A study by Lam and colleagues (2016) shows that employees' engagement in organizational citizenship behavior during the workday is positively related to their end-of-workday vigor, occurring through a mechanism of increased perception of work meaningfulness. This study suggests that undertaking extra-role work behaviors that provide people with a sense of meaning can benefit workday energy. However, engaging in extra-role work behaviors requires employees to go beyond their core job tasks, and this can pose challenges in the presence of pressure for completing regular work activities. When certain in-role work activities that closely relate to core tasks and naturally need to occur in the job (e.g., meetings) can provide replenishing conditions, it may be an even more advantageous option.

Another study by Demerouti, Bakker, Sonnentag, and Fullagar (2012) shows that the experience of flow at work, particularly the dimensions of absorption and work enjoyment, is positively associated with vigor at work. This study implies that work activities that provide flow

experiences might enhance workday energy. On the other hand, for knowledge workers, the experience of flow mainly concerns concentrated individual work tasks (Quinn, 2005), and additional consideration is needed for what energy enhancement possibilities lie in interactive, non-individual work activities (e.g., meetings, or non-meeting social events at work).

Finally, a study by Gross and colleagues (2011) found that the number of positive work events during the workday is associated with less fatigue at the end of workday, though only on days with a greater number of negative events. This study suggests that activities that are generally experienced as positive can be useful for replenishing workday energy. More research, however, is needed to reveal what specific experiential dimensions make certain work activities a positive, replenishing event. The present research will address these issues discussed above.

Research on Meetings in Work Organizations

In the present research, I will examine meetings as a theoretical example of work activity events, along with the work activity of individual tasks. In this sense, the focus in the present investigation is not on the peculiarities of meetings per se (e.g., how to better run meetings), but on meeting events as a representative of general work activity events during the day. Nevertheless, to facilitate a background understanding, I briefly review research on meetings in work organizations.

In earlier organizational research, meetings are often used as contexts and tools for studying other topics and are not themselves treated as targets of the investigation. For example, Schwartzman (1986) pointed out that meetings are often put in the background in studying small groups or decision-making processes. Recently, Rogelberg and colleagues (Rogelberg, Leach, Warr, & Burnfield, 2006; Scott, Shanock, & Rogelberg, 2012) made similar claims that meetings have often been used as a background context for studying other variables, with less empirical

research on meetings in their own right. My additional literature search suggests that meetings are sometimes also invoked in studying organizational communication, though usually examined along with other specific media such as memos and emails and not as a standalone research targets (Barley, Meyerson, & Grodal, 2010; Trevino, Webster, & Stein, 2000; Yates & Orlikowski, 1992).

Recently, however, an increasing number of empirical studies in the organizational literature have focused on meetings in their own right, explicitly including meetings and meeting-related constructs as part of their conceptualization. In this stream of work, meetings are viewed as a social form that involves the gathering of individuals and organizes interactions for organizational and group purposes (Rogelberg et al., 2006; Schwartzman, 1986). Most of these empirical studies have two types of foci. One focus is to assess specific characteristics and dimensions of meetings, aiming to understand various forms of meetings and how to improve meetings. The other is to link meeting-related features and factors to employee and workplace outcomes that are beyond immediate outcomes of the meetings themselves.

For studies of the first focus, a variety of dimensions of meetings have been considered and empirically examined. Objective characteristics of meetings studied include organizing formats (e.g., presentation versus forum meetings; Volkema & Niederman, 1995), physical settings (e.g., stand-up versus sitting-down meetings; Bluedorn, Turban, & Love, 1999; Knight & Baer, 2014), logistic features (e.g., meeting size, use of agenda, quality of facilities, or extent of pre-meeting planning; Leach, Rogelberg, Warr, & Burnfield, 2009; Niederman & Volkema, 1999), or norms of within-meeting activities (Köhler, Cramton, & Hinds, 2012). More subjective features examined usually concern individuals who are responsible for running and facilitating the meetings, such as behaviors of managers and supervisors who run the meetings (Allen &

Rogelberg, 2013; Baran, Shanock, Rogelberg, & Scott, 2012) or characteristics of meeting facilitators (Niederman & Volkema, 1999).

In these studies under the first focus, outcomes assessed are usually proximal ones (i.e., closely related to meetings themselves), including people's perceptions of and attitudes toward meetings (e.g., satisfaction with meetings, perceived meeting effectiveness; Bluedorn et al., 1999; Leach et al., 2009) or immediate outcomes produced from the meetings (e.g., decisions made and creative solutions produced from meetings, or behaviors exhibited during meetings; Bluedorn et al., 1999; Baran et al., 2012; Knight & Baer, 2014). Some studies also take a more descriptive approach and reveal different forms and processes of meetings that exist in work organizations (e.g., Köhler et al., 2012; Volkema & Niederman, 1995).

Studies of the second focus—those that examine the implications of meeting features and experiences for more distal outcomes beyond the meetings themselves--are less common. Rogelberg and colleagues' (2006) study assessed the relationship between meeting time demands, perceived meeting effectiveness, and employees' job attitudes and subjective well-being, in the time frame of a typical week and a single workday. Shanock and colleagues' (2013) cross-sectional study examined employees' surface acting during meetings and perceived effectiveness of meetings in a typical week in association with exhaustion and intentions to quit the job. Allen and Rogelberg's (2013) study showed relationships between manager behaviors in meetings (e.g., voice allowed and time management by managers) and employees' work engagement in general.

As the review above suggests, the extant research has demonstrated that meetings are a form of work activity that has it specific attributes, though the understanding of actual *experiences* provided in meeting events is still limited. The design and logistic characteristics of meetings are extrinsic to individuals who participate in the meeting events, and they are also not

necessarily fully translated into individuals' subjective experience of the meetings. Although Rogelberg and colleagues' study (2006) assessed perceived meeting effectiveness as an indicator of positive meeting experience, experiences in meetings can be richer than an overall perception of how effective a meeting is. Furthermore, for the purpose of the present research, compared to capturing the vast range of logistic characteristics that are unique to meetings (e.g., format, physical setting, facilities, size, and agenda), examining individuals' actual experiences in meeting events will offer more generalizable implications for other types of work activities and workday events in relation to energy replenishment.

Some empirical limitations are also worth noting in this body of research. When testing relationships of meetings variables with either proximal or broader outcomes, many of the empirical studies above used cross-sectional, single-source, and single-time self-report surveys. As such, they do not always allow for strong inferences about the relationships. Addressing these limitations will contribute to a better understanding of the implications of meeting events and other workday activities.

Conceptual Issues: Key Terms and Concepts

In addition to reviewing relevant literatures, I discuss some key terms and concepts I use in the present research to further clarify the conceptual foundations.

Energy

Building upon the conceptualization of Quinn et al. (2012), Owens et al. (2016), and Ryan and Frederick (1997), I use the term "energy" (or "human energy") to refer to the subjective experience of heightened aliveness that enhances an individual's capacity to do work, which can manifest as high levels of vigor and vitality. Consistent with the approaches in prior empirical research (e.g., Christian, Eisenkraft, & Kapadia, 2015; Trougakos et al., 2014), I use

"energy" as an umbrella term, operationalizing it as specific variables such as vigor or vitality in the empirical investigation.

The concept of energy in the present research is different from the concept of *motivation* used in motivational research. Motivation is usually conceptualized to involve the initiative, direction, intensity, and persistence of effort (Landy & Becker, 1987; Pinder, 1998). A key difference between motivation and energy concerns the notion of effort. Energy is mainly concerned with an individual's capacity to do work that lies in their psychological and physical states (e.g., highly vigorous and not fatigued). Unlike motivation, the concept of energy does not involve the extent to which individuals want to expend effort or the level of intensity and persistence with which they expend effort. For example, an individual may feel energetic and able to conduct a lot of work, but not motivated to actually perform the work tasks. Individuals might even invest their energy in other things (e.g., helping coworkers) as a way to avoid tasks they do not feel motivated to do (e.g., finishing a work report), which means that high energy and high motivation are not necessarily concurrent. Conversely, individuals may feel highly motivated toward their work activities but feel a lack of energy (e.g., feel depleted or exhausted) to actually accomplish them (e.g., Michel, 2011). Although some motivational scholars define motivation in terms of energy—for example, Pinder (1998) conceptualizes motivation as "the energy a person expends in relation to work" (p. 1)--such definitions of motivation still concerns the actual expenditure of a psychological resource (i.e., energy) rather than the resource itself.

<u>Not distinguishing between "replenishment" and "enhancement" of energy at work</u>

In all the conceptual discussion in this research, I do not specifically distinguish between "replenishment" and "enhancement" of energy at work. The terms signify some differences when used in a strict sense. The term replenishment (as well as its synonyms, including recovery,

recharge, restoration, and recuperation) implies that there have been demands, stress, and/or taxing experiences that precede the focal time point, which are things that an individual might recover *from*, with their energy resources increasing and returning toward a previous level. The term enhancement, however, does not imply any preceding demands, but simply suggests an increase in energy resources. For the purpose of the present research, it is more useful not to make this nuanced distinction. I use both terms to mean that something is expected to contribute to higher levels of energy (indicated by vigor or vitality).

Not making this distinction makes sense in the current research for several reasons. This approach allows me to draw upon a variety of theoretical perspectives that are useful for building the conceptual framework, without limiting it to theories that specifically adopt a recovery lens (e.g., the effort-recovery model). It also allows me to reference a wider range of empirical evidence, including both those studies that explicitly discuss replenishment (e.g., in the work recovery literature) and those that do not do so (e.g., in self-determination research). Note that, even in studies in the work recovery literature, the occurrence of demands and stress before recovery activities and experiences is often not explicitly examined, and it is commonly assumed that, as long as an individual has been to work, he/she will have exerted effort for work demands, and things that contribute to higher levels of energy variables are viewed as affording recovery. Thus, from the standpoint of empirical investigation, activities and experiences that are proposed to "replenish" energy can be viewed as "enhancing" energy as well, and vice versa, as long as individuals have faced work demands prior to the assessment of energy variables.

Meetings

Drawing upon the conceptualizations of Schwartzman (1986) and Rogelberg et al. (2006), I define a meeting at work as an arranged gathering of two or more individuals for work-related

purposes. A meeting can be conducted either face-to-face or through communication technologies. Meetings are different from spontaneous work interactions, such as colleagues chatting briefly in the hallway to exchange information, or workmates gathering socially for personal purposes (i.e., hanging out for fun after work).

Meetings represent a form of workday event with both temporal and experiential features. Events are discrete, discontinuous "happenings" in which entities (e.g., individuals) encounter and interact (Allport, 1967; Morgeson, Mitchell, & Liu, 2015). Morgeson et al. (2015) point out that events are bounded in time, with a beginning and an end that are temporally identifiable. A meeting is a work activity event that takes place on the time continuum of a workday and has temporal properties (e.g., duration). Meetings also create experiences for the individual participants in the process of fulfilling instrumental functions, such as coordination, communication, and ritualization (Okhuysen & Bechky, 2009; Scott et al., 2015; Yates & Orlikowski, 1992). Meeting events thus carry experiential features in addition to their temporal features.

Micro Breaks for Recovery

In the work recovery literature, breaks have been defined as a period of time during the workday when work tasks are not expected or required, or when employees shift their attention away from work tasks as needed (Hunter & Wu, 2016; Trougakos et al., 2008). While this general conceptualization of breaks encompasses both formal scheduled breaks (e.g., prescribed lunch breaks) and informal short breaks, Fritz and colleagues' (2011) study of knowledge workers more specifically uses the term "micro breaks" to describe employees' informal breaks that involve temporarily turning away from work tasks and engagement in non-work activities for managing workday energy. As for "recovery", the work recovery literature has

conceptualized it as a process of reducing physical and psychological strain symptoms that result from work demands (Meijman & Mulder, 1998; Sonnentag & Fritz, 2007, 2015)

Integrating these conceptualizations, I define a micro break for recovery (or "micro break" for short) as a short period of time during the workday when employees temporarily pause or shift away from the work tasks to reduce their physical and psychological strains. Examples of micro break activities at work include taking a short walk, listening to music for a few minutes, meditating, browsing social media, or having a casual conversation with colleagues about common interests. Micro breaks are different from formally scheduled long breaks (e.g., a formally prescribed one-hour lunch break), and they are also different from leaving work for a substantial period of time (e.g., leaving the office to go to a doctor's appointment).

CHAPTER 3

HYPOTHESIS DEVELOPMENT

In this chapter, I develop the hypotheses, proposing that (1) engagement in micro breaks can benefit workday energy but twill be constrained by the time demands of workday meetings, and that (2) when certain experiences (i.e., psychological need satisfaction, temporary relief of performance pressure) are provided in a meeting event, these experiences themselves can replenish workday energy, thus serving as compensatory possibilities for replenishment when micro breaks are constrained.

Individual Work and Meeting Events during a Workday

I start by discussing the presumptions about work activities of knowledge workers (e.g., meeting events, individual work) that underlie the hypotheses to be developed and tested. First, the hypotheses use a narrowly defined meaning of the "workday," focusing on the period of time when a knowledge worker is expected to be *at work* in a conventional organizational setting (e.g., as used in Ashforth, Kreiner, & Fugate, 2000; Ilies, Wilson, & Wagner, 2009)--that is, the time elapsed between when an individual starts at work and when he/she finishes at work, and not the full calendar day from wakeup time to bedtime. As such, all work or non-work activities discussed below refer to those that occur during expected, regular work time.

An important presumption in the present research is that a knowledge worker's workday typically involves both *continuous, non-event work activities* (e.g., individual work) and *discrete, event-form work activities* (e.g., work meetings). For knowledge workers, there are work tasks

that entail a continuous work flow and certain levels of concentration for applying relevant knowledge and skills (Davenport, 2013; Quinn, 2005), which typically involve working individually on the focal issues (e.g., by oneself at the desk or on a computer). Examples include analyzing data, processing information, or compiling a work report. Some individual tasks may also indirectly involve other people, such as drafting an email intended for a co-worker or revising a report that is a collaborative product with other team members, but they can still be viewed as individual work given that they take place with a solitary focus of attention. The amount of individual work can vary for different knowledge workers (e.g., less for upper-level workers who assume more managerial duties) as well as differ across workdays (e.g., more concentrated work on some days and less on others), but individual tasks that involve intellectual activities are by definition a key part of knowledge workers' job (Alvesson, 2004; Davenport, 2013).

Unlike individual work that often involves a continuous temporal flow (Ancona, Goodman, Lawrence, & Tushman, 2001; Quinn, 2005), event-form work activities are discrete happenings that have clearly identifiable, or even intentionally specified, temporal boundaries during the workday (Ancona, Okhuysen, & Perlow, 2001; Morgeson et al., 2015). As such, these events can segment the time span of a workday into identifiable chunks (e.g., time segments before, during, and after a meeting event). In this sense, these events can sometimes punctuate the time continuum for individual work.

For knowledge workers, meetings are a prevalent form of work activity events during the workday. Meetings refer to an arranged gathering of two or more individuals for work-related purposes, conducted either face-to-face or through communication technology (Schwartzman, 1986; Rogelberg et al., 2006). Meeting events are different from unorganized, spontaneous work

interactions, such as colleagues briefly chatting in the hallway to exchange information, and they are also different from gathering of individuals for non-work purposes, such as workmates hanging out for fun after work. Compared to many smaller discrete events during the workday, meetings have more substantial time durations and can thus be a significant component of a workday's temporal configuration. Meetings also usually generate clear time demarcation and involve strong themes of behaviors, thus creating salient episodes during the workday (Beal, Weiss, Barros, & MacDermid, 2005; Trougakos & Hideg, 2009). For these reasons, examining workday meetings as a representative of event-form work activities fits well with the purpose of the present research. Throughout the writing below, I will use the term "meeting events" to emphasize that meetings here are examined as a *theoretical example* of event-form work activities (i.e., the key is the "event"), and they are not investigated as meetings in a practical sense (e.g., how should we run meetings).

As I will theorize below, although micro breaks can benefit workday energy, discretionary engagement in micro breaks will be constrained by the need to spend time in meeting events as opposed to individual tasks. Under such situations, what experiences, if provided in the workday meeting events themselves, may serve as compensatory possibilities to replenish workday energy? I explore two types of potential replenishing experiences in workday meeting events, both considered in the context of corresponding experiences in individual work tasks ("individual tasks" for short).

Micro Breaks Benefit Workday Energy but Will Be Constrained by Time Demands of Meetings

One natural option for replenishing energy at work is to take micro breaks for recovery ("micro breaks" hereafter), which are a short period of time during the workday when

individuals temporarily pause or shift away from work tasks to reduce their physical and psychological strains (Fritz et al., 2011; Hunter & Wu, 2016; Sonnentag & Fritz, 2015; Trougakos et al., 200). Examples of micro break activities at work include taking a short walk in or outside the office space, having a casual conversation with colleagues about common interests, or browsing something for fun online (Fritz et al., 2011).

Taking micro breaks can benefit workday energy. According to Meijman and Mulder's (1998) effort-recovery model, expending effort on work demands generates load reactions in human functional systems such as fatigue and arousal, and when exposure to work demands is discontinued, load reactions can be reversed and recovery thus occurs. Engaging in micro breaks temporarily suspends an individual's exposure to work demands and allows some rest for the human functional systems taxed by work tasks, thus creating a restoration of energy resources. An emerging body of research in the organizational literature provides evidence for the beneficial effects of break activities at work. Studies show that engaging in respite activities during breaks between work sessions is related to positive emotions (Trougakos et al., 2008), that taking relaxation during lunch time is related to lower end-of-workday fatigue (Trougakos et al., 2014), that doing preferred things using formal or informal breaks is related to higher post-break energy (Hunter & Wu, 2016), and that the use of micro breaks as energy management strategies is related to less fatigue and higher vitality (Zacher et al., 2014). A key focus of these studies is to find out what characteristics or types of activities might make a break more beneficial. In the present research, because the concern is not with breaks per se but is about the possibilities for workday replenishment from both non-work and work activities, I focus on the *level of engagement* in micro breaks instead of specific characteristics of break activities.

Although micro breaks can benefit workday energy, engagement in micro breaks will be constrained by the time demands of workday meeting events. That is, the more time a knowledge worker needs to spend in meetings on a workday (and hence less time on individual work), the less likely he/she will take micro breaks during the day. Meetings and individual tasks do not provide equally facilitating conditions for undertaking micro break activities. In contrast to individual work, which usually affords knowledge workers greater discretion over specific actions (Davenport, 2013), meeting events create more structured and restrictive episodes on the time span of the workday (Schwartzman, 1986; Volkema & Niederman, 1995).

First, when more time of a workday is spent on meetings, individuals will have less discretionary time for their own allocation, which will discourage the engagement in micro breaks. Common expectations for "ideal workers" pressure individuals to treat work responsibilities with higher priorities than personal concerns (Dumas & Sanchez-Burks, 2015; Kelly, Ammons, Chermack, & Moen, 2010; Williams, 1989, 2001). Because taking micro breaks essentially involves engagement in non-work activities that benefit oneself but might not immediately contribute to work goals, individuals will likely prioritize completing their individual tasks above taking micro breaks when their discretionary time is reduced by meetings. In other words, when meetings consume time otherwise available for individual tasks, workers will feel pressured to utilize the remaining time as much as possible to meet task demands, thus leaving even less time for taking micro breaks.

In addition, time expenditure in meeting events can also shape the extent to which individuals perceive they have control over the workday time. Research of organizational time suggests that even the same amount of clock time can be experienced rather differently in subjective terms (Ancona, Goodman, et al., 2001; Bluedorn, 2002). Compared to individual work

time, which usually affords knowledge workers more discretion over specific small actions and imposes less immediate scrutiny and confinement, meetings are a type of work event that organizes time in more structured, controlled ways, often with prescribed starting and/or ending schedules (Schwartzman, 1996), and sometimes an agenda for activity and pace control (Volkema & Niederman, 1995; Leach et al., 2009). Individuals' behaviors are also under greater visibility and scrutiny during meeting time. These features are conducive of a subjective experience of time as being under external control. Therefore, a greater amount of time spent in meetings can perpetuate a weaker sense of control over workday time. Because taking micro breaks at work is a behavior that signifies and depends on individual volition, individuals will be less inclined to engage in micro breaks when their sense of control over workday time is weakened due to meeting time demands.

Taking these arguments together, I expect that engagement in micro breaks can benefit workday energy (H1a), but it will be constrained by the time demands of workday meetings (H1b), such that when a greater amount or proportion of workday time is spent on meeting events, an individual will be less likely to engage in micro breaks during the workday.

Hypothesis 1a: The level of engagement in micro breaks during a workday will be positively related to workday energy.

Hypothesis 1b: Time demands of meeting events during a workday will be negatively related to engagement in micro breaks during that day.

Experiences in Meeting Events (in the Context of Individual Tasks) and the Replenishment of Workday Energy

Although the time demands of workday meetings are expected to constrain micro breaks, when certain experiences are provided in a meeting event (e.g., satisfaction of psychological needs, temporarily relief of performance pressure), such experiences themselves may benefit workday energy. This argument is not suggesting that it is desirable to add extra meetings for the purpose of replenishment. Instead, it is suggesting that, given that some meetings need to take place during the day for work purposes, which will constrain opportunities for micro breaks as a channel for energy recovery, the provision of some replenishing experiences in the meeting events themselves may constitute alternative and compensatory possibilities.

Importantly, I consider potentially replenishing experiences in a meeting event in the context of corresponding experiences in individual tasks during that day. This way, it captures a more complete picture of workday activities by incorporating both continuous, non-event work activities (i.e., individual tasks) and event-form work activities (i.e., meetings).

Exploring two types of replenishing experiences in a workday meeting event

I draw upon two parallel theoretical perspectives to explore potential replenishing experiences in workday meeting events. In their literature review, Quinn and colleagues (2012) identified two theoretical perspectives of human energy at work, including an *abundance perspective* and a *scarcity perspective*. From an abundance perspective, human energy is abundant such that it can be generated from the work itself when the work is fulfilling (Marks, 1977; Quinn et al., 2012). Based on this perspective, I consider when a meeting event provides fulfillment of human psychological needs beyond that provided in individual tasks. From a scarcity perspective of human energy at work, energy is a scarce resource that is consumed by

work demands but can be recovered when demands are suspended or reduced (Meijman & Mulder, 1998; Quinn et al., 2012). Based on this perspective, I consider when a meeting event provides temporary relief of performance pressure amongst high-pressure individual tasks.

When a meeting event provides fulfillment of psychological needs beyond that provided by individual tasks

Self-determination research reflects an abundance perspective on human energy. According to its theorization (Ryan & Deci, 2000; Ryan & Frederick, 1997), human vitality, which can be viewed as an important indicator of energy resources, is supported by the satisfaction of human beings' fundamental psychological needs, including competence, relatedness, and autonomy (Baumeister & Leary, 1995; deCharms, 1968; Deci, 1975; Harter, 1978; Reis, 1994; White, 1963). The experience of competence refers to when individuals feel efficacious and capable in their activities; relatedness refers to when individuals feel that they socially belong and are connected with other people; and autonomy refers to when individuals feel they are agentically controlling their own behaviors and actions (Baumeister & Leary, 1995; Ryan & Deci, 2000). Self-determination theory posits that satisfaction of these fundamental psychological needs of human beings can facilitate optimal human functioning and enhance aliveness and energy (Ryan & Deci, 2000; Ryan & Frederick, 1997).

Meeting events during a workday can supply high or low levels of psychological need satisfaction for an individual. To accomplish instrumental objectives (e.g., coordination, information exchange, decision making; Schwartzman, 1986; Scott et al., 2015), meetings often call upon individuals to utilize their skills and capabilities for serving various roles, such as presenting information, facilitating discussion, conveying arguments and opinions, and generating ideas and solutions, among others. During a meeting event, an individual may or may

not feel capable and efficacious in carrying out these intended activities and roles, thus experiencing high or low levels of psychological need satisfaction. Similarly, an individual may feel autonomous and agentic, or constrained and externally controlled, in what they do and say during the meeting, which renders varied levels of psychological need satisfaction. Furthermore, a meeting event creates an arena for either pleasant social interactions with characteristics such as mutual presence and generative conversations (Collins, 1993; Dutton, 2003; Dutton & Heaphy, 2003), or unpleasant interactions with interpersonal incivility and other forms of hassles (Cortina, Magley, Williams, & Langhout, 2001), thus inducing high or low levels of psychological need satisfaction.

The level of psychological need satisfaction depicts an overall extent of fulfillment that an individual obtains from various activities in a meeting event. For example, when in a meeting an individual actively provided insightful feedback to teammates and received appreciation for doing so, it can make her feel agentic, capable, and connected with colleagues, creating high levels of psychological need satisfaction. High psychological need satisfaction provided in a meeting event, according to the arguments above, should stimulate human vitality and enhance energy levels during the workday.

Meeting events are not the only type of work activities that can supply psychological need fulfillment, though. Individual tasks (e.g., those they work on alone at the desk or on a computer) are prominent workday activities for knowledge workers and can also fulfill fundamental psychological needs to varying degrees. For example, a person may feel autonomous, efficacious, and supported by coworkers in composing some project reports on a day, thus experiencing high levels of psychological need satisfaction. Although such multiple sources of fulfillment are present, meetings and individual tasks also comprise different types of

activities and do not address psychological needs in same ways. I expect that psychological need satisfaction provided in a meeting event should benefit energy during the workday even when taking into account psychological need satisfaction experienced in individual tasks[1].

Hypothesis 2: Higher levels of psychological need satisfaction experienced in a meeting event will be positively related to workday energy, above and beyond psychological need satisfaction experienced in the individual tasks on that day.

When a meeting event provides temporary relief of performance pressure amongst high-pressure individual tasks

According to Meijman and Mulder's (1998) effort-recovery model, when an individual is faced with stressful work demands, having a period of time that temporarily relieves such stress and demands allows for recovery. This idea also resonates with Elsbach and Hargadon's (2006) conceptual work on workday design, in which they argue that a workday involves different episodes of work activities, and that having a mixture of workday activities with higher versus lower levels of pressure can benefit knowledge workers who do creative work. They point out that those work activities with lower pressure may, intentionally or not, serve as useful intermittent episodes among other high-pressure work activities and create desirable psychological experiences.

In this theoretical view, Elsbach and Hargadon (2006) particularly discussed *performance pressure*. Performance pressure is the experience of heightened importance to perform well on

[1] In the present research, psychological need satisfaction is used as a combined construct, without separating the three specific needs, because based on the theoretical arguments, the three psychological needs are expected to have similar relationships with the outcome variables. This approach is similar to prior studies that used an overall construct of psychological need satisfaction with the expectation that they will relate to other variables of interest in similar ways (e.g., Greguras & Diefendorff, 2010; Lian, Ferris, & Brown, 2012). Other studies that used the three psychological needs as separate variables typically had theoretical reasons to expect their different relationships in the conceptual framework(e.g., Greguras & Diefendorff, 2009), which is not the case in the present research.

particular things or occasions (Baumeister, 1984; Gardner, 2012). The performance pressure an individual experiences in a task or event can come from accountability for the outcomes, scrutiny placed on the work, and/or significant consequences associated with the work and occasion (Gardner, 2012). Prolonged exposure to high performance pressure can be depleting as it compels individuals to engage in a great deal of self-evaluation and to continuously exert high effort in order to meet high performance standards (Elsbach & Hargadon, 2006; Welsh & Ordóñez, 2014). Under the circumstances of exposure to high performance pressure, certain intermittent episodes of activities and events, if involving low levels of performance pressure, may facilitate energy restoration.

On a workday when individual tasks involve high performance pressure, a meeting event that similarly creates high performance pressure will further drain energy, but a meeting event that involves low performance pressure may serve as a window for energy recovery. Although work meetings are not intended for recovery or pressure relief, it is possible that, for a given worker, certain meeting events will present lower performance pressure than others, possible due to that specific individual's roles and positions in the meeting. For instance, a meeting in which an individual acts as the core presenter will likely pose higher performance pressure, whereas a meeting in which this person mainly receives updates and information from coworkers will likely involve lower performance pressure. Similarly, a meeting in which an individual reports to the boss about work progress can be a high-pressure event, whereas a meeting without a need to impress other people could be a low-pressure event. Importantly, a meeting that involves lower performance pressure does not mean the meeting is a waste of a time: a meeting event can be useful and meaningful but simply low-pressure because of the role and activities a given individual undertakes in the meeting.

Similar to meeting events, individual tasks on a given workday can involve high or low performance pressure. High performance pressure may exist in individual tasks on some days, for example, when a boss holds high expectations for the quality of those task deliverables, or when those tasks expose the focal individual to high accountability and visibility in the group. On a day when a knowledge worker faces high performance pressure in individual tasks and needs to go to a meeting event, experiencing low (rather than high) performance pressure in the meeting will allow for a temporary period of relief, which can create replenishment of workday energy. For example, on a day when a data specialist is working on a high-profile analysis report and feels a lot of pressure to do a great job on the report, it could be a recovering experience when he attends an information session in which he mainly receives updates about others teams' projects, which may afford him a period of temporary relief from the pressure to deliver superb performance on his part and enable some replenishment. Note that these arguments do not suggest having *additional* meetings in order to obtain recovery; instead, it is arguing that, given the meetings that need to take place for work purposes, having a lower-pressure meeting event, rather than a higher-pressure one, will be more conducive of energy recovery on a day with high-pressure individual tasks. This way, energy replenishment occurs as a by-product of a low-pressure meeting, which becomes a pseudo "break" from high-pressure tasks.

Consistent with Elsbach and Hargadon's (2006) ideas about alternating episodes of work activities, the arguments above essentially suggest an interplay between the experiences in meeting events and in individual tasks on a workday. I thus propose the following hypothesis regarding the temporary relief of performance pressure in a meeting event amongst high-pressure individual tasks, which involves an interaction between the two work activities:

H3: The level of performance pressure experienced in a meeting event interacts with that experienced in individual tasks on the workday, such that low levels of performance pressure experienced in a meeting event will be positively related to workday energy when performance pressure is high in individual tasks on that day.

Note that the two types of replenishing experiences discussed above—satisfaction of psychological needs, and relief of performance pressure among other tasks—are depicted in a main-effect and an interaction-effect hypothesis, respectively (also see Figure 1 on Page 43 for an illustration), though both involving meeting event and individual tasks. This difference is due to the nature of the two theoretical perspectives I have drawn upon to develop the hypotheses. The abundance perspective of human energy emphasizes fulfilling experiences from activities (Marks, 1977; Quinn et al., 2012; Ryan & Deci, 2000; Ryan & Frederick, 1997), and different work activities (e.g., meetings, individual tasks) can act as simultaneous, co-existent sources of fulfillment of psychological needs, which means that it is appropriate to assess the main effects a work activity (i.e., meetings) while holding the other ones (i.e., individual tasks) constant. The scarcity perspective of energy at work, on the other hand, views different workday activities as alternating episodes with divergent levels of demands and stress (Elsbach & Hargadon, 2006; Meijman & Mulder, 1998), pointing to a potential recovery function of some activities against the backdrop of what is going on in other activities, which means that it is more appropriate to assess the effects of a work activity (i.e., meeting events) as depending upon other activities (i.e., individual tasks) as boundary conditions.

The two experiential factors discussed above—the level of psychological need satisfaction and the level of performance pressure –also do not necessarily co-vary. In some cases, conditions that promote psychological need satisfaction in a meeting event (e.g., having a

generative discussion of a critical project) may also co-occur with the pressure to perform well, but this is not always the case. For example, an individual may experience the fulfillment of psychological needs when she provided some useful advice to colleagues during a meeting, even if she did not experience high performance pressure being a non-central member in the meeting. The experience of performance pressure often pertains to the nature of issues or roles involved in the occasion (Gardner, 2012), which do not necessarily overlap with the actions and occurrences that engenders psychological need satisfaction for an individual during the event, and these two experiential dimensions thus do not have to correlate. It is thus reasonable to view them as separate factors.

Implications for Downstream Work Outcomes

One reason it is important to explore replenishing meeting experiences when micro breaks are constrained is that human energy resources can contribute to organizationally-relevant work outcomes, including task performance and positive discretionary behaviors at work (e.g., voice, helping, and creative behaviors).

When individuals have higher levels of energy at work, they have enhanced capacity to concentrate, exert effort, and overcome challenges and hence greater capacity to perform the work effectively, thus facilitating task performance on the job. Energy resources are also important for promoting positive discretionary behaviors that can benefit the group and organization--such as voicing suggestions, helping coworkers, and undertaking creative endeavors--because discretionary behaviors entail efforts to go beyond the basic job requirements (Grant & Ashford, 2008; Van Dyne & LePine, 1998). When individuals' energy level is low, they may try to conserve the energy resource to meet core task requirements rather than invest it in extra volitional behaviors (Christian et al., 2015; DeWall, Baumeister, Gailliot,

& Maner, 2008; Halbesleben et al., 2014; Qin, DiRenzo, Xu, & Duan, 2014; Trougakos, Beal, Cheng, Hideg, & Zweig, 2015). In contrast, when individuals have higher levels of energy at work, they will be more willing to contribute it toward discretionary activities that can potentially benefit the collective.

Prior research evidence supports the importance of energy resources at work for downstream work outcomes. For example, studies in the work recovery literature show that individuals' feelings of being refreshed in the morning, which indicates good energy for a workday, is positively related to work engagement (Sonnentag et al., 2012; Sonnentag, 2003), self-rated task performance (Binnewies et al., 2009), personal initiative and pursuit of learning (Binnewies et al., 2009; Sonnentag, 2003), and organizational citizenship behavior (Binnewies et al., 2009). Other studies also show that employees' feelings of vigor or vitality, which similarly indicate good energy resources at work, are associated with higher job performance (Carmeli et al., 2009), more citizenship behavior and less deviant behavior (Little et al., 2011), and more engagement in creative behavior (Kark & Carmeli, 2009).

Because of the presence of extant evidence, I do not include a redundant hypothesis relating human energy to work outcomes. Nevertheless, to better illustrate the relevance of the hypothesized relationships in this research, I will still examine a linkage between energy at work and downstream work outcomes, including task performance and positive discretionary behaviors, in my final empirical study (Study 3).

Additional Hypotheses: Characteristics of Meeting Events as Antecedents of Experiences

The sections above have laid out the main hypotheses that constitute the conceptual framework. Below I develop a set of additional hypotheses as supplementary extensions of the main hypotheses.

Given that fulfillment of psychological needs and relief of performance pressure in a meeting event are expected to benefit workday energy, it should be useful to explore what are some characteristics of a work activity event that will affect the levels of psychological need satisfaction and performance pressure individuals experience in the event. I draw on the event systems theory developed by Morgeson and colleagues (2015) to examine three characteristics theorized to shape and represent the strength of an event at work, namely novelty, disruption, and criticality. These event characteristics are not limited to workday meetings and can have broader applicability to other work activity events too.

According to the event systems theory (Morgeson et al., 2015), *event novelty* refers to the extent to which an event is different from usual, expected circumstances, and a novel event renders unanticipated information and/or creates uncommon situations (Ballinger & Rockmann, 2010; Bechky & Okhuysen, 2011; Morgeson et al., 2015). In the case of workday meeting events, novelty concerns the extent to which a meeting involves unexpected content or provides unusual information that will break expectations and create new situations, for example, when a meeting introduces an innovative technology tool or a new business partner. *Event disruption* refers to the extent to which an event represents a discontinuity in the ongoing activities and calls for changes, such that things will not continue the way they would prior to the event (Hoffman & Ocasio, 2001; Morgeson et al., 2015). For workday meeting events, disruption concerns the extent to which a meeting disrupts individuals' previous plans or compels them to make changes in the current work. *Event criticality* refers to the extent to which an event is crucial and of high priority to an entity (Morgeson & DeRue, 2006; Morgeson et al., 2015). Critical events are viewed as more salient happenings and require more invested attention and actions (Morgeson et al., 2015). In the case of workday meeting events, a critical meeting event is one that is important

for individuals' current work and/or is essential for meeting his/her needs in the ongoing work goals and tasks. From the perspective of event systems theory, these three dimensions are all important characteristics in shaping the strength of an event.

I propose that these event characteristics will relate to psychological need satisfaction and performance pressure experienced in workday meeting events, such that stronger event novelty will promote psychological need satisfaction, weaker event disruption will keep performance pressure low, and that higher event criticality will enhance psychological need satisfaction but also intensify performance pressure.

A novel event, which deviates from expectations and presents a surprising situation, can trigger the need for in-depth processing and non-routine actions (Morgeson et al., 2015). A novel meeting event with unusual content and information—for instance, when it introduces a new technological tool or involves a new business partner—creates a need for extra effort to interpret and handle the novel situation, thus providing unusual opportunities for individuals to utilize their knowledge and skills and potentially experience the psychological need satisfaction for competence and autonomy. A novel meeting event can also trigger a common focus of attention among the different actors toward the central issues, and the novel situation may even promote shared emotions (e.g., surprise, excitement, anxiety), thus potentially nurturing high-quality connections during the meeting event (Collins, 1993; Dutton & Heaphy, 2003) and providing satisfaction of the psychological need for relatedness. I thus propose the following hypothesis:

H4a: Higher levels of event novelty of a workday meeting will be related to higher psychological need satisfaction experienced in the meeting.

A disruptive meeting event is one that creates discontinuity in the work process, upsets previous plans and solutions, and compels changes in the means or procedures of doing work.

Examples of event disruption in a meeting include when a meeting results in a decision to suspend an important project, or when it intensifies conflict among different units and thus overrides previous consensus. When a meeting event carries a disruptive nature, it can invalidate an individual's previously prepared ideas and plans for how to perform in the meeting, and it also produces difficulty for performing well in the meeting as conventional tactics may become less useful. Therefore, a meeting event that is higher on the disruption dimension will create stronger performance pressure, making superior performance both more important and more challenging. In contrast, a meeting event that is lower on the disruption dimension makes it easier for an individual to deliver high performance. The routine, non-disruptive situation also means fewer significant consequences even if the individual does not end up performing at the best, keeping performance pressure relatively low. I thus propose the following hypothesis:

> *H4b: Lower levels of event disruption of a workday meeting will be related to lower performance pressure experienced in the meeting.*

A meeting event that has high criticality is one that bears greater significance and essentiality in one's work (Morgeson & DeRue, 2006). Compared to a trivial meeting, a critical meeting heightens the value of exercising capabilities, skills and agency during the event, thus likely fostering the experience of psychological need satisfaction. A critical meeting event also commands greater attention among the attending parties and induces bigger investment of collective effort (Gersick & Hackman, 1990; Morgeson et al., 2015), thus providing opportunities for satisfying psychological needs in the social interactions.

Although criticality of a meeting event is expected to be favorable for fulfilling psychological needs, it might also intensify performance pressure. Higher performance pressure arises when the consequences at stake are high on an occasion. When a meeting is crucial for an

individual's current work goals or is essential for meeting his/her work needs (e.g., for gaining support and resources), there is a stronger need for the individual to performance well in the meeting, so that he/she can accomplish the important objectives and obtain needed resources through the meeting. As such, event criticality is expected to be a double-edged sword, fostering psychological need satisfaction while also raising performance pressure in a meeting event.

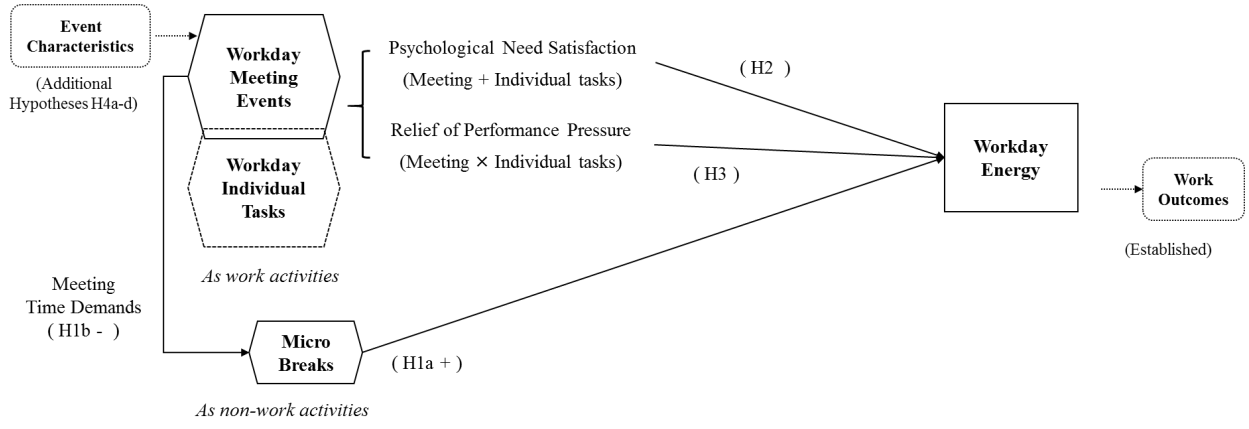
H4c: Higher levels of event criticality of a workday meeting will be related to higher psychological need satisfaction experienced in the meeting.

H4d: Higher levels of event criticality of a workday meeting will be related to higher performance pressure experienced in the meeting.

I will test these additional hypotheses for extension of the main conceptual framework, not as the core part of the empirical investigation, but as supplementary analyses in the empirical investigation.

Figure 1 below (the same as presented above in Chapter 1) provides a summary of all the hypotheses.

Figure 1. Overview of the Conceptual Framework and Hypotheses



CHAPTER 4

EMPIRICAL STUDIES

I conducted three studies to test the hypotheses. Study 1 used experience sampling methodology and provided a first test of the hypothesized relationships among micro breaks, meeting events, and workday energy, albeit not including the context of individual tasks. The relationships were assessed for both the morning and the afternoon during the workday. Study 2 was a second experience sampling study using a field sample. It extended Study 1 to incorporate workday individual tasks, which provided a more comprehensive test of the hypothesized relationships. Study 3 was a multi-source survey study, which sought to replicate Study 2 findings about meeting experiences and individual task experiences at the individual level, and it also examined the linkage between energy at work and supervisor-rated work outcomes, showing the relevance of the hypothesized relationships for workplaces.

Study 1: An Experience Sampling Method Study

Purpose of the Study

The purpose of this study is to provide a first test of the hypotheses, focusing on experiences in workday meeting events without yet including experiences in individual tasks. The variables and relationships were assessed for both the morning and the afternoon of the workday.

Participants

Participants in this study were 245 full-time employees recruited from the online platform Amazon Mechanical Turk (MTurk). I acknowledge that using MTurk for this study poses some challenges, including not providing a single, clean organizational and industrial context for investigating the issues of interest, which I address to my best using the screening process and a triangulation with a subsequent field study (i.e., Study 2). Empirical research has demonstrated that MTurk allows researchers to collect data that have adequate reliability comparable to traditional methods (Buhrmester, Kwang, & Gosling, 2011; Paolacci & Chandler, 2014; Sprouse, 2011). MTurk has also been used successfully by organizational researchers for collecting primary data in experience sampling research (e.g., Lanaj, Johnson, & Barnes, 2014).

As part of the recruitment process, I conducted a screening survey to identify participants who fit the target population of the study. First, the survey identified employees whose jobs involved knowledge work. Individuals responded to a question "Which of the following types of activities best represents the core components of your job?" Response options included: "Customer service interactions (e.g., retailing, serving, talking with customers)," "Physical activities (e.g., making, manufacturing, constructing, maintaining)," "Intellectual activities (e.g., analyzing, problem solving, creating, designing, writing)," "Managerial activities (e.g., supervising, resource allocating, monitoring)," and "Other." Participants were allowed to select multiple answers, and only those who included "Intellectual activities" in their selection were viewed as meeting the eligibility criterion. This way of identifying knowledge workers is consistent with the conceptual discussion of knowledge work and knowledge workers by Alvesson (2004) and Davenport (2013). Alvesson points out that knowledge-intensive work "revolve[s] around the use of intellectual and analytical tasks" (2004: 1). Davenport similarly

states: “Knowledge workers think for a living. They live by their wits—any heavy lifting on the job is intellectual, not physical” (2013: 10). Focusing on individuals whose jobs’ core components are intellectual activities is thus an appropriate way of identifying knowledge workers when potential participants were from a variety of industries and organizations.

Second, the screening survey identified individuals who worked in settings that were more representative of conventional knowledge workers--that is, full-time employees in office settings. Individuals indicated their employment status, reporting whether they were a full-time employee, a part-time employee, an independent contractor/freelancer, a retiree, or were unemployed. Then individuals responded to the question, “Which of the following options best describes the physical environment of your main workspace (i.e., where you spend most of your work time)?” with options including "Home," "Open-space office," "Private office," "Customer service sites (e.g., retail stores, restaurants)," "Public space (e.g., library, coffee shops)," "Co-working space," "Plant facilities (e.g., manufacturing plants)," "Vehicles (e.g., cars, buses)," "Outdoors," and "Other." Individuals who were full-time employees and worked in open-space office or private office settings met the eligibility criterion. Overall, these screening steps ensured the comparability of the meaning of workday meetings and micro breaks across study participants. Individuals who completed the screening survey and met the eligibility criteria then received further description of the full study and an invitation to participate.

In total, during a one-week recruitment period, 311 individuals who completed the screening survey met the eligibility criteria, of whom 283 signed up for the focal study and 245 actually participated in the study surveys and constituted the final sample of participants. The 245 participants were from a variety of industries (e.g., finance, information, and professional, scientific, and technical services). Of the participants, 35.1% were female, 15.9% were of non-

Caucasian ethnicities, and 92.7% held college or higher degrees. The mean age was 36.0 year old (*SD* = 8.6). The majority of participants worked in small- to medium-sized workgroups in their job—that is, groups of 1-5 (22.4%), 6-10 (36.7%), or 11-15 people (20.8%). The average organizational tenure of the participants was 6.9 years (*SD* = 5.9). On average, participants' workday spanned between 8:03 AM (*SD* = 1.0 hrs) and 5:09 PM (*SD* = 1.40 hrs).

Study Procedure

The study employed experience sampling methodology (ESM), administering two daily surveys per day for five consecutive workdays (Monday-Friday). Before the five-day daily surveys period, participants first completed a background survey that gathered basic information about their job and demographics. During the five-day daily survey period, participants were asked to respond to a mid-day survey and an end-of-afternoon survey on each of the five workdays. Links to the two daily surveys were sent to participants through emails, and participants were instructed to complete the mid-day survey (sent at 11 AM) within one hour before or after their lunch time, and to complete the end-of-afternoon survey (sent at 4 PM) within one hour before or after they finish their afternoon work. Participants were offered monetary rewards (maximum $13) for their participation, including a reward for completing each daily survey on time ($1 each) and an additional bonus for completing at least eight of the ten daily surveys ($3).

In total, during the five-day period, participants provided 1096 mid-day survey responses (response rate = 89.5%) and 1057 end-of-afternoon survey responses (response rate = 86.3%), which were combined as 1163 day-level observations nested within 245 individuals[2]. On average,

[2] Because the data analyses (discussed in more detail below) did not require both mid-day and end-of-afternoon variables to be non-missing values in a day-level observation and the data were merged using an outer join method, the combined dataset included a larger number of day-level observations than the separate counts of the two surveys.

participants completed the mid-day survey at 12:31 PM (*SD* = 1.05 hrs) and the end-of-afternoon survey at 17:19 PM (*SD* = 1.02 hrs). The average time elapsed between the two daily surveys was 4.82 hours (*SD* = 1.09 hrs).

Measures

The mid-day and the end-of-afternoon surveys included the same measures but asked about activities and experiences *before* and *since* lunch time today at work, respectively, each capturing a half-day period. The two daily surveys both assessed meeting time demands, engagement in micro breaks, experiences in a focal meeting event, and an energy outcome. As commonly recommended for experience sampling studies (Fisher & To, 2012; Ohly, Sonnentag, Niessen, & Zapf, 2010; Uy, Foo, & Aguinis, 2010), I used shortened scales to measure the study variables to limit daily survey length and hence reduce participation fatigue and ensure study procedure compliance. Sample items for each variable measure are described below, and the full sets of items used are presented in Appendix A.

Time demands of meetings. Meetings at work were defined to participants as "an arranged gathering of two or more individuals (in-person or through communication technology) for work-related purposes." During the five-day period, participants had an average of 1.55 meetings per day (*SD* = 1.32). Each mid-day and end-of-afternoon survey asked about the duration of meetings during the half-day period. Meeting time demands were then calculated as the total amount of time an individual spent in meetings during that half-day period.

Meeting event experiences. In each mid-day and end-of-afternoon survey, participants rated their experiences in the most recent meeting event, including psychological need satisfaction and performance pressure. Focusing on the most recent meeting event is consistent with research findings showing that recent happenings are particularly potent in shaping

cognitive and affective experiences in a period of time (Baddeley & Hitch, 1974; Kahneman, Frederickson, Schrieber, & Redelmeier, 1993). This approach is also similar to that used in prior ESM research that assessed event experiences under a fixed-interval design, which involved asking participants to answer questions about the most recent event (e.g., Butts, Becker, & Boswell, 2015). This approach ensured that comparable responses were provided in each daily survey.

Meeting event experience: Psychological need satisfaction. Psychological need satisfaction experienced in the meeting event was measured using three items from the need satisfaction scale of La Guardia, Ryan, Couchman, and Deci (2000), which were adapted to apply to a meeting context, including "During this meeting, I felt very capable and effective," "...I felt a lot of closeness with others," and "...I felt free to act in ways I wanted to" (1=Strongly disagree, 5=Strongly agree). Cronbach's alpha computed separately for the daily surveys ranged between .61 and .76 (M = .71).

Meeting event experience: Performance pressure. Performance pressure experienced in the meeting event was measured using three items adapted from the job performance pressure measure of Eisenberger and Aselage (2009). Sample items include "During this meeting, I felt pressured to do a good job" and "…I felt it to be critical to perform at my best" (1=Strongly disagree, 5=Strongly agree). Cronbach's alpha ranged between .83 and .92 (M = .89).

Engagement in micro breaks. In each mid-day and end-of-afternoon survey, participants indicated the extent to which they engaged in micro break activities during the half-day period. In the background survey administered before the daily-survey period, participants were shown a list of fifteen common micro break activities that were from the micro break strategies Fritz and

colleagues discovered for knowledge professionals[3] (2011). Examples of micro break activities in the list include "Do some form of physical activity, including walks or stretching," "Talk to colleagues about non-work-related subjects" and "Read something for fun." From this list, each participant was asked to choose three types of micro break activities that he/she most often used to replenish him-/her-self at work. Then, in each daily survey, participants' three choices from the background survey were piped into the text of the question. That is, each individual saw a customized display of three micro break items and responded to the question "Before/since lunch time today, to what extent did you engage in each of the following activities to replenish yourself at work?" (1=Not at all, 5=A great deal)[4].

Energy outcome: Vigor at the moment. Participants rated their feelings of *vigor* at the moment as the energy outcome, using three items from the measure of McNair, Lorr, and Droppleman (1971; See Lam et al., 2016 for a similar use of this measure for vigor). Items include "lively," "vigorous," and "active" (1=Not at all, 5=Very much). Cronbach's alpha ranged between .90 and .95 (M = .93).

Control Variables

Baseline energy state. To control for participants' baseline state of energy at the start of a half-day period, in each mid-day and end-of-afternoon survey, participants indicated the extent to which they felt tired before starting their work in the morning/afternoon (i.e., when first arriving at work in the morning, or when starting afternoon work after lunch; 1=Not at all, 5=Very much).

[3] The full list in Fritz and colleagues' study (2011) included 21 items. To make it easier for participants to select three most commonly used break activities, a shortened list was presented, which included 15 break activities that had the highest frequency in Fritz and colleagues' (2011) study.

[4] The micro breaks measure was a composite scale, and the three break activity items were viewed as defining components (rather than reflective indictors) of the micro breaks variable (Bagozzi, 2011; Diamantopoulos & Siguaw, 2006). Therefore, following the suggestion of Diamantopoulos and Siguaw (2006), Cronbach's alpha, which is typically used to indicate internal consistency of reflective measures but not relevant for formative measures, was not calculated and used here for this micro breaks measure. This approach is similar to recent research on micro breaks (e.g., Kim, Park, & Headrick, 2018).

This baseline energy state was controlled for when predicting mid-day and end-of-afternoon vigor[5].

Meeting cognitive demands. Prior research shows that exerting cognitive effort can consume energy (Schmeichel, Vohs, & Baumeister, 2003; Sedek & Kofta, 1990; van der Linden, Frese, & Meijman, 2003). Even when a meeting event involves low performance pressure as a type of relief, it can still pose high cognitive demands (e.g., when a meeting presents complex information for an individual to process and think, even when it does not require the individual to deliver performance on his/her part), and it will affect workday energy. Thus, cognitive demands in a meeting event should be accounted for along with performance pressure when predicting the energy outcome. Meeting event cognitive demands were measured using three items adapted from the knowledge characteristics subscale in Morgeson & Humphrey's (2009) Work Design Questionnaire. Sample items includes "This meeting involved complex or difficult issues" and "This meeting required me to engage in a large amount of thinking" (1=Strongly disagree, 5=Strongly agree). Cronbach's alpha ranged between .86 and .94 (M = .91).

In robustness checks, the results and conclusion of hypothesis testing below did not change when these control variables were excluded from the analyses.

Discriminant Validity

I conducted multilevel confirmatory factor analyses for variables assessed in the same daily survey to ensure their discriminant validity. The analyses were performed using Mplus 7.0 (Muthén & Muthén, 1998-2012). For variables measured in the mid-day survey, a hypothesized

[5] Note that the baseline state was recalled in the two daily surveys rather than measured real-time at the start of the morning/afternoon work using extra separate surveys. This approach is admittedly not ideal in terms of measurement accuracy. However, it does constitute a conservative control: the recalled variable was more likely to have a higher correlation with the vigor outcome (i.e., the dependent variable) because they were measured in the same survey, compared to if the baseline variable had been measured in a separate survey. With the greater correlation, the baseline control variable will account for a bigger proportion of the variance in the vigor DV, making it harder for other predictors to have significant effects, thus representing a relatively conservative control.

five-factor model (i.e., meeting psychological need satisfaction, meeting performance pressure, meeting cognitive demands, micro breaks, and vigor) showed a good fit to the data (χ^2 = 362.98, *df* = 160, $p < .001$; CFI = .96, TLI = .94, RMSEA = .03). Loading any pair of these variables on one factor yielded poorer fit (best fitting alternative model, with psychological need satisfaction and vigor combined as one factor: χ^2 = 633.62, *df* = 168, $p < .001$; CFI = .90, TLI = .87, RMSEA = .05; Satorra–Bentler scaled $\Delta\chi^2$ = 176.45, Δdf = 8, $p < .001$). For variables measured in the end-of-afternoon survey, the hypothesized five-factor model also showed a good fit to the data (χ^2= 252.49, *df* = 160, $p < .001$; CFI = .98, TLI = .97, RMSEA = .02). Loading any pair of these variables on one factor similarly yielded poorer fit (best fitting alternative model, with psychological need satisfaction and vigor combined as one factor: χ^2 = 478.11, *df* = 168, $p < .001$; CFI = .93, TLI = .91, RMSEA = .04; Satorra–Bentler scaled $\Delta\chi^2$ = 145.91, Δdf = 8, $p < .001$).

Analytical Strategy

Data in this study had a nested structure, with day-level observations (Level 1) nested within individuals (Level 2). I thus conducted multilevel analyses with random coefficient modeling (Raudenbush & Bryk, 2002). The *Multilevel* package in R was used for the analyses (Bliese, 2013). All day-level predictors were centered on person-mean values to properly model and test within-person relationships (Hofmann, Griffin, & Gavin, 2000; Ohly et al., 2010).

Due to the circadian rhythm of human energy (Brown, 1999; Thayer, 1989), individuals' energy as well as how workday activities relate to the energy outcome can differ during different time periods of a workday, including in the morning versus in the afternoon. I thus conducted parallel, separate analyses of the hypothesized relationships for the two half-day periods of the morning and the afternoon, with morning activities predicting the mid-day vigor outcome and afternoon activities predicting the end-of-afternoon vigor outcome. In predicting end-of-

afternoon vigor, controlling for the baseline energy state after lunch before starting afternoon work also takes into account potential carryover of energy levels from the morning period.

Results

Descriptive Statistics. Table 1 (see the Tables and Figures section) presents the descriptive statistics and correlations of the study variables. The null models show that, for the mid-day vigor outcome, 57.7% of the variance was between person and 42.3% was within person; for the end-of-afternoon vigor outcome, 55.1% of the variance was between person and 44.9% was within person.

Hypothesis Testing. H1a predicts that engagement in micro breaks will be positively related to energy during the workday. Figure 2 shows analysis results of the relationships between micro breaks and vigor, with baseline energy states controlled for. As expected, micro breaks in the morning were positively related to mid-day vigor (b = .19, SE = .05, p < .01). This relationship was not significant in the afternoon, though, between afternoon micro breaks and end-of-afternoon vigor (b = .06, SE = .05, *n.s.*). H1a was thus partially supported. H1b predicts that engagement in micro breaks will be negatively related to meeting time demands. As results in Figure 2 show, meeting time demands were negatively related to the engagement in micro break activities, and this relationship was significant both in the morning (b = -.11, SE = .02, p < .01) and in the afternoon (b = -.08, SE = .02, p < .01), supporting H1b. Although I did not hypothesize about mediation, path analyses show that in the morning meeting time demands had a negative significant indirect effect on vigor via micro breaks (ab = -.021, SE = .007, p < .01, 95% C.I. = [-.034, -.007]).

H2 predicts a positive relationship between meeting psychological need satisfaction and energy during the workday. This relationship is expected to hold above and beyond the effects of

individual task psychological need satisfaction. Because individual task experiences were not assessed in Study 1, analyses here present a preliminary test of this hypothesis, focusing on meeting event experiences by themselves. Table 2 presents the results of multilevel analyses. As Model 2 shows, meeting psychological need satisfaction was positively related to vigor both in the morning and the afternoon (morning variable with mid-day vigor: $b = .18$, $SE = .05$, $p < .01$; afternoon variable with end-of-afternoon vigor: $b = .20$, $SE = .06$, $p < .01$). Meeting psychological need satisfaction in the morning (afternoon) explained 2.1 percent (2.5 percent) of the variance in mid-day (end-of-afternoon) vigor. These results support H2.

H3 hypothesizes an interaction between meeting performance pressure and individual task performance pressure in predicting workday energy. H3 was not tested here because individual task experiences were not assessed in this first study. Model 2 in Table 2 does show that meeting performance pressure did not have a significant main-effect relationship with the vigor outcome either in the morning ($b = -.03$, $SE = .04$, *n.s.*) or in the afternoon ($b = .04$, $SE = .04$, *n.s.*), implying that this relationship might indeed depend on boundary conditions (e.g., experiences in individual tasks).

Supplementary analyses. As described above, when predicting end-of-afternoon vigor, I controlled for the baseline state of energy for the afternoon period (i.e., the extent to which an individual felt tired before starting afternoon work), which accounted for potential carryover in energy from the morning activities. Nevertheless, as a robustness check, I conducted supplementary analyses for the afternoon variable relationships, additionally entering morning activities and experiences in the models. Results show that the significant relationship between afternoon meeting psychological need satisfaction and end-of-afternoon vigor still held ($b = .27$, $SE = .08$, $p < .001$) when accounting for morning meeting experiences. Similarly, meeting time

demands in the afternoon still showed a negative relationship with afternoon micro breaks (b = -.07, SE = .03, p < .01) when accounting for morning meeting time demands.

Discussion

Results from this study support that although micro breaks can benefit workday energy, they will be constrained by the time demands of workday meetings. However, when certain experiences are provided in workday meeting events themselves, including the satisfaction of psychological needs, it can be a useful alternative for enhancing energy during the workday.

In this study's results, the relationship between micro breaks and energy outcome was significant in the morning, though not in the afternoon. This was potentially due to the time division of the two half-day periods within the workday, and I will discuss this issue later in combination with the Study 2 results.

In this study, the vigor outcome, just as the experiential variables, was captured using self-reports. This approach was similar to prior studies assessing the energy or affective outcomes of a workday event, which adopted self-reports (e.g., Butts et al., 2015; Hunter & Wu, 2016), largely because energy states were hard to observe by others. What reduced the concern for common method variance in this study was the controlling of the baseline state for each half-day period, which accounted for the possibility that a participant was simply rating positively (or negatively) on all relevant variables because he/she was "having a good (or bad) day" in general, thus addressing the limitation in this approach.

Study 1 did not assess experiences in the individual tasks during the workday. Study 2 will address this issue and examine meeting events and individual task experiences in tandem to more fully test the hypotheses.

Study 2: An Experience Sampling Field Study

Purpose of the Study

The purpose of this study is to fully test the hypotheses, especially by incorporating individual tasks during the workday.

Participants

Participants of this study were recruited from three technology companies located in China. These companies were in the Internet and technological services industry, and most of their employees were knowledge workers primarily doing intellectual work, working in job functions such as R&D, design, marketing, product management, and human resource and finance. All three companies had open-space office settings. A small number of employees worked off-site from their company (including 3 individuals at Company #2 in a warehouse and 7 individuals at Company #3 as off-site sales representatives), and they did not participate in the on-site recruitment procedure due to their unique work arrangements (and hence were not in the study). All three companies had similar workday schedules (i.e., 10 AM - 7 PM at Company #1 and 9 AM - 6 PM at Companies #2 and #3).

In each of the companies, I first conducted exploratory interviews with general and human resource managers and with representative employees to understand employees' day-to-day work dynamics and the issues of interest (e.g., meetings, individual work, and micro breaks in the focal workplace). Then I organized workshop sessions for employees, in which I introduced the study as a research project on individuals' workday experiences, explained the procedure of the study, and invited interested employees to sign up. As incentives for participation, employees were offered both (1) feedback reports about the study findings after data collection completion and (2) a small, random-amount lottery at the end of each daily

survey (with a 100% probability of receiving a reward but a randomly varying amount for each participant; the average reward was 5 RMB, or approximately 0.8 USD, for each daily survey).

Of the 210 employees who initially signed up for the study and filled out a background survey, 194 individuals actually participated in the daily surveys and constituted the final sample of the study. The mean age of the participants was 28.2 years (*SD* = 2.8). Of these participants, 47.6% were female, and 79.2% had at least a college degree and 19.6% a junior college degree; all participants had at least high-school education. The majority of participants worked in small groups of 1-5 (48.2%) or 6-10 people (28.0%). Participants were in a variety of job functions, and top categories included R&D (19.6%), design (17.3%), product management and operations (13.4%), human resources and finance (10.1%), and marketing (7.1%). To check whether there were biases in the participants in the final sample, I compared these respondents to those individuals who filled out the background survey but did not respond to the daily surveys (i.e., missing in the main part of the study). Respondents and non-respondents did not differ on a few dimensions of interest reported in the background survey, including the general level of energy in work and life ($M_{difference}$ = -.11, t = -.85, df = 208, *n.s.*), perceived control over work time ($M_{difference}$ = -.11, t = -.71, df = 208, *n.s.*), or autonomy over work scheduling ($M_{difference}$ = 0.56, t = .38, df = 208, *n.s.*), suggesting that the participants included in the final sample did not represent a biased sample who simply responded to the daily surveys because they were more energetic at work or had more control and autonomy in their work time.

Study Procedure

Similar to Study 1, this study employed experience sampling methodology. Participants first completed a background survey, in which they provided basic information about their job and their demographics. Participants were then asked to respond to two daily surveys per day,

including a mid-day and an end-of-afternoon survey, for five consecutive workdays. Throughout the data collection process, I stayed on the field site to administer the surveys[6]. All daily survey links were sent to participants using an instant messaging application on their cell phone.

The mid-day survey was sent about half an hour before employees' lunch time (e.g., 11:30-11:45 AM). The end-of-afternoon survey was sent about half an hour before the end of afternoon work time (e.g., 5:30-5:45 PM). Similar to Study 1, the mid-day and the end-of-afternoon surveys asked participants about their activities and experiences before or after lunch time today at work, capturing the morning and the afternoon half-day period, respectively. Participants were instructed to complete the mid-day survey before the end of their lunch time, and the end-of-afternoon survey before finishing their afternoon work or within one hour after. Daily survey links were set up to expire after 3 hours after being initially sent to make sure the surveys were not completed at inappropriate times (e.g., mid-day survey completed in the late afternoon). In total, the participants completed 770 mid-day surveys (response rate = 79.4%) and 748 end-of-afternoon surveys (response rate = 77.1%), which were combined as 836 day-level observations (nested in 194 individuals). On average, participants completed the mid-day survey at 12:08 PM (*SD* = .62 hrs) and the end-of-afternoon survey at 18:14 PM (*SD* = .87 hrs). The average time elapsed between the two daily surveys was 6.11 hours (*SD* = .88 hrs).

Measures

Similar to Study 1, in this study the mid-day and the end-of-afternoon surveys used the same measures, each assessing a half-day period (i.e., morning, afternoon).

Because this study incorporated additional variables for individual task experiences, a problem had arisen that the daily surveys could become longer (than Study 1), creating a risk for

[6] Data collection in the three companies was conducted sequentially, rather than simultaneously, to ensure high-quality execution of the study procedure with the first author on site.

participants' study procedure compliance. What added to this challenge was the fact that employees in the three companies worked in the fast-paced technology industry and had to deal with busy workday plans. Therefore, in order to further limit the daily survey length to ensure high-quality participation and reduce study attrition, I followed methodological recommendations (Fisher & To, 2012; Ohly et al., 2010; Uy et al., 2010) and further shortened the measures for the study variables (compared to Study 1), with two to three items used for each variable. Fisher and To (2012), in their discussion of measurement scales in experience sampling studies, point out that although having three or more items for each construct is ideal (Shrout & Lane, 2011), shorter measures can also be effective and sufficient when an ESM study examines very concrete and relatively straightforward constructs, which is the case for the present study.

Following the translation-back translation procedure (Brislin, 1986), all the measurement items in English were first translated into Chinese by the first author, a bilingual researcher in management and organizational behavior, and then translated back into English by a bilingual doctoral student in management and organizational behavior. Based on comparison between the back-translated English version and the original English version, modifications were made to the translated Chinese items to ensure both accuracy and readability of the measures.

Time demands of meetings (proportion). As in Study 1, meetings were defined to participants as "an arranged gathering of two or more individuals (in-person or through communication technology) for work-related purposes." During the five-day period, participants had an average of 1.69 meetings per day (*SD* = 2.19). In each mid-day and end-of-afternoon survey, participants indicated durations of meetings during the half-day period. Because this study now incorporated individual tasks as a context to assess workday meetings, participants also indicated the amount of time they spent working individually (e.g., by oneself at the desk or

on a computer) during the half-day period. Meeting time demands were then calculated as a proportion—that is, the total amount of meeting time during the half-day period divided by the sum of meeting time and individual work time.

Meeting even experiences. As in Study 1, in each mid-day and end-of-afternoon survey, participants reported their experiences in the most recent meeting event.

Meeting event experience: Psychological need satisfaction. Psychological need satisfaction experienced in the meeting event was measured using three items adapted from the need satisfaction scale of La Guardia and colleagues (2000), including "During this meeting, I felt very capable and effective," "...I felt a lot of closeness with others," and "...I felt free to act in ways I wanted to" (1=Strongly disagree, 5=Strongly agree). Cronbach's alpha computed separately for the daily surveys ranged between .73 and .86 (M = .80).

Meeting event experience: Performance pressure. Performance pressure experienced in the meeting event was assessed using two items adapted from the performance pressure measure of Eisenberger and Aselage (2009), including "During this meeting, I felt pressured to do a good job" and "…I felt it to be critical to perform at my best" (1=Strongly disagree, 5=Strongly agree). Cronbach's alpha ranged between .50 and .75 (M = .62).

Individual task experiences. In each mid-day and end-of-afternoon survey, participants were asked to think about the tasks they worked on individually during the half-day period and rated their experiences in those individual tasks, using measures similar to the ones used for meeting experiences.

Individual task experience: Psychological need satisfaction. Similar to that in meeting events, psychological need satisfaction experienced in individual tasks was measured using three items from the La Guardia et al. (2000) scale. Sample items include "When working on these

tasks, I felt very capable and effective" and "...I felt free to do things the way I wanted to" (1=Strongly disagree, 5=Strongly agree). Cronbach's alpha ranged between .74 and .88 (*M* = .83).

Individual task experience: Performance pressure. As for meeting events, performance pressure experienced in individual tasks was measured using two items adapted from Eisenberger and Aselage (2009), including "I felt it to be critical to perform at my best on these tasks" and "I felt pressured to do a good job on these tasks" (1=Strongly disagree, 5=Strongly agree). Cronbach's alpha ranged between .61 and .83 (*M* = .77).

Engagement in micro breaks. Participants indicated the extent to which they engaged in micro break activities during the half-day period (1=Not at all, 5=To a very large extent). Using a subject matter expert approach, I selected the micro break items based on interviews at the field sites. In the exploratory interviews before survey data collection, I asked HR managers and representative employees about activities that employees would most commonly use to replenish themselves during work time. Based on the obtained information, three items of micro break activities were used in the daily surveys, including "light physical activities (e.g., walks, stretching)," "casual conversations with colleagues about non-work subjects," and "browsing something for fun online (e.g., on your computer or phone)." Managers and employees in the three companies confirmed that these activities were frequently used by individuals in the place as small breaks for recovery during work. In each mid-day/end-of-afternoon survey, participants responded to the question "Before/since lunch time today, to what extent did you engage in each of the following activities to replenish yourself at work?" (1=Not at all, 5=A great deal)[7].

[7] Similar to Study 1, Cronbach's alpha was not calculated for the micro breaks variable because of non-applicability.

Energy outcome: Vigor at the moment. Participants rated their feelings of vigor at the moment as the energy outcome, using two items[8] including "lively" and "vigorous" from the measure of McNair and colleagues (1971; 1=Not at all, 5=Very much). Cronbach's alpha ranged between .88 and .98 (M = .94).

Control Variables

Dummy variables for the companies. To account for potential differences among employees in the three companies, dummy variables were used in the analyses, including two 0-1 dummy variables indicating Company #1 and #2, respectively (i.e., with Company #3 as the reference point).

Baseline energy state. Same as in Study 1, to control for an individual's baseline state of energy at the start of a half-day period, in each mid-day and end-of-afternoon survey, participants indicated the extent to which they felt tired before starting the morning or afternoon work (i.e., when first arriving at work in the morning, or when first starting afternoon work after lunch; 1=Not at all, 5=Very much). This control variable was included when predicting the mid-day or end-of-afternoon energy outcome.

Meeting and individual task cognitive demands. As discussed in Study 1, cognitive demands in meeting events and individual tasks should be taken into consideration along with their performance pressure when predicting energy during the workday, as meeting events or individual tasks that involve low performance pressure may still pose high cognitive demands and thus consume energy resources. Meeting cognitive demands were measured using two items

[8] Because a shortened two-item measure was used here for the vigor variable, I conducted additional checks for the two items' reliability using Study 1 data. In Study 1, the two items "lively" and "vigorous" had high correlations (r = .83~.88) with the three-item total scale (which had an additional item of "active"). In addition, in Study 1, if the third item was not included, the Cronbach's alpha of the two-item vigor measure would still be high (alpha = .92). These results support that using only the two items in Study 2 should have adequate reliability and did not lose much information compared to the three-item scale used in Study 1.

adapted from Morgeson and Humphreys' (2009) Work Design Questionnaire, including "This meeting involved complex or difficult issues" and "This meeting required me to engage in a large amount of thinking" (1=Strongly disagree, 5=Strongly agree). Cronbach's alpha ranged between .76 and .88 (M = .83). A similar measure was used for cognitive demands in individual tasks during the half-day period, including "These tasks involved complex or difficult issues" and "These tasks required me to engage in a large amount of thinking." Cronbach's alpha ranged between .72 and .88 (M = .81).

In robustness checks, the results of hypothesis testing did not change when these control variables were excluded from the analyses.

Analytical Strategy

As in Study 1, I conducted multilevel analyses with random coefficient modeling (Raudenbush & Bryk, 2002), with day-level observations (Level 1) nested within individuals (Level 2). A Chi-square test did not support adding the companies as Level-3 units (log-likelihood ratio = .002, df = 1, *n.s.*), and thus I used dummy variables instead to control for potential company effects (as described above). The *Multilevel* package in R was used for the analyses (Bliese, 2013). All day-level predictors were centered on person-mean values to model and test within-person relationships (Hofmann et al., 2000; Ohly et al., 2010). Same as in Study 1, I conducted parallel analyses of the hypothesized relationships for the morning and the afternoon.

Results

Descriptive Statistics. Table 3 presents the descriptive statistics and correlations of the study variables. The null models show that, for the mid-day vigor outcome, 43.8% of the

variance was between person and 56.2% was within person; for the end-of-afternoon vigor outcome, 44.3% of the variance was between person and 55.7% was within person.

Hypothesis Testing. H1a predicts that the level of engagement in micro breaks will positively relate to energy during the workday. Figure 3 shows the analysis results relating micro breaks to vigor, with the baseline energy states and company dummy variables controlled for. The relationship between micro breaks and vigor was positive and significant in the afternoon (b = .12, SE = .05, p < .05), though not in the morning (b = .04, SE = .04, *n.s.*). H1a was thus supported in the afternoon. H1b predicts that engagement in micro breaks will be constrained by meeting time demands. Results in Figure 3 show that the proportion of meeting time had an expected negative relationship with micro breaks in the afternoon (b = -.52, SE = .12, p < .01), though not in the morning (b = -.12, SE = .11, *n.s.*). H1b were thus similarly supported in the afternoon. Although I did not hypothesize about mediation, path analyses show that, in the afternoon, meeting time proportion had a significant indirect effect on vigor via micro breaks (ab = -.060, SE = .029, p < .05, 95% C.I. = [-.117, -.003]).

H2 and H3 hypothesized about meeting event and individual task experiences in relation to workday energy. Table 4 presents the results of multilevel analyses. H2 predicts that meeting psychological need satisfaction will be positively related to workday energy, and this relationship should hold above and beyond the effects of individual task psychological need satisfaction. Model 2 in Table 4 shows that, with individual task psychological need satisfaction controlled for, meeting psychological need satisfaction positively related to vigor, both in the morning (b = .28, SE = .10, p < .01) and in the afternoon (b = .25, SE = .11, p < .01). Meeting psychological need satisfaction explained 1.1 and 0.9 percent of the variance in mid-day and end-of-afternoon vigor, respectively. H2 was thus supported.

H3 predicts an interaction between meeting performance pressure and individual task performance pressure, such that lower levels of performance pressure in a meeting event will be related to higher energy (i.e., a negative relationship) when performance pressure is high in individual tasks. Model 3 in Table 4 shows that, although not found in the afternoon, meeting and individual task performance pressure did interact in predicting vigor in the morning (b = -.29, SE = .11, p < .05). The interaction term explained 1.7 percent of variance in mid-day vigor. Figure 4 illustrates this interaction, displaying how meeting performance pressure related to vigor at high versus low levels (± 1 SD) of performance pressure in individual tasks (Aiken & West, 1991). Simple slope tests show that, when performance pressure was low in individual tasks, meeting performance pressure did not have a significant relationship with vigor (b = .13, SE = .10, *n.s.*). In other words, during a workday period without much pressure in individual tasks, there were no extra benefits for energy from having lower-pressure meetings. However, when performance pressure was high in individual tasks, meeting performance pressure negatively related to the vigor outcome (b = -.16, SE = .08, p < .05), suggesting that lower-pressure meetings can benefit workday energy when performance pressure was high in individual tasks.

Supplementary analyses. As in Study 1, when predicting end-of-afternoon vigor in the analyses above, controlling for the baseline energy state before the start of afternoon work helped account for potential carryover in energy levels from morning activities. Nevertheless, as a robustness check, I conducted supplementary analyses for the afternoon relationships, examining whether the effects of afternoon experience variables on afternoon outcomes remained the same when additionally accounting for morning variables. Results show that the relationship between afternoon meeting psychological need satisfaction and end-of-afternoon

vigor remained the same (b = .39, SE = .15, p < .05) when morning meeting experiences were simultaneously entered into the afternoon model[9]. The constraining effect of afternoon meeting time demands on micro breaks also remained the same (b = -.62, SE = .16, p < .001) when additionally including morning meeting time demands.

Discussion

Similar to Study 1, results from this study show that, although micro breaks can benefit workday energy, engagement in micro breaks is constrained when workers need to spend time in meetings during the workday. More importantly, however, this study demonstrates that when a meeting event provides psychological need satisfaction in addition to that provided in individual tasks, or when a meeting event provides relief of performance pressure amongst high-pressure individual tasks, these experiences themselves can benefit workday energy. These results extend Study 1 findings to further support the usefulness of replenishing experiences in meeting events--the very work activities that constrain micro breaks for replenishment, while taking individual tasks into consideration.

This study's results show that the relief of performance pressure in meeting events (among high-pressure individual tasks) will benefit energy in the morning, though not in the afternoon. One potential reason is that workers need "real" breaks (i.e., non-work activities) to replenish themselves in the afternoon, which is a period of time when they are more subject to fatigue from work (e.g., Hülsheger, 2016). Although low-pressure work activities (e.g., low-pressure meeting events) may fulfill some relief and recovery functions and serve as pseudo "breaks" among other high-pressure activities, real breaks will still be needed when individuals

[9] This supplementary analysis for robustness check was not applied to the performance pressure interaction in the afternoon because the afternoon interaction term was not significant in the first place.

have already been exposed to work demands for quite a while during the workday (e.g., in the afternoon).

Note that one difference in the Studies 1 and 2 results was that in Study 1 engagement in micro breaks was beneficial for energy in the morning, whereas in Study 2 it was so in the afternoon. One potential reason is the different workday schedules for the employee samples in the two studies, especially in terms of morning and afternoon work time division. In Study 1, the average workday span of participants was 8:03 AM (*SD* = 1.0 hrs) to 5:09 PM (*SD* = 1.40 hrs), whereas in Study 2 the three technology companies had formal workday schedules that started between 9-10 AM and ended between 6-7 PM. The lunch time was similarly around noon. As a result, Study 1 participants on average had longer morning work time, while Study 2 participants had longer afternoon work time. This might be the potential reason that morning micro breaks were more beneficial for Study 1 participants whereas afternoon breaks were more so for Study 2 participants.

In both Studies 1 and 2, the outcome I focused on was energy at work, which was consistent with the hypotheses. Nevertheless, it will be useful to additionally link energy at work with organizationally relevant work outcomes. Although the association between energy and desirable work outcomes has been shown in prior research (see discussion in Chapters 1 and 2), an examination of task performance and positive work behaviors in the present research will still help illustrate the importance of the hypothesized relationships. Study 3 will thus address this issue using an individual-level multi-source survey study, which involved work outcome ratings from supervisors. Study 3 will also seek to replicate the findings about the hypothesized relationships using individual-level variables. In addition, while Studies 1 and 2 used

psychological need satisfaction as a combined construct based on theoretical reasons, Study 3 will assess satisfaction of the three types of needs as separate variables for exploration purposes.

Study 3: A Multi-Source Survey Study

Purpose of the Study

One purpose of this study is to test hypotheses about meeting and individual task experiences (i.e., H2, H3) again using individual-level data, thus constructively replicating the findings. This study will also measure satisfaction of the three types of psychological needs (competence, autonomy, and relatedness) separately to explore which one in meeting events might be more potent in shaping energy at work. Finally and importantly, to show the relevance of the hypothesized relationships for work organizations, this study collects multi-source data and links energy at work to supervisor-rated work outcomes.

Participants and Study Procedure

The sample in this study was 207 employees in the U.S. along with their supervisors. Both focal employees and supervisors were recruited through the subject pool at the business school of a large Midwestern university in the U.S. A total of 570 employees, as well as their supervisors, were directly contacted by the subject pool using the full names and email information provided earlier by the focal employees in the subject pool's general recruitment process. Contacted focal employees and supervisors were invited to respond to a main survey and a complementary survey online, respectively. Focal employees reported their experiences in meetings and in individual tasks at work, and supervisors rated focal employees' task performance and positive discretionary behaviors at work. Among the individuals contacted by the subject pool, 397 employees and 326 supervisors responded to the surveys (response rate = 69.6% and 57.2%, respectively).

Among those employees who responded to the survey, I conducted a screening procedure to identify employees whose jobs mainly involved knowledge work, in line with the proposed target population of the research. In the main survey, focal employees responded to a question "Which of the following types of activities best represents the core components of your job?" Response options included: "Customer service interactions (e.g., retailing, serving, talking with customers)," "Physical activities (e.g., making, manufacturing, constructing, maintaining)," "Intellectual activities (e.g., analyzing, problem solving, creating, designing, writing)," "Managerial activities (e.g., supervising, resource allocating, monitoring)," and "Other." Participants were allowed to select multiple answers, and those who included "intellectual activities" in their selection were included in the analyses. The final sample consisted of 207 employees, along with corresponding supervisor ratings.

These study participants were in a variety of industries (e.g., finance, information, technology, and professional services). The mean age of focal employees was 24.8 years (*SD* = 13.2). Of these employees, 52.7% were female, and 25.6% were of non-Caucasian ethnicities; 94.5% held at least a college degree; 94.1% were working full-time, and the average organizational tenure was 7.9 years (*SD* = 9.0). The supervisors' mean age was 25.5 years (*SD* = 11.1). Of the supervisors, 44.4% were female, and 22.4% were of non-Caucasian ethnicities; 94.3% of the supervisors had received at least a college degree. The average organizational tenure of supervisors was 10.8 years (*SD* = 9.1). The average duration for which the supervisors worked with their corresponding focal employee was 4.5 years (*SD* = 5.0).

Measures

The full set of items used in the study is presented in Appendix B, and sample items for each variable measure are described below. Because this study mainly sought to replicate

findings for Hypotheses 2 and 3, the variables measured focused on experiences in meetings and in individual tasks and energy at work.

Meeting experience: Psychological need satisfaction. Participants were asked to think about what their experiences were like in a typical meeting they would have at work. In this study, feelings of competence, relatedness, and autonomy, as three types of psychological needs, were measured as separate variables. Each variable was measured using 3 items of the Basic Psychological Need Satisfaction and Frustration Scale (BPNSFS) developed by Chen et al. (2015), with the items adapted to apply to meetings at work (1=Strongly disagree, 5=Strongly agree). Sample items for competence include "In a typical meeting I have at work, I feel competent to achieve my goals" and "...I feel capable at what I do" (Cronbach's α = .92). Sample items for relatedness include "… I feel connected with other people" and "...I feel close to other people" (Cronbach's α = .85). Sample items for autonomy include "…I feel a sense of choice and freedom in what I say and do in the meeting" and "…I feel I can act the way I want in the meeting" (Cronbach's α = .86).

Meeting experience: Performance pressure. Performance pressure experienced in meetings was assessed using 3 items adapted from the measure of Eisenberger and Aselage (2009). Sample items include "In a typical meeting I have at work, I feel it to be critical to perform at my best" and "...I feel pressured to do a good job" (Cronbach's α = .80; 1=Strongly disagree, 5=Strongly agree).

Individual task experience: Psychological need satisfaction. Participants were asked to think about what their experiences were like when working on individual tasks in their job. Similar to experiences in meetings, satisfaction of the psychological needs for competence, relatedness, and autonomy in individual tasks were each measured using 3 items from the

BPNSFS scale of Chen et al. (2015;1=Strongly disagree, 5=Strongly agree). Sample items include "When working on my individual tasks, I feel competent to achieve my goals" for competence (Cronbach's α = .92), "...I feel connected with other people" for relatedness (α = .89), and "...I feel a sense of choice and freedom" for autonomy (Cronbach's α = .79).

Individual task experience: Performance pressure. Same as for meetings, performance pressure experienced in individual tasks was measured using 3 items adapted from the Eisenberger and Aselage (2009) measure. Sample items include "When working on my individual tasks in the job, I feel it to be critical to perform at my best" and "...I feel pressured to do a good job" (α = .75; 1=Strongly disagree, 5=Strongly agree).

Energy outcome: Subjective vitality at work. Employees rated their subjective vitality at work as the energy outcome. Subjective vitality refers to a positive feeling of aliveness and energy (Ryan & Frederick, 1997) and was measured using the 7-item scale developed by Ryan and Frederick (1997). Sample items include "I feel alive and vital at work" and "I have energy and spirit at work" (Cronbach's α = .90; 1=Strongly disagree, 5=Strongly agree).

Control variables: Cognitive demands in meetings and individual tasks. Same as in Studies 1 and 2, cognitive demands in meetings and individual tasks were measured and controlled for in predicting the energy outcome. Cognitive demands were measured using 3 items adapted from Morgeson & Humphrey's (2009) Work Design Questionnaire. Participants were asked to indicate what their typical meetings were like at work, and sample items include "…involve complex or difficult issues" and "…require me to engage in a large amount of thinking" (α = .88; 1=Strongly disagree, 5=Strongly agree). Cognitive demands in individual task were assessed using the same measure and with respect to tasks that participants worked on

individually in their job (Cronbach's α = .88). In robustness checks, results of hypothesis testing did not change when the control variables were excluded from the analyses.

Supervisors-rated work outcomes. Supervisors rated the focal employee's task performance, as well as positive discretionary behaviors at work including voice, helping, and creative behaviors. Task performance was measured using the 7-item scale from Williams and Anderson (1991), with sample items including "This person adequately completes assigned duties" and "This person meets formal performance requirements of the job" (Cronbach's α = .87; 1=Strongly disagree, 5=Strongly agree). For positive discretionary behaviors, supervisors were asked to indicate how often the focal employee engaged in each of the listed behaviors at work. *Voice behavior* refers to the behavior of expressing constructive suggestions, ideas and/or concerns to improve the situations at work (Van Dyne & LePine, 1998) and is a commonly assessed proactive behavior (Grant & Ashford, 2008; Morrison, 2014). Voice behavior was measured using the 6-item scale developed by Van Dyne and LePine (1998), and sample items include "develop and make recommendations concerning issues that affect the workgroup" and "speak up in the workgroup with ideas for new projects or changes in procedures" (Cronbach's α = .94; 1=Never, 5=Very often). *Helping behavior* is a form of prosocial discretionary behavior at work and was measured using the 6-item scale of helping from Van Dyne and LePine (1998). Sample items include "Help others in the group with their work responsibilities" and "Help others in the group learn about the work" (Cronbach's α = .92; 1=Never, 5=Very often). *Creative behavior* was measured using 8 items from the scale of George and Zhou (2001; see also Scott & Bruce, 1994). Sample items include "This person comes up with creative solutions to problems" and "This person often has a fresh approach to problems" (Cronbach's α = .95; 1=Strongly disagree, 5=Strongly agree).

Discriminant validity. I conducted confirmatory factor analyses to examine discriminant validity among those study variables reported by the same source (i.e., focal employees, or supervisors). For employee-reported variables, the hypothesized measurement model with all ten factors (i.e., meeting competence, relatedness, and autonomy; meeting cognitive demands and performance pressure; individual task competence, relatedness, and autonomy; individual task cognitive demands and performance pressure) showed a reasonable fit to the data (χ^2 = 674.30, df[10] = 356, p < .001; CFI = .92, TLI = .90; RMSEA = .07, SRMR = .07). Loading any pair of these variables on one factor resulted in poorer fit (best fitting alternative model, with meeting and individual task performance pressure combined as one factor: $\chi 2$ = 763.11, df = 365, p < .001; CFI = .90, TLI = .88; RMSEA = .07, SRMR = .07; $\Delta\chi^2$ = 88.81, Δdf = 9, p < .001). Table 7 presents the estimated covariance matrix of the employee-rated latent variables (i.e., the Phi matrix). For supervisor-rated work outcomes, the hypothesized four-factor measurement model (i.e., task performance, voice, helping, and creative behavior) showed a reasonably good fit to the data (χ^2 = 596.65, df[11] = 315, p < .001; CFI = .92, TLI = .91; RMSEA = .08, SRMR = .06). Loading any pair of these variables on one factor yielded poorer fit (best fitting alternative model, with voice and creative behavior combined as one factor: χ^2 = 807.10, df = 318, p < .001; CFI = .86, TLI = .85; RMSEA = .10, SRMR = .07; $\Delta\chi^2$ = 210.45, Δdf = 3, p < .001). The

[10] Following the approach outlined by Byrne (2012), I carefully reviewed the model parameters, including error covariances indicated to involve major misspecification when constrained to zero (i.e., with large modification indices). Using the criteria recommended by Byrne (2012). a few error covariance parameters were specified to be freely estimated (rather than constrained to zero) based on both substantial conceptual meaningfulness and on the magnitude of modification indices (M.I.) and expected parameter change values (E.P.C.) This included one error covariance among meeting autonomy items, one among meeting relatedness items, one among individual task cognitive demands items, and one among individual task autonomy items.

[11] Using the same procedure as above, the model parameters of error covariances were carefully reviewed, especially the extent to which those with large modification indices (i.e, which indicate that they should be freely estimated rather than being constrained to zero) are conceptually meaningful. With this careful review, one error covariance among two task performance items and two error covariances among helping items were allowed to be freely estimated.

hypothesized four-factor model of supervisor ratings also had a better fit than a one-factor model (χ^2 = 1500.64, *df* = 321, $p < .001$; CFI = .67, TLI = .64; RMSEA = .16, SRMR = .13; $\Delta\chi^2$ = 903.99, $\Delta df = 6$, $p < .001$), showing that the work outcomes did not just represent a unidimensional overall evaluation by the supervisors. Table 8 presents the estimated covariance matrix of the supervisor-rated latent variables.

In summary, the results above support the discriminant validity among the study variables.

Results

Means, standard deviations, and correlations among the study variables are presented in Table 5.

Hypothesis 2 predicts that psychological need satisfaction experienced in meetings will be positively related to energy at work, a relationship that should hold above and beyond the effects of psychological need satisfaction in individual tasks. Table 6 presents the results of multiple regression analyses. As Model 1 in Table 6 shows, after controlling for competence, relatedness, and autonomy experienced in individual tasks, experience of relatedness in meetings had a positive relationship with subjective vitality at work ($b = .17$, $SE = .09$, $p < .05$). Meeting relatedness explained 1.3 percent of the variance in subjective vitality. Meeting competence and autonomy did not have significant relationships with the vitality outcome. Hypothesis 2 was thus supported for the psychological need satisfaction of relatedness in meetings.

Hypothesis 3 predicts that lower performance pressure experienced in meetings will be related to higher levels of energy at work (i.e., a negative relationship) when performance pressure is high in individual tasks. Model 3 in Table 6 presents the results. As expected, performance pressure in meetings and in individual tasks interacted in predicting subjective

vitality (b = -.20, SE = .08, p < .05). This interaction term explained 2.0 percent of the variance in subjective vitality. Figure 5 plots the interaction (Aiken & West, 1991), and simple slope tests show that, when performance pressure in individual tasks was low (-1 SD), performance pressure in meetings did not have a significant relationship with subjective vitality at work (simple slope: b = .07, SE = .08, *n.s.*). However, when performance pressure in individual tasks was high (+1 SD), lower performance pressure in meetings was related to higher subjective vitality at work (i.e., a negative simple slope with marginal significance: b = -.17, SE = .10, p < .08). Although difference in the statistical significance of simple slopes was not as substantial as in Study 2, in combination with the significant interaction term and the effect size, these results still suggest support of Hypothesis 3. The results demonstrate again that relief of performance pressure in meetings is beneficial for energy at work in the presence of high-pressure individual tasks.

Figure 6 shows the results of multiple regression analyses linking energy at work with organizationally relevant work outcomes. Focal employees' subjective vitality at work was positively and significantly related to supervisor-rated task performance (b = .13, SE = .06, p < .05), voice behavior (b = .34, SE = .09, p < .001), and creative behavior (b = .19, SE = .07, p < .05), and it was also positively related to helping behavior with marginal significance (b = .16, SE = .09, p < .07).

As presented in Figures 7 and 8, analyses using bootstrapping procedures (number of resamples = 10,000) further show that the psychological need satisfaction of relatedness in meetings had indirect effects on these work outcomes via subjective vitality (indirect effect on task performance 95% C.I. = [.001, .073]; voice behavior 95% C.I. = [.006, .136]; helping behavior 95% C.I. = [.000, .091]; creative behavior 95% C.I. = [.004, .082]). The interaction between meeting and individual task performance pressure similarly had indirect effects on the

work outcomes via subjective vitality (indirect effect on task performance 95% C.I. [-.079, -.002]; voice behavior 95% C.I. = [-.156, -.010]; helping behavior 95% C.I. = [-.102, .000]; creative behavior 95% C.I. = [-.093, -.006]). These results further support the relevance of the proposed replenishing experiences.

Discussion

Results in this study replicated findings about the beneficial effects of psychological need satisfaction and relief of performance pressure in meetings, with individual task experiences as a context taken into account. The study results also indicate that, among the three types of psychological needs, experience of relatedness in meetings played a more prominent role in relation to energy at work. One potential reason is that meetings are by nature interactive events that go beyond solitary work, and among the psychological needs, the experience of social relatedness might be what individuals look forward to most in meetings and thus benefit from most strongly for energy replenishment. Subsequent research can further examine the relative potency of competence, relatedness, and autonomy experienced in meeting events and individual tasks, potentially exploring their unique antecedents and boundary conditions in shaping energy at work.

Using supervisor ratings, this study also demonstrates the association between energy at work and important work outcomes (i.e., task performance and positive discretionary behavior). It is consistent with findings in prior literature and additionally supports the importance of the hypothesized replenishing experiences in the present research.

Additional Analyses Using Study 1 Data:

Meeting Event Characteristics as Antecedents of Experiences

Purpose

The purpose of these additional analyses is to examine a set of event characteristics as antecedents of potential replenishing experiences in meetings, exploring what promotes satisfaction of psychological needs or relieves performance pressure. These additional analyses test Hypotheses 4a-c, and the variables used were collected as part of Study 1.

Measures

In the mid-day and end-of-afternoon surveys of Study 1, participants rated the three hypothesized event characteristics—novelty, disruption, and criticality--of the most recent meeting they had at work along with other meeting experience variables.

Meeting event characteristics: Novelty, disruption, and criticality. Measures for meeting event characteristics were developed for this study based on the conceptual definition and discussion of each characteristic in the theoretical work of Morgeson et al. (2015). Participants responded to the question, "To what extent did this meeting…?" (1=Not at all, 5=Very much). *Novelty* was measured using two items, "involve unexpected content" and "provide unusual information" (Cronbach's alpha in the daily surveys ranged between .69 and .91; M = .85). *Disruption* was measured using two items including "disrupt previous work plans" and "compel you to make changes in your work" (Cronbach's alpha ranged between .64 and .87; M = .80). *Criticality* was measured using two items "was crucial for your current work" and "was essential to meet the needs in your work" (Cronbach's alpha ranged between .92 and .97; M = .95).

Analytical Strategy

As in Study 1, I performed multilevel analyses, with all day-level predictors person-mean centered.

Results

Descriptive Statistics. Table 9 presents the descriptive statistics and correlations of the variables used in these additional analyses. Null models were also analyzed to assess the within-person versus between-person variance in meeting psychological need satisfaction (morning: 57.0% of the variance was within person; afternoon: 59.0% was within person) and in meeting performance pressure (morning: 68.3% within person; afternoon: 66.7% was within person).

Hypothesis Testing. Table 10 presents the results of the multilevel analyses, examining meeting event characteristics as predictors of psychological need satisfaction and performance pressure. H4a predicts that meeting event novelty will be positively related to psychological need satisfaction. Results, however, did not show significant relations between meeting event novelty and psychological need satisfaction (morning: b = -.05, SE = .03, *n.s.*; b = -.02, SE = .04, *n.s.*). H4a was thus not supported.

H4b expects that performance pressure will be lower in a meeting event with lower disruption (i.e., a positive relationship). Supporting H4b, results show that disruption was positively related to the experience of performance pressure in a meeting event (morning: b = .15, SE = .05, p < .01; afternoon: b = .10, SE = .05, p < .08). Disruption explained 1.7 percent (morning) and 0.5 percent (afternoon) of the variance in performance pressure.

H4c and H4d predict that meeting event criticality will be positively related to both psychological need satisfaction and performance pressure. Results provided support for H4d regarding performance pressure (morning: b = .30, SE = .03, p < .01; afternoon: b = .33, SE = .04,

$p < .01$), and partial support for H4c regarding psychological need satisfaction (morning: $b = .10$, $SE = .02$, $p < .01$; afternoon: $b = .03$, $SE = .03$, *n.s.*). Criticality explained 13.2 percent (morning) and 16.2 percent (afternoon) of the variance in performance pressure, and 3.0 percent (morning) of the variance in psychological need satisfaction.

In summary, results supported some of the hypotheses, especially those regarding the experience of performance pressure (H4b, H4d). Both event disruption and event criticality were related to higher levels of performance pressure experienced in a meeting event. For psychological need satisfaction, event criticality was beneficial (H4c), but event novelty did not have expected positive effects (H4a).

Discussion

Results of these additional analyses provide some evidence for how characteristics of work activity events (e.g., meetings) relate to experiences generated from those events. The findings suggest that events with greater strength, including those with high disruption and high criticality, will stimulate (rather than reduce) experienced performance pressure. As such, these events will not be suitable candidates to serve as low-pressure episodes for recovering workday energy.

Event characteristics relate to psychological need satisfaction in more complex ways. The analyses provide evidence that high event criticality is favorable for promoting psychological need satisfaction, but different from hypothesized, event novelty did not show beneficial effects. One potential reason is that, although high event novelty may heighten the value of exerting skills and expertise and trigger a common focus in social interactions, it can at the same time create surprises for an individual that caught him/her off guard, making it more challenging for

an individual to exhibit and utilize his/her competence and to focus on positive interpersonal interactions, thus impeding the fulfillment of psychological needs.

Future research can continue to explore characteristics of work activity events, including both features that are generally applicable to a broad array of workday events and those that are specific to certain types of events (e.g., meetings), investigating how various event characteristics might create favorable or unfavorable conditions for generating replenishing and experiences during the workday.

CHAPTER 5

DISCUSSION

Findings from the three studies largely support the hypotheses. Engagement in micro breaks, though beneficial for workday energy, is constrained by the time demands of meetings. More importantly, however, when replenishing experiences are provided in meeting events, including psychological need satisfaction beyond that experienced in individual tasks, or relief of performance pressure amongst high-pressure individual tasks, these experiences can benefit energy at work. This way, replenishing experiences from the constraining work activities themselves (i.e., meetings) serve as additional pathways for replenishment that compensate for the loss of micro breaks.

Theoretical Contributions

This research contributes to an enriched, more complete understanding of pathways for replenishing and enhancing human energy at work. It calls attention to the challenges in resorting only to *non-work activities* for replenishment but also reveals additional possibilities that lie in *work activities*. Extant research on work recovery emphasizes replenishment of human energy through off-work occasions (e.g., evenings, weekends, vacations; for reviews, see Sonnentag & Fritz, 2015; Sonnentag et al., 2012) or through breaks at work (e.g., Hunter & Wu, 2016; Trougakos et al., 2008, 2014), both of which entail engagement in non-work activities. Although off-work occasions afford greater flexibility and longer period of detachment from work (Sonnentag & Fritz, 2015; Sonnentag et al., 2012), intensified demands in today's workplaces

have made it increasingly hard for individuals to wait only until after work to recover themselves, as individuals might already experience considerable fatigue before then (Michel, 2011; Reid & Ramarajan, 2016). Breaks within work time have thus received greater attention as options for replenishment *at work*. Indeed, an emerging body of empirical research in the organizational literature demonstrates the benefits of taking small breaks during the workday, especially when appropriate break activities are undertaken (e.g., Fritz et al., 2011; Hunter & Wu, 2016; Trougakos et al., 2008, 2014; Zacher et al., 2014). These findings also resonate with earlier research in the ergonomics literature that shows the value of within-workday breaks, though mainly focused on addressing physical pains and discomfort (e.g., Dababneh, Swanson, & Shell, 2001; Galinsky, Swanson, Sauter, Hurrell, & Schleifer, 2000; Henning, Jacques, Kissel, Sullivan, & Alteras-Webb, 1997; McLean, Tingley, Scott, & Rickards, 2001; Pronk, Pronk, Sisco, Ingalls, & Ochoa, 1995).

The present research substantiates the value of taking breaks during the workday (as demonstrated by Studies 1 & 2 results), but it also points to potential challenges if professional workers only resort to taking breaks for workday replenishment. Discretionary undertaking of small breaks means volitionally engaging in non-work activities during work time, which usually appears to be a deviation from the work processes while its immediate benefits for work performance could be hard to observe. As such, workers and managers are unlikely to treat breaks with high priority (e.g., Chinander & Schweitzer, 2003), and break activities can be easily constrained under unfavorable conditions, including when the time demands of meetings reduce discretionary work time and elevate task completion pressure. Given the prevalence of such circumstances in many knowledge workers' day-to-day work, turning to work activities themselves for additional options of replenishment becomes useful, especially if there can be

some replenishing possibilities in the very work activities that suppress breaks in the first place (e.g., meetings). Indeed, the present research shows that two types of experiences in meeting events are beneficial for workday energy, including fulfillment of fundamental psychological needs and temporary relief of performance pressure. These replenishing experiences present a compensatory channel for recovering workday energy when breaks are constrained. The present research thus moves forward our understanding of replenishing human energy at work, building a more complete picture by incorporating and connecting both non-work and work activities.

Second, this research also advances a non-simplistic, dual perspective on how work activities and workday events may shape employee energy and well-being. Using workday meeting events as a theoretical example, the present research demonstrates that the same work activities might create *both* constraints and opportunities for employee well-being (e.g., regarding energy resources). On the one hand, work activities like meetings can pose limits on preferred options for enhancing energy (e.g., through breaks) due to their time demands. On the other hand, under the right experiential conditions, the same work activities can also serve as opportunities for promoting energy (and potentially other well-being outcomes too). This dual view extends theoretical perspectives in related literatures, including the research on job demands and resources and research on work events. Research using a job demands-resources framework emphasizes that factors in a job can typically be categorized as demands or resources, and that job demands tend to create a burnout process that impairs employee energy and well-being, whereas job resources can promote work engagement and foster energy and well-being (Bakker & Demerouti, 2007; Demerouti et al., 2001; for a recent review, see Bakker et al., 2014). The present research extends this perspective and suggests that the same work activities can simultaneously encompass demands and resources aspects, both of which can manifest in an

issue of interest when we consider multiple dimensions at the same time (e.g., time versus experiential dimensions of a work activity). As such, even those work activities that often carry negative connotations--of which meetings are a good example (Belkin, 2007; Grady, 2013; Mankins, Brahm, & Caimi, 2014; Rogelberg et al., 2006)--can still be used as resources for nurturing worker energy and well-being when managers and workers make the effort to create facilitating conditions (e.g., by supplying fulfilling and replenishing experiences in a work activity event). This dual view of seeing potential resources in demanding work activities can open up more avenues for understanding flexible use and creative activation of resources in the workplace, which resonates with an emerging "resourcing" perspective in organizational research (Feldman, 2004; Feldman & Worline, 2012; Sonenshein, 2014) while also extending it to specific workday activities.

In a similar vein, this dual approach extends theoretical perspectives on work events, highlighting a multi-faceted way of understanding the implications of work activity events. Research on workday events, which mainly draws upon the affective events theory (Weiss & Cropanzano, 1996), typically categorizes events as either positive or negative, depending on their overall valence and on individuals' appraisals and affective reactions (e.g., Brown, Westbrook, & Challagalla, 2005; Bono, Glomb, Shen, Kim, & Koch, 2013; Gross et al., 2011; Matta, Erol-Korkmaz, Johnson, & Bıçaksız, 2014). Recent development in the event systems theory (Morgeson et al., 2015), however, suggests that discrete events at work can be multi-faceted, carrying multiple dimensions worth of consideration if we want to understand their implications. In line with this emerging view, the current research presents a more nuanced way of looking at workday events by examining their temporal and experiential features in tandem. Even when a workday event has undesirable temporal features (e.g., prolonged time duration), it may still

offer positive possibilities when we take into account its experiential features. For example, at the end of a meeting, an individual may feel frustrated about the meeting being long and squeezing work time for the rest of the day, but she may also feel energized about having shown competence and capabilities during the meeting. This multi-faceted approach can inform more fine-grained investigations of workday events, especially when some events do not easily fall into a positive-negative dichotomy.

Finally, this research also contributes to the literature on workday design and scheduling. Elsbach and Hargadon (2006) points out in their theoretical work that traditional research on work design focuses on relatively stable, enduring characteristics of a job and its tasks (e.g., task identity or skill variety in the job; Hackman & Oldham, 1975). They argue that more research is needed to go beyond the design of professional *work* and further focus on the design of professional *workdays*, including the arrangement of various tasks and activities within the day. Specifically, Elsbach and Hargadon (2006) propose that some bouts of work activities during the workday may serve as a change in demands and experiences from other bouts of work activities, an alternation that can be beneficial for professional workers. Despite the interesting possibility this idea offers and the continued calls for new ways of approaching work design (e.g., Grant & Parker, 2009; Parker, 2014), empirical research has seldom investigated such issues, and little light has been shed on how to take advantage of varied work activities in arranging a workday. The present research provides a foray into this direction, though admittedly coarse and rudimentary but useful for inviting further conversations and investigations. For example, my finding that a meeting event with low performance pressure can benefit workday energy in the presence of high-pressure individual tasks suggests that certain episodes of work activities may serve as intermittent breaks from other work activities or a change in experiences to promote

desirable outcomes for knowledge workers. The present research thus encourages and informs further research to look into varied work activities for understanding and improving workday designs.

Along the same line, this work additionally extends research on workday scheduling. Traditionally, workday scheduling focuses on the issues of starting and ending times of a workday and the number of hours worked during given shifts. These issues have been important since the widespread use of shift work (e.g., Czeisler, Moore-Ede, & Coleman, 1982; Dalton & Mesch, 1990; Pierce & Dunham, 1992; Zedeck, Jackson, & Summers, 1983) and are still of central concern in contemporary literatures on flexible work schedules and idiosyncratic employment deals (Baltes, Briggs, Huff, Wright, & Neuman, 1999; Kelly & Moen, 2007; Moen et al., 2016; Rosen, Slater, Chang, & Johnson, 2013; Rousseau, 2001). Less attention, however, has been paid to issues of scheduling *within* a workday, for example, with regard to the scheduling of various events and activities (e.g., meetings, other non-meeting social events). Although the present research did not assess the precise timing of meeting events, the findings imply that, when an individual expects a long stretch of high-pressure work, it might be useful to schedule an episode of low-pressure work event as an intermittent punctuating point, so that the event offers some relief and recovery. Overall, the present research suggests that paying attention to various types and episodes of work activities and individuals' different experiences in them may generate useful insights for within-workday scheduling.

Limitations and Future Directions

This research has some limitations that point to directions of future directions. First, I chose to focus on two major types of work activities—individual tasks and meeting events. They are both highly prevalent in knowledge work and can reasonably represent the core components

of many knowledge workers' day-to-day activities. They might not constitute an exhaustive set of work activities, though. Examples of other work activities that might be of interest for workday energy include spontaneous interactions with other people (e.g., colleagues, clients) that do not take a meeting form, or less sedentary work activities that involve physical movement (e.g., running errands). Future research can encompass a broader array of work activities and look into how they connect and interact to offer replenishing experiences during the workday.

Second, when examining both temporal and experiential features of meeting events, I focused on one specific temporal feature that is salient for meetings—the amount of time they take (i.e., duration). There could be other temporal features, though, that are also relevant for understanding workday events and their implications for energy (Ancona, Okhuysen, et al., 2001; Morgeson et al., 2015). For example, it might be useful for future research to examine a meeting's exact location on the workday calendar (e.g., 8:00 AM vs. 2:00 PM), or its temporal relation with other activities (e.g., back-to-back vs. spread-out arrangement of meetings versus other work). Such investigations will be particularly valuable for more precisely testing the transitions among different work episodes during a day (Beal et al., 2005; Elsbach & Hargadon, 2006; Trougakos & Hideg, 2009). Furthermore, the implications of such temporal issues can be different during various time periods of the workday (e.g., morning vs. afternoon). Findings from this research provide a glimpse of such differential relationships (e.g., micro breaks not equally important in the morning and the afternoon), and future research may provide further insights into these issues with a broader array of temporal dimensions investigated.

Third, the theory and empirical investigation of this research have mainly focused on day-level, within-person relationships. There can be individual differences, though, that can play a role in how strongly such relationships hold for particular workers. For example, extroverted

knowledge workers might benefit more from psychological need satisfaction in meetings events beyond individual tasks than introverted workers. Or, some individuals might find high perform-pressure work itself energizing and not as depleting, thus benefiting less from having low-pressure events among high-pressure tasks. Such individual-level boundary conditions for the hypothesized replenishing experiences are worth investigation in future research.

Related, in examining both the temporal dynamics and the workday energy issues, a direction worth pursuing in future research is to use other data generation methods beyond self-reports in surveys. The increasing use of intelligent equipment in workplaces makes it possible to capture duration and timing of workday activities with much greater precision; wearable devices that collect physiological, biometric measures might also allow assessing workday energy levels more frequently and in less obtrusive ways. These alternative data and measurement methods might not only provide methodological triangulation but can also inspire new issues to be studied about work and non-work activities in connection with energy and well-being at work.

There are some limitations in the empirical designs of studies in this research. In the two experience sampling studies, the focal variables for hypothesis testing were from the same half-day period (e.g., morning meeting experiences predicting mid-day energy outcome). This approach makes sense conceptually, because work activities during a half-day period should be most likely to shape the energy level at the end of that half day (rather than the energy level of later half-day periods). Nevertheless, I acknowledge that it can induce empirical concerns for common method variance. I adopted measures to alleviate such concerns, including controlling for the baseline state of energy for the half-day period, which can help reduce a potential "halo" effect in the hypothesized relationships, accounting for the possibility that an individual was simply having a good/bad time since the start of that half-day period and was hence rating

positively/negatively on all relevant variables. In addition, given that any non-negligible common method variance should consistently exist across different daily surveys, the fact that experiences in meeting evens (or individual tasks) did not always show the same relationship patterns with the energy outcome in the morning versus in the afternoon implies that the significant relationships I found were not simply due to a common method variance. Nevertheless, for future research, adopting a greater number of daily survey assessments to further separate some variables temporally may help alleviate such concerns even more.

Finally, I acknowledge that I need to use caution not to draw strong causal inference from the empirical findings due to the non-experimental design of the studies. Given the conceptual framework I developed and presented, having an experimental testing in the present research would be challenging, as it would have to involve manipulations of time demands, level of psychological need satisfaction, and level of performance pressure in meeting events, separately. However, future research that has a narrower focus and assesses one specific experiential feature (e.g., performance pressure) can consider conducting experimental studies in a lab or field setting to better establish causal inferences for that particular factor.

Practical Implications

The present research offers practical implications for workers and managers. First, it is important to note that this research is not intended to suggest that breaks at work are not useful. In fact, the study findings show that engagement in micro break activities *is* beneficial for workday energy outcomes. However, the need to spend time in meetings poses challenges for workers to take small breaks during the day. When managers request meetings on workers' calendars, it is important they be aware that such time demands do not only influence the time available for workers to complete their other tasks, which is more commonly recognized, but

also workers' effort to maintain and restore their own energy for work, which is a much less recognized issue but is no less important for individuals' sustainable performance and well-being at work.

When individuals do get limited opportunities to take small breaks during the workday, however, this research suggests some possible solutions. First, managers and employees can use and craft certain work activities in ways that enable them to create fulfilling experiences and provide replenishment. For example, in a meeting managers can encourage employees to utilize their unique skills and capabilities in giving input and generating problem solutions (Allen & Rogelberg, 2013), or start a meeting with workers' updates of their work progress and enable others to help if necessary (Dutton, 2003), or designate a small section of the meeting for employees to share their personal learning and feelings and express mutual care (Perlow, 2012). Such types of practices can facilitate the fulfillment of fundamental psychological needs for competence, autonomy, and relatedness. Although it means additional items that tax upon the time budget of a meeting event, it is not an investment without benefits-- replenishing experiences that enhance individuals' energy for the workday can in turn benefit work performance and promote desirable work behaviors.

Furthermore, findings from the present research suggest that, in designing and arranging workday activities, managers and employees can consider inserting some episodes of low-pressure work among other high-pressure activities, so that the low-pressure work episodes act as a time window that enables recovery. Although taking "real" breaks and engaging in relaxing non-work activities is ideal and preferable, sometimes workers do encounter circumstances that limit their opportunities for taking breaks during the workday. In such situations, using a subset of work activities that present relatively low pressure as temporary, intermittent relief is a

feasible alternative. For example, an employee may put a low-pressure information sharing meeting with another teammate among some high-pressure analytical work that he is tackling today. Scheduling meetings that are necessary but do not involve high pressure strategically allows workers to take advantage of such alternation in work activities for more recovery opportunities. This approach, however, should not be used to fully substitute for micro breaks when breaks are actually plausible during a workday, as non-work activities are important for allowing human functional systems to rest from effortful work (Meijman & Mulder, 1998).

For practitioners, the present research also calls attention to the crafting of favorable experiences in specific, discrete events in day-to-day work (e.g., meetings). Compared to attempts to change those stable, enduring features of the work environment (e.g., the demands inherent in the jobs), keeping an eye on discrete work activity events during the day and working on improving the specific experiences they supply offers a nearer-term, and sometimes more feasible, ways of enhancing energy and other workday outcomes.

TABLES AND FIGURES

TABLE 1
Study 1: Means, Standard Deviations, and Correlations

Variable	Mean	s.d.	ICC1	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Meeting time (morning)	0.65	0.75	0.34	-	-.05	.08**	-.01	.24**	.12**	.07*	.52**	-.07*	.02	.10**	.23**	.14**	.04
2. Micro breaks (morning)	1.84	0.61	0.44	-.09**	-	.10**	.02	.02	-.04	.06*	.01	.63**	.08**	.00	.07*	.04	.13**
3. Morning baseline energy state	2.83	1.25	0.40	.03	.08**	-	-.23**	.14**	.15**	-.47**	.00	.11**	.75**	-.16**	.06*	.09**	-.31**
4. Meeting psychological need satisfaction (morning)	3.83	0.73	0.43	-.04	.01	-.19**	(.70)	.15**	.16**	.46**	-.04	.06*	-.28**	.55**	.14**	.13**	.46**
5. Meeting cognitive demands (morning)	3.33	1.09	0.23	.22**	-.03	.08*	.10*	(.90)	.57**	.00	.18**	.01	.16**	.14**	.40**	.33**	.05
6. Meeting performance pressure (morning)	3.41	0.99	0.32	.17**	-.06	.10**	.13**	.56**	(.88)	.07*	.08*	-.04	.14**	.14**	.31**	.53**	.09**
7. Vigor (mid-day)	2.77	1.01	0.58	.07*	.08**	-.39**	.41**	.03	.05	(.92)	.00	.10**	-.46**	.45**	.15**	.17**	.82**
8. Meeting time (afternoon)	0.54	0.80	0.36	.30**	-.04	.00	-.01	.12**	.11**	.01	-	-.04	.04	.05	.23**	.13**	-.10**
9. Micro breaks (afternoon)	1.90	0.61	0.43	-.01	.41**	.10**	.06	.02	.02	.05	-.07*	-	.13**	.05	.08*	.11**	.17**
10. Afternoon baseline energy state	2.65	1.13	0.39	.03	.05	.57**	-.20**	.07	.10**	-.37**	.02	.08**	-	-.24**	.04	.10**	-.40**
11. Meeting psychological need satisfaction (afternoon)	3.80	0.75	0.40	.03	.08	-.09*	.44**	.05	.06	.34**	-.07	.03	-.23**	(.72)	.30**	.20**	.49**
12. Meeting cognitive demands (afternoon)	3.36	1.08	0.25	.19**	.02	.07	.11*	.31**	.14*	.10*	.19**	.02	.05	.18**	(.91)	.51**	.17**
13. Meeting performance pressure (afternoon)	3.35	1.04	0.33	.09	.04	.02	.16**	.18**	.33**	.15**	.11*	-.01	.04	.19**	.54**	(.89)	.16**
14. Vigor (end-of-afternoon)	2.55	1.00	0.55	.02	.09**	-.26**	.34**	.04	.02	.63**	-.09**	.13**	-.34**	.42**	.11**	.13**	(.93)

Note. Correlations below the diagonal are day-level correlations (n = 1163). Correlations above the diagonal are person-level correlations (N = 245). Mean Cronbach's alphas across days are shown in parentheses along the diagonal. ICC = Intraclass correlation.
* $p < .05$; ** $p < .01$.

TABLE 2
Study 1: Meeting Event Experiences and Workday Energy

DV: Mid-day vigor	Null Model	Model 1	Model 2
Intercept	2.77** (0.05)	2.77** (0.05)	2.84** (0.06)
Control variables			
Morning baseline energy state		-0.20** (0.02)	-0.16** (0.03)
Meeting time		0.06 (0.04)	-0.04 (0.05)
Micro breaks		0.19** (0.05)	0.19** (0.06)
Meeting event experiences (morning)			
Meeting cognitive demands			-0.01 (0.04)
Meeting psychological need satisfaction			0.18** (0.05)
Meeting performance pressure			-0.03 (0.04)
Pseudo R-square (level-1)	--	.09	.12
Model Deviance	2675.50	2572.30	1756.34
DV: End-of-workday vigor	Null Model	Model 1	Model 2
Intercept	2.55** (0.05)	2.54** (0.05)	2.55** (0.07)
Control variables			
Afternoon baseline energy state		-0.22** (0.03)	-0.20** (0.04)
Meeting time		-0.07* (0.04)	-0.14** (0.05)
Micro breaks		0.06 (0.05)	0.11 (0.07)
Meeting event experiences (afternoon)			
Meeting cognitive demands			-0.05 (0.04)
Meeting psychological need satisfaction			0.20** (0.06)
Meeting performance pressure			0.04 (0.05)
Pseudo R-square (level-1)	--	.09	.15
Model Deviance	2604.44	2524.04	1326.28

Note. n = 1163 days (nested in 245 individuals). Unstandardized coefficients are reported, with standard errors displayed in parentheses. Level-1 predictor variables were all person-mean centered. Pseudo R-square values were calculated using the formula from Kreft and De Leeuw (1998). Model deviance, as an indicator of model fit, is based on -2 * log likelihood; a smaller deviance value indicates a better overall fit of the model (Burnham & Anderson, 2002).

† $p <$ .10. * $p <$ .05. ** $p <$ .01.

TABLE 3
Study 2: Means, Standard Deviations, and Correlations

Variable	Mean	s.d.	ICC1	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Meeting time proportion (morning)	0.17	0.25	0.36	-	-.03	.05	.09*	.13**	.02	-.02	.18**	.07	.08*	.69**	-.02	-.09*
2. Micro breaks (morning)	2.17	0.94	0.61	-.05	-	.36**	.04	.07	.02	-.04	.00	.06	.06	.04	.87**	.28**
3. Morning baseline energy state	2.42	1.14	0.45	.01	.22**	-	-.22**	.11**	.00	-.37**	.05	-.07*	-.45**	.08*	.31**	.59**
4. Meeting psychological need satisfaction (morning)	3.70	0.64	0.35	.02	.02	-.20**	(.79)	.21**	.25**	.60**	.24**	.31**	.35**	.14**	.03	-.11**
5. Meeting cognitive demands (morning)	3.30	0.95	0.19	.26**	.01	.06	.15**	(.83)	.49**	.23**	.54**	.23**	.04	.16**	.04	.12**
6. Meeting performance pressure (morning)	3.39	0.80	0.14	.10	-.03	.00	.28**	.42**	(.64)	.34**	.21**	.48**	.27**	.13**	.04	.11**
7. Individual task psychological need satisfaction (morning)	3.75	0.66	0.44	-.02	.01	-.28**	.61**	.15**	.21**	(.83)	.20**	.43**	.50**	.02	-.06	-.25**
8. Individual task cognitive demands (morning)	3.38	0.85	0.29	.16**	-.02	.03	.16**	.42**	.19**	.17**	(.82)	.44**	.14**	.19**	-.06	.18**
9. Individual task performance pressure (morning)	3.71	0.71	0.35	.07	.09*	-.05	.29**	.18**	.34**	.34**	.44**	(.80)	.27**	.09*	.03	.03
10. Vigor (mid-day)	3.34	0.85	0.44	.02	.06	-.40**	.36**	.02	.17**	.42**	.08*	.22**	(.94)	.11**	.05	-.31**
11. Meeting time proportion (afternoon)	0.13	0.23	0.46	.43**	.03	.02	.08	.11	.06	.03	.14**	.09*	.04	-	.01	-.07*
12. Micro breaks (afternoon)	2.28	0.91	0.63	-.03	.70**	.22**	.04	.00	.05	-.02	-.05	.05	.05	-.06	-	.26**
13. Afternoon baseline energy state	2.81	1.03	0.39	-.01	.16**	.38**	-.07	.07	.07	-.17**	.08*	.01	-.22**	-.03	.19**	-
14. Meeting psychological need satisfaction (afternoon)	3.79	0.63	0.34	.10	-.04	-.16**	.54**	.14	.12	.43**	.23**	.23**	.35**	.00	-.02	-.13*
15. Meeting cognitive demands (afternoon)	3.41	0.91	0.22	.05	-.03	.03	.19**	.28**	.21**	.12*	.38**	.32**	.05	.20**	-.04	.07
16. Meeting performance pressure (afternoon)	3.57	0.75	0.32	-.10	-.07	-.04	.31**	.16*	.34**	.26**	.23**	.42**	.19**	.05	-.04	-.05
17. Individual task psychological need satisfaction (afternoon)	3.78	0.62	0.45	.01	.04	-.20**	.41**	.14*	.01	.52**	.09*	.28**	.36**	-.01	.07	-.14**
18. Individual task cognitive demands (afternoon)	3.55	0.78	0.38	.09*	-.01	-.03	.17**	.29**	.14*	.15**	.49**	.35**	.05	.12**	-.05	.12**
19. Individual task performance pressure (afternoon)	3.75	0.68	0.33	.02	-.01	-.07	.28**	.16**	.23**	.27**	.19**	.48**	.19**	.06	-.03	-.02
20. Vigor (end-of-afternoon)	3.23	0.83	0.44	-.03	.14**	-.22**	.17**	.00	.10	.26**	.00	.11**	.50**	.01	.17**	-.16**
21. Company #1 (dummy)	0.13	0.34	-	.07	.04	.04	-.05	-.26**	-.10*	-.09*	-.03	.06	.00	-.05	.12**	.10**
22. Company #2 (dummy)	0.40	0.49	-	-.10**	-.04	.11**	-.10	.21**	.11*	-.08*	.10**	.07	-.03	-.02	-.03	.09**

Variable	14	15	16	17	18	19	20	21	22
1. Meeting time proportion (morning)	.15**	.07	-.04	.01	.07	-.01	.00	.09**	-.14**
2. Micro breaks (morning)	-.04	-.06	-.09*	.07*	-.03	-.02	.22**	.05	-.03
3. Morning baseline energy state	-.24**	.06	.01	-.27**	-.01	-.08*	-.27**	.05	.13**
4. Meeting psychological need satisfaction (morning)	.57**	.15**	.17**	.55**	.21**	.27**	.13**	-.05	-.19**
5. Meeting cognitive demands (morning)	.32**	.35**	.04	.22**	.43**	.22**	.10*	-.29**	.22**
6. Meeting performance pressure (morning)	.17**	.15**	.34**	.19**	.25**	.42**	.18**	-.04	.13**
7. Individual task psychological need satisfaction (morning)	.55**	.20**	.21**	.71**	.28**	.42**	.39**	-.13**	-.11**
8. Individual task cognitive demands (morning)	.36**	.38**	.13**	.20**	.69**	.33**	.07*	-.01	.14**
9. Individual task performance pressure (morning)	.25**	.22**	.43**	.38**	.49**	.73**	.18**	.07*	.07*
10. Vigor (mid-day)	.42**	.05	.10*	.46**	.15**	.31**	.69**	.00	-.02
11. Meeting time proportion (afternoon)	.03	.15**	-.01	-.01	.08*	.03	.05	-.05	-.03
12. Micro breaks (afternoon)	.02	-.04	-.06	.05	-.09*	-.09**	.20**	.14**	-.06
13. Afternoon baseline energy state	-.15**	.11**	-.02	-.22**	.23**	-.01	-.25**	.11**	.13**
14. Meeting psychological need satisfaction (afternoon)	(.80)	.13**	.21**	.65**	.35**	.30**	.33**	.00	-.22**
15. Meeting cognitive demands (afternoon)	.18**	(.83)	.44**	.27**	.36**	.25**	.09*	-.11**	.03
16. Meeting performance pressure (afternoon)	.31**	.43**	(.60)	.21**	.23**	.52**	.14**	.06	.04
17. Individual task psychological need satisfaction (afternoon)	.68**	.16**	.24**	(.83)	.33**	.51**	.42**	-.14**	-.06
18. Individual task cognitive demands (afternoon)	.22**	.48**	.28**	.28**	(.80)	.57**	.11**	.08*	.06
19. Individual task performance pressure (afternoon)	.27**	.14*	.45**	.41**	.42**	(.75)	.29**	.05	.01
20. Vigor (end-of-afternoon)	.36**	.07	.16**	.37**	.05	.21**	(.94)	-.09**	.04
21. Company #1 (dummy)	-.02	-.07	-.03	-.08*	.07	.05	-.06	-	-.32**
22. Company #2 (dummy)	-.13*	.04	.04	-.06	.05	.00	.01	-.32**	-

Note. Correlations below the diagonal are day-level correlations (n = 836). Correlations above the diagonal are person-level correlations (N = 194). Mean Cronbach's alphas across days are shown in parentheses along the diagonal. ICC = Intraclass correlation.
* $p < .05$; ** $p < .01$.

TABLE 4
Study 2: Meeting Event and Individual Task Experiences in Relation to Workday Energy

DV: Mid-day vigor	Null Model	Model 1	Model 2	Model 3
Intercept	3.33** (0.05)	3.34** (0.07)	3.39** (0.09)	3.40** (0.09)
Control variables				
Company #1		-0.07 (0.15)	-0.04 (0.17)	-0.04 (0.17)
Company #2		-0.02 (0.10)	-0.13 (0.13)	-0.14 (0.13)
Morning baseline energy state		-0.24** (0.03)	-0.16** (0.05)	-0.15** (0.05)
Meeting time proportion		-0.15 (0.13)	-0.04 (0.28)	-0.01 (0.28)
Micro breaks		0.04 (0.04)	0.12 (0.08)	0.17* (0.08)
Morning experiences				
Meeting cognitive demands			0.06 (0.06)	0.07 (0.06)
Meeting psychological need satisfaction			0.28** (0.10)	0.28** (0.10)
Meeting performance pressure			-0.06 (0.07)	-0.02 (0.07)
Individual task cognitive demands			0.06 (0.07)	0.04 (0.07)
Individual task psychological need satisfaction			0.09 (0.09)	0.10 (0.09)
Individual task performance pressure			-0.03 (0.08)	0.00 (0.08)
Meeting performance pressure × Individual task performance pressure				-0.29* (0.11)
Pseudo R-square		.06	.10	.11
Model Deviance	1773.90	1637.74	769.28	765.14
DV: End-of-workday vigor	Null Model	Model 1	Model 2	Model 3
Intercept	3.23** (0.05)	3.23** (0.07)	3.22** (0.08)	3.22** (0.08)
Control variables				
Company #1		-0.14 (0.15)	-0.03 (0.18)	-0.03 (0.18)
Company #2		0.03 (0.10)	0.13 (0.12)	0.13 (0.12)
Afternoon baseline energy state		-0.03 (0.03)	0.03 (0.05)	0.03 (0.05)
Meeting time proportion		0.15 (0.16)	0.38 (0.32)	0.38 (0.32)
Micro breaks		0.12* (0.05)	0.15 (0.11)	0.15 (0.11)
Afternoon experiences				
Meeting cognitive demands			0.11 (0.07)	0.11 (0.07)
Meeting psychological need satisfaction			0.25* (0.11)	0.25* (0.11)
Meeting performance pressure			-0.07 (0.09)	-0.08 (0.09)
Individual task cognitive demands			-0.10 (0.09)	-0.10 (0.09)
Individual task psychological need satisfaction			0.37** (0.11)	0.37** (0.11)
Individual task performance pressure			0.09 (0.09)	0.09 (0.10)
Meeting performance pressure × Individual task performance pressure				0.03 (0.18)
Pseudo R-square	--	.005	.12	.12
Model Deviance	1667.56	1585.78	662.02	663.56

Note. n = 836 days (nested in 194 individuals). Unstandardized coefficients are reported, with standard errors displayed in parentheses. Level-1 predictor variables were all person-mean centered. Pseudo R-square values were calculated using the formula from Snijders and Bosker (1994). Model deviance, as an indicator of model fit, is based on -2 * log likelihood; a smaller deviance value indicates a better overall fit of the model (Burnham & Anderson, 2002). † $p <$ .10. * $p <$ .05. ** $p <$ .01.

TABLE 5
Study 3: Means, Standard Deviations, and Correlations

Variable	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Meeting competence	4.25	0.65	(.92)														
2. Meeting relatedness	3.57	0.71	.50**	(.85)													
3. Meeting autonomy	3.84	0.80	.53**	.60**	(.86)												
4. Meeting cognitive demands	3.67	0.83	.24**	.23**	.21**	(.88)											
5. Meeting performance pressure	3.91	0.74	.20**	.16*	.09	.42**	(.80)										
6. Individual task competence	4.44	0.52	.60**	.29**	.34**	.25**	.18**	(.92)									
7. Individual task relatedness	3.23	0.85	.07	.45**	.20**	.14	.08	.16*	(.89)								
8. Individual task autonomy	3.79	0.75	.48**	.49**	.60**	.18**	.16*	.39**	.26**	(.79)							
9. Individual task cognitive demands	4.09	0.69	.24**	.15*	.19**	.62**	.33**	.26**	.12	.12	(.88)						
10. Individual task performance pressure	4.18	0.61	.20**	.16*	.11	.22**	.55**	.29**	.16*	.17*	.43**	(.75)					
11. Subjective vitality at work	3.36	0.71	.36**	.47**	.40**	.27**	.14*	.28**	.38**	.43**	.18*	.13	(.90)				
12. Task performance (supervisor-rated)	4.53	0.52	.04	.16	.14	.18*	-.01	.05	.17*	.14	.10	-.01	.18*	(.87)			
13. Voice behavior (supervisor-rated)	3.93	0.78	.18*	.15	.18*	.24**	.17*	.16	.19*	.16	.13	.18*	.30**	.35**	(.94)		
14. Helping behavior (supervisor-rated)	4.04	0.75	.03	.11	.07	.12	.07	.00	.17*	.13	-.01	.10	.15	.50**	.57**	(.92)	
15. Creative behavior (supervisor-rated)	4.07	0.62	.16	.12	.19*	.26**	.14	.14	.16	.20*	.10	.11	.21*	.32**	.75**	.55**	(.95)

Note. N = 207. Reliability values (Cronbach's alphas) are reported in parentheses on the diagonal.
* $p < .05$; ** $p < .01$.

TABLE 6
Study 3: Meeting and Individual Task Experiences in Relation to Energy at Work

	Model 1	Model 2	Model 3
Intercept	0.52	0.45	-2.59*
	(0.38)	(0.43)	(1.30)
Individual task competence	0.05	0.03	0.02
	(0.10)	(0.10)	(0.10)
Individual task relatedness	0.19**	0.19**	0.19**
	(0.06)	(0.06)	(0.06)
Individual task autonomy	0.16*	0.17*	0.15*
	(0.07)	(0.07)	(0.07)
Individual task cognitive demands		-0.02	-0.01
		(0.08)	(0.08)
Individual task performance pressure		-0.01	0.76*
		(0.09)	(0.32)
Meeting competence	0.12	0.11	0.14
	(0.09)	(0.09)	(0.09)
Meeting relatedness	0.17*	0.16†	0.16†
	(0.09)	(0.09)	(0.08)
Meeting autonomy	0.07	0.06	0.06
	(0.07)	(0.07)	(0.07)
Meeting cognitive demands		0.12†	0.11
		(0.07)	(0.07)
Meeting performance pressure		-0.01	0.79*
		(0.07)	(0.33)
Meeting performance pressure × Individual task performance pressure			-0.20*
			(0.08)
R^2	.33	.34	.36
F	16.20**	10.19**	10.07**
ΔR^2	-	.01	.02
F	-	1.13	6.12*

Note. N = 207 individuals. Dependent variable is subjective vitality at work. Unstandardized coefficients are reported, with standard errors displayed in parentheses.

† $p <$ .10. * $p <$ .05. ** $p <$ .01.

TABLE 7
Study 3: Estimated Covariance Matrix for the Latent Variables (Employee-rated Variables)

Employee rated variables	Meeting autonomy	Meeting relatedness	Meeting competence	Meeting performance pressure	Meeting cognitive demands	Individual task autonomy	Individual task relatedness	Individual task competence	Individual task performance pressure	Individual task cognitive demands
Meeting autonomy	0.62									
Meeting relatedness	0.29	0.30								
Meeting competence	0.28	0.19	0.37							
Meeting performance pressure	0.05	0.06	0.07	0.23						
Meeting cognitive demands	0.14	0.13	0.13	0.17	0.60					
Individual task autonomy	0.38	0.24	0.24	0.08	0.12	0.51				
Individual task relatedness	0.12	0.24	0.03	0.04	0.12	0.17	0.68			
Individual task competence	0.13	0.09	0.18	0.05	0.10	0.14	0.06	0.21		
Individual task performance pressure	0.06	0.05	0.05	0.12	0.09	0.07	0.06	0.07	0.15	
Individual task cognitive demands	0.11	0.08	0.12	0.12	0.39	0.07	0.09	0.10	0.14	0.53

TABLE 8
Study 3: Estimated Covariance Matrix for the Latent Variables (Supervisor-rated Variables)

	Task performance	Voice behavior	Helping behavior	Creative behavior
Task performance	0.62			
Voice behavior	0.13	0.09	0.18	0.05
Helping behavior	0.06	0.05	0.05	0.12
Creative behavior	0.11	0.08	0.12	0.12

TABLE 9
Study 1 Additional Analyses on Event Characteristics: Means, Standard Deviations, and Correlations

Variable	Mean	s.d.	ICC1	1	2	3	4	5	6	7	8	9	10
1. Meeting event novelty (morning)	1.94	1.03	0.33	(.82)	.57**	.12**	-.09**	.13**	.45**	.31**	.10**	.00	.03
2. Meeting event disruption (morning)	1.90	0.97	0.31	.52**	(.80)	.04	-.19**	.17**	.24**	.52**	-.05	-.07*	.10**
3. Meeting event criticality (morning)	3.31	1.23	0.32	.12**	.13**	(.94)	.20**	.38**	.17**	.04	.45**	.18**	.19**
4. Meeting psychological need satisfaction (morning)	3.83	0.73	0.43	-.07	-.12**	.20**	(.70)	.16**	.03	.05	.33**	.55**	.13**
5. Meeting performance pressure (morning)	3.41	0.99	0.32	.21**	.25**	.39**	.13**	(.88)	.08*	.17**	.13**	.14**	.53**
6. Meeting event novelty (afternoon)	1.98	1.07	0.33	.36**	.19**	.04	-.01	.12*	(.88)	.44**	.24**	.03	.32**
7. Meeting event disruption (afternoon)	1.88	1.00	0.20	.22**	.29**	.03	.07	.16**	.53**	(.79)	.13**	.04	.34**
8. Meeting event criticality (afternoon)	3.19	1.28	0.28	.04	-.05	.26**	.25**	.08	.20**	.20**	(.95)	.45**	.29**
9. Meeting psychological need satisfaction (afternoon)	3.80	0.75	0.40	.06	-.07	.11*	.44**	.06	-.02	-.08	.26**	(.72)	.20**
10. Meeting performance pressure (afternoon)	3.35	1.04	0.33	.04	.06	.14*	.16**	.33**	.23**	.28**	.39**	.19**	(.89)

Note. Correlations below the diagonal are day-level correlations (n = 1163). Correlations above the diagonal are person-level correlations (N = 245). Mean Cronbach's alphas across days are shown in parentheses along the diagonal. ICC = Intraclass correlation.
* $p < .05$; ** $p < .01$.

TABLE 10
Study 1 Additional Analyses: Event Characteristics as Antecedents of Meeting Experiences

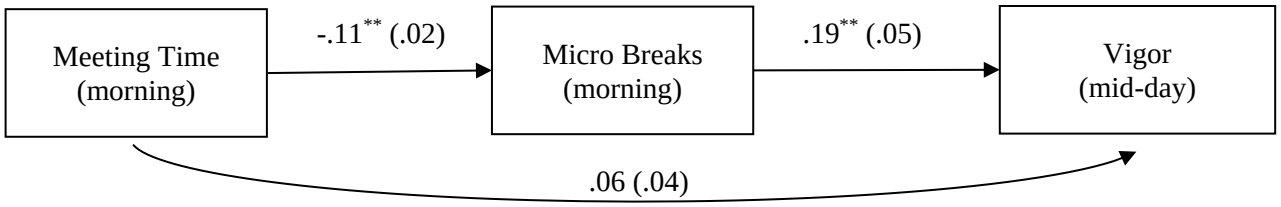
Morning	DV: Psychological Need Satisfaction	DV: Performance Pressure
Intercept	3.81** (0.04)	3.41** (0.05)
Meeting event characteristics (morning)		
Event novelty	-0.05 (0.03)	0.09* (0.04)
Event disruption	-0.08* (0.03)	0.15** (0.05)
Event criticality	0.10** (0.02)	0.30** (0.03)
Pseudo R-square *(level-1)*	.04	.20
Model Deviance	1453.84	1858.3
Afternoon	DV: Psychological Need Satisfaction	DV: Performance Pressure
Intercept	3.76** (0.04)	3.32** (0.06)
Meeting event characteristics (afternoon)		
Event novelty	-0.02 (0.04)	-0.05 (0.05)
Event disruption	-0.17** (0.04)	0.10† (0.05)
Event criticality	0.03 (0.03)	0.33** (0.04)
Pseudo R-square *(level-1)*	.06	.19
Model Deviance	1118.9	1429.88

Note. n = 1163 days (nested in 245 individuals). Unstandardized coefficients are reported, with standard errors displayed in parentheses. Level 1 predictor variables were all person-mean centered. Pseudo R-square values were calculated using the formula from Kreft and De Leeuw (1998). Model deviance, as an indicator of model fit, is based on -2 * log likelihood; a smaller deviance value indicates a better overall fit of the model (Burnham & Anderson, 2002).

† $p <$ .10. * $p <$ .05. ** $p <$ .01.

FIGURE 2
Study 1: Meeting Time Demands, Micro Breaks, and Workday Energy

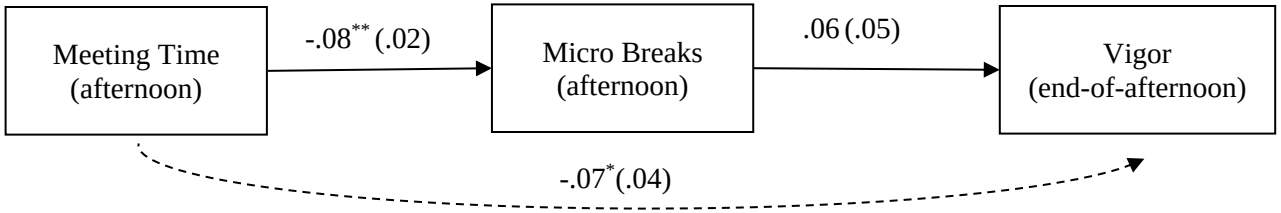
Morning



Morning baseline energy state was included as a control in predicting mid-day vigor.

Indirect effects on vigor: *ab* = -.021, s.e. = .007, $p < .01$, 95% C.I. = [-.034, -.007]

Afternoon



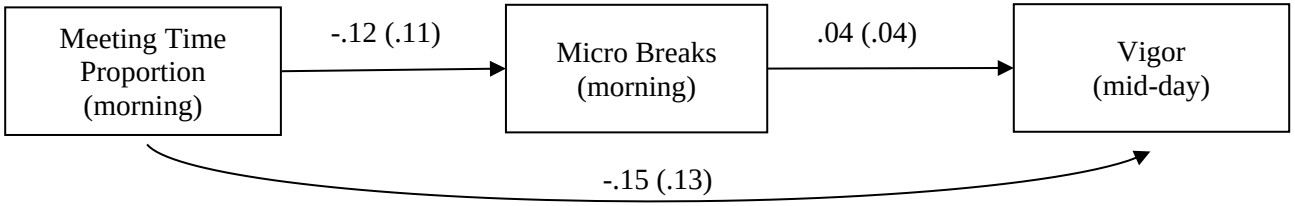
Afternoon baseline energy state is included as a control in predicting end-of-afternoon vigor.

Indirect effects on vigor: *ab* = -.005, s.e. = .004, *n.s.*, 95% C.I. = [-.013, .003]

Note: n = 1163 days (nested in 245 individuals). Unstandardized coefficients are reported, with standard error shown in parentheses.
† $p < .10$; * $p < .05$; ** $p < .01$.

FIGURE 3
Study 2: Meeting Time Demands, Micro Breaks, and Workday Energy

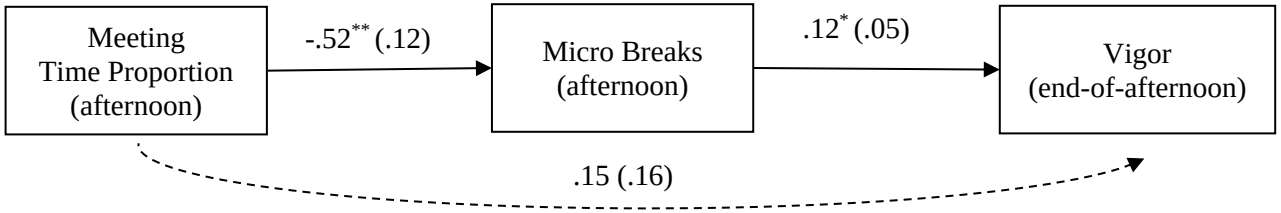
Morning



Morning baseline energy state is controlled for in predicting vigor. Company dummy variables are included in both paths.

Indirect effects on vigor: *ab* = -.005, s.e. = .007, *n.s.*, 95% C.I. = [-.018, .009]

Afternoon

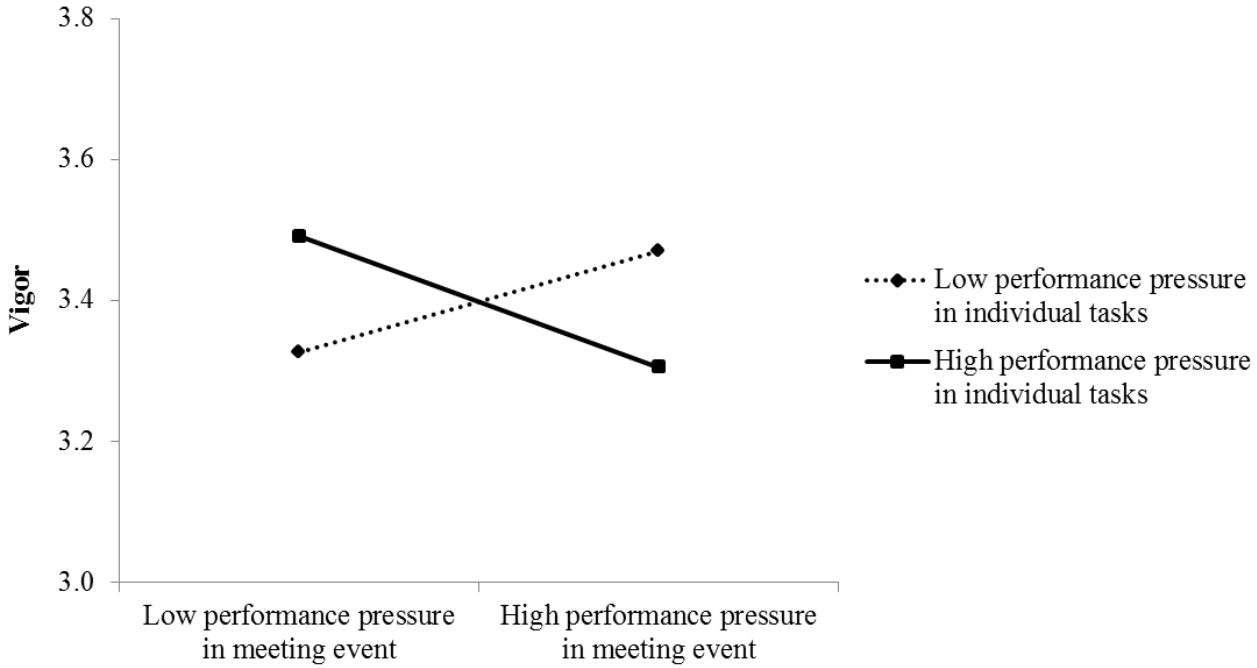


Afternoon baseline energy state is controlled for in predicting vigor. Company dummy variables are included in both paths.

Indirect effects on vigor: *ab* = -.060, s.e. = .029, $p < .05$, 95% C.I. = [-.117, -.003]

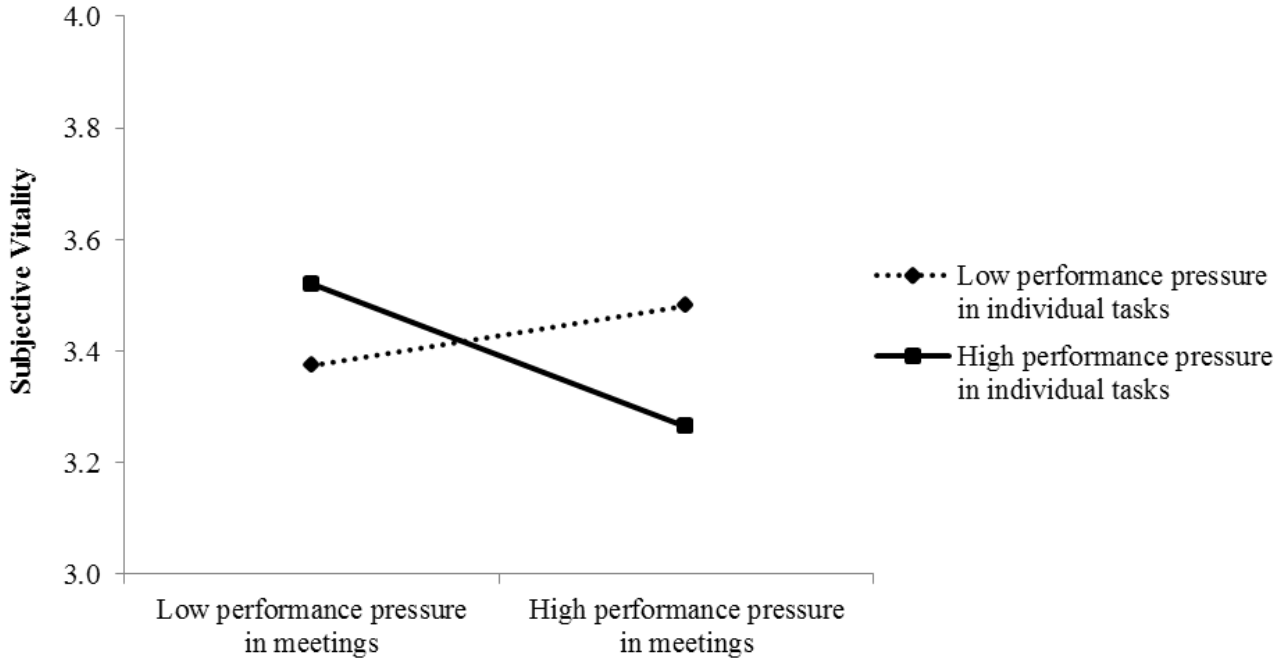
Note: n = 836 days (nested in 194 individuals). Unstandardized coefficients are reported, with standard error shown in parentheses.
$^{\dagger}\, p < .10$; $^{*}\, p < .05$; $^{**}\, p < .01$.

FIGURE 4
Study 2: Interaction between Meeting Event and Individual Task Performance Pressure



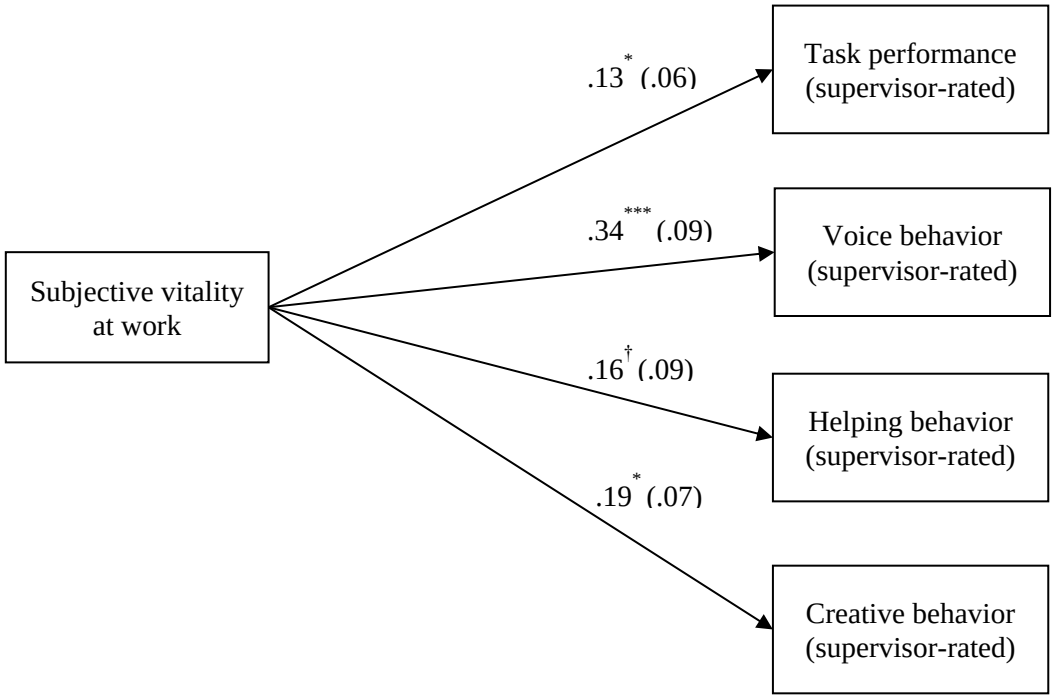
Simple slopes:
At low performance pressure in individual tasks: b = .13, SE = .10, *n.s.*
At high performance pressure in individual tasks: b = -.16, SE = .08, $p < .05$

FIGURE 5
Study 3: Interaction between Meeting and Individual Task Performance Pressure



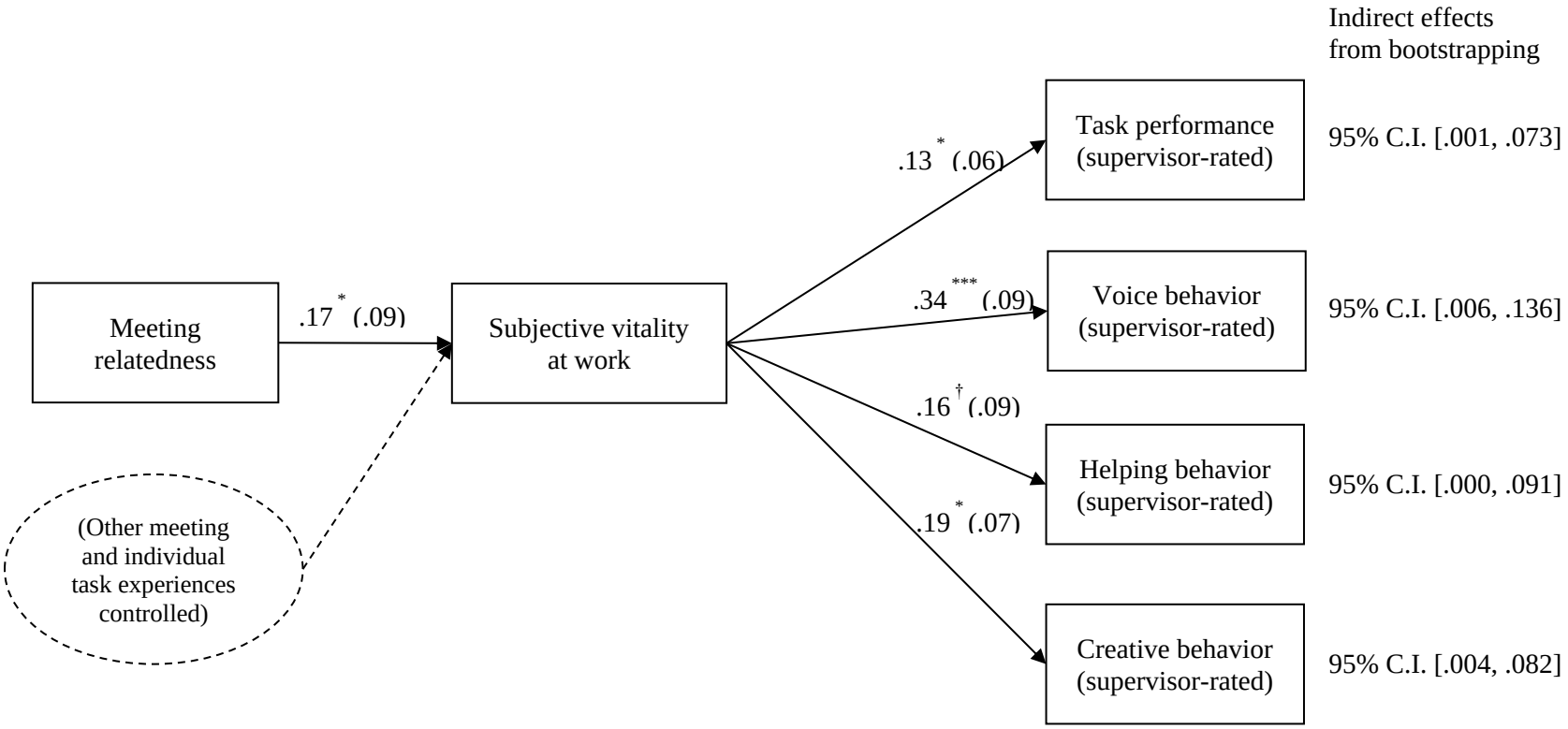
Simple slopes:
At low performance pressure in individual tasks: $b = .07$, $SE = .08$, *n.s.*
At high performance pressure in individual tasks: $b = -.17$, $SE = .10$, $p < .08$

FIGURE 6
Study 3: Energy at Work in Relation to Work Outcomes



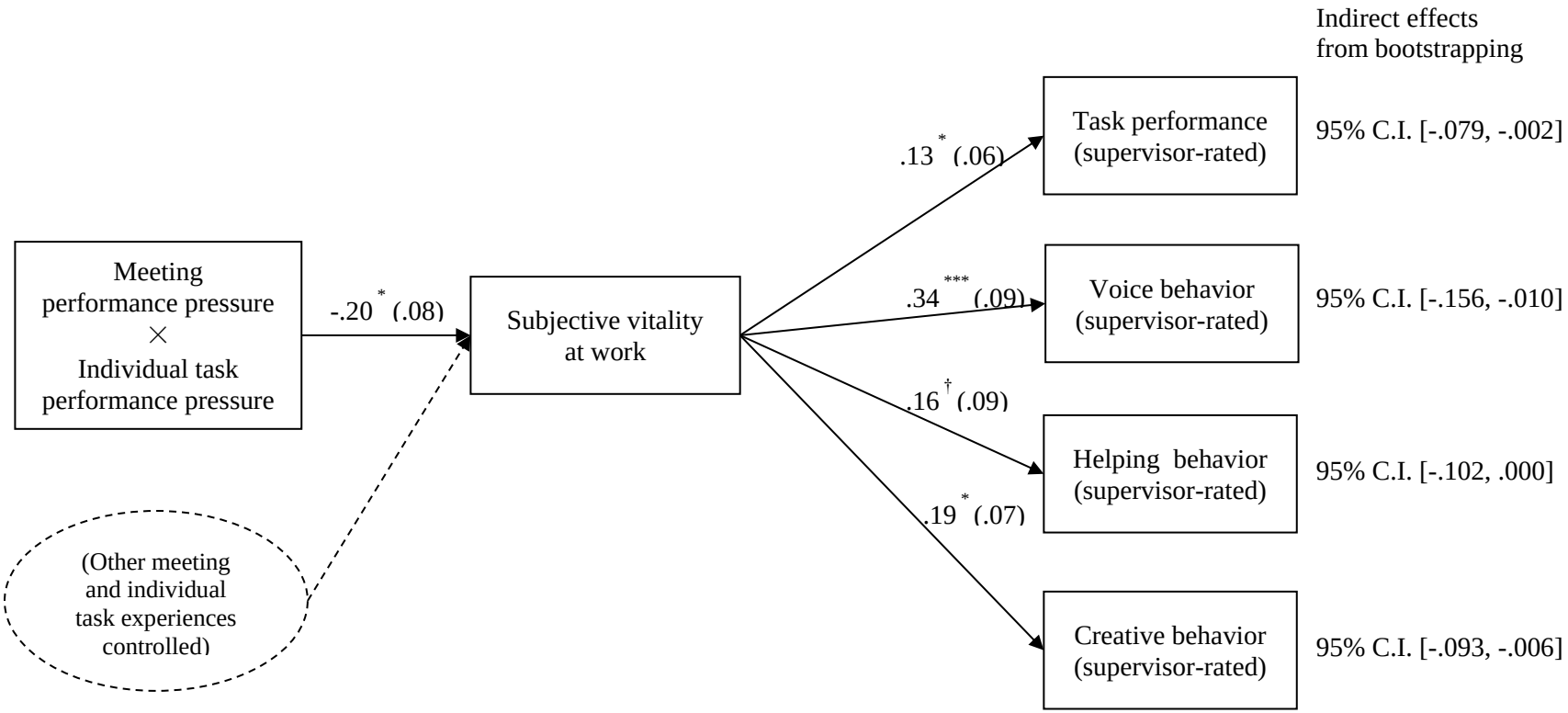
Note: N = 207 individuals. † $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

FIGURE 7
Study 3: Meeting Experience (Relatedness), Energy at Work, and Work outcomes



Note: N = 207 individuals. † $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

FIGURE 8
Study 3: Meeting Experience (Performance Pressure), Energy at Work, and Work outcomes



Note: N = 207 individuals. † $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

APPENDICES

Appendix A

Study 1 Survey Measures

Meeting Event Experience: Psychological Need Satisfaction

(1=Strongly disagree, 5=Strongly agree)

During this meeting…

1. I felt very capable and effective.
2. I felt a lot of closeness with others.
3. I felt free to act in ways I wanted to.

Meeting Event Experience: Performance Pressure

(1=Strongly disagree, 5=Strongly agree)

During this meeting…

1. I felt it to be critical to perform at my best
2. I felt pressured to do a good job
3. I was under pressure to deliver superb performance

Meeting Event Experience: Cognitive Demands

(1=Strongly disagree, 5=Strongly agree)

This meeting…

1. Involved complex or difficult issues
2. Required me to engage in a large amount of thinking
3. Required me to process a great deal of information

Baseline State of Energy
(1 = Strongly disagree, 5 = Strongly agree)

Morning
I felt tired when I first arrived at work this morning.

Afternoon
I felt tired when I started my afternoon work after lunch.

Micro Breaks

Before/since lunch time today, to what extent did you engage in each of the following activities to replenish yourself at work? (1=Not at all, 5=A great deal)

1. Piped text – most often used break activity 1 (selected in background survey)
2. Piped text – most often used break activity 2 (selected in background survey)
3. Piped text – most often used break activity 3 (selected in background survey)

Vigor

To what extent are you experiencing the following feelings at this moment? (1=Not at all, 5=Very much)

1. Lively
2. Vigorous
3. Active

Appendix B

Study 3 Survey Measures

Meeting Experience: Psychological Need Satisfaction

Think about what your experiences are like in typical meetings at work. To what extent do you agree or disagree with the following statements? (1=Strongly disagree, 5=Strongly agree)

In typical meetings I have at work,…

Competence

1. I feel capable at what I do
2. I feel competent to achieve my goals
3. I feel I can successfully handle difficult issues in the meetings

Relatedness

1. I feel connected with other people
2. I feel close to other people
3. I experience warm feelings with those in the meetings

Autonomy

1. I feel a sense of choice and freedom in what I say and do in the meetings
2. I feel my input in the meetings expresses who I really am
3. I feel I can act the way I want in the meetings

Meeting Experience: Performance Pressure

(1=Strongly disagree, 5=Strongly agree)

In typical meetings I have at work,

1. I feel it to be critical to perform at my best
2. I feel pressured to do a good job
3. I feel I have to deliver superb performance

Meeting Experience: Cognitive Demands

(1=Strongly disagree, 5=Strongly agree)

A typical meeting I have at work…

1. Involves complex or difficult issues
2. Requires me to engage in a large amount of thinking
3. Requires me to process a great deal of information

Individual Task Experience: Psychological Need Satisfaction
(1=Strongly disagree, 5=Strongly agree)

When working on my individual tasks…

Competence
1. I feel capable at what I do
2. I feel competent to achieve my goals
3. I feel I can successfully complete difficult tasks

Relatedness
1. I feel connected with other people
2. I feel close to other people
3. I experience warm feelings with people I work with

Autonomy
1. I feel a sense of choice and freedom
2. I feel my choices express who I really am
3. I feel that I can do things the way I want

Individual Task Experience: Performance Pressure
(1=Strongly disagree, 5=Strongly agree)

When working on my individual tasks in the job……

1. I feel it to be critical to perform at my best
2. I feel pressured to do a good job
3. I feel I have to deliver superb performance

Individual Task Experience: Cognitive Demands
(1=Strongly disagree, 5=Strongly agree)

The tasks that I work on individually in my job…

1. Involve complex or difficult issues
2. Require me to engage in a large amount of thinking
3. Require me to process a great deal of information

Subjective Vitality at Work

Think about your feelings at work. To what extent to you agree or disagree with each of the following statements? (1=Strongly disagree, 5=Strongly agree)

1. I don't feel very energetic at work (REVERSE CODED)
2. I feel alive and vital at work
3. I have energy and spirit at work
4. Sometimes I feel so alive at work I just want to burst
5. I look forward to each new day at work
6. I nearly always feel alert and awake at work
7. I feel energized at work

Supervisor-rated Work Outcomes: Task Performance

Think about this subordinate's performance in his/her work. To what extent do you agree or disagree with the following statements? (1= strongly disagree; 5 = strongly agree)

This person…

1. Adequately completes assigned duties.
2. Fulfills responsibilities specified in job description.
3. Performs tasks that are expected of him/her.
4. Meets formal performance requirements of the job.
5. Engages in activities that will directly benefit his/her performance evaluation.
6. Neglects aspects of the job he/she is obligated to perform. (REVERSE CODED)
7. Fails to perform essential duties. (REVERSE CODED)

Supervisor-rated Work Outcomes: Voice Behavior

How often does this person engage in the following behaviors at work? (1=Never, 5=Very often)

1. Develop and make recommendations concerning issues that affect the work group
2. Speak up in the workgroup with ideas for new projects or changes in procedures

3. Communicate his/her opinions about work issues to others in the workgroup even if his/her opinion is different and others in the group disagree with him/her
4. Speak up and encourages others in the workgroup to get involved in issues that affect the group
5. Keep well informed about issues where his/her opinion might be useful to the work group
6. Get involved in issues that affect the quality of work life here in the workgroup

Supervisor-rated Work Outcomes: Helping Behavior

How often does this person engage in the following behaviors at work? (1=Never, 5=Very often)

1. Volunteer to do things for the work group
2. Help orient new employees in the group
3. Help others in the group learn about the work
4. Help others in the group with their work responsibilities
5. Assist others in the group with their work for the benefit of the group
6. Get involved to benefit the work group

Supervisor-rated Work Outcomes: Creative Behavior

Think about this subordinate's behaviors at work. To what extent do you agree or disagree with each of the following statements? (1= strongly disagree; 5 = strongly agree)

This person…

1. Is a good source of creative ideas
2. Promotes and champions ideas to others
3. Exhibits creativity on the job when given the opportunity to
4. Suggests new ways to achieve goals or objectives
5. Comes up with new and practical ideas to improve performance
6. Often has new and innovative ideas
7. Comes up with creative solutions to problems
8. Often has a fresh approach to problems

REFERENCES

Aiken, L.S., & West, S.G. (1991). *Multiple regression: Testing and interpreting interactions*. London: Sage.

Allen, J.A., & Rogelberg, S.G. (2013). Manager-led group meetings: A context for promoting employee engagement. *Group & Organization Management, 38*(5), 543 -569.

Allport, F.H. (1967). A theory of enestruence (event-structure theory): Report of progress. *American Psychologist, 22*(1), 1-24.

Alvesson, M. (2004). *Knowledge work and knowledge-intensive firms*. New York: Oxford University Press.

Ancona, D.G., Goodman, P.S., Lawrence, B.S., & Tushman, M.L. (2001). Time: A new research lens. *The Academy of Management Review, 26*(4), 645-663.

Ancona, D.G., Okhuysen, G.A., & Perlow, L.A. (2001). Taking time to integrate temporal research. *The Academy of Management Review, 26*(4), 512-529.

Ashforth, B.E., Kreiner, G.E., & Fugate, M. (2000). All in a day's work: Boundaries and micro role transitions. *Academy of Management review, 25*(3), 472-491.

Baddeley, A.D., & Hitch, G. (1974). Working memory. In H. B. Gordon (Ed.), *Psychology of learning and motivation* (pp. 47-89): Academic Press.

Bakker, A.B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology, 22*(3), 309-328.

Bakker, A.B., Demerouti, E., Oerlemans, W., & Sonnentag, S. (2013). Workaholism and daily recovery: A day reconstruction study of leisure activities. *Journal of Organizational Behavior, 34*(1), 87-107.

Bakker, A.B., Demerouti, E., & Sanz-Vergel, A.I. (2014). Burnout and work engagement: The jd–r approach. *Annual Review of Organizational Psychology and Organizational Behavior, 1*(1), 389-411.

Ballinger, G.A., & Rockmann, K.W. (2010). Chutes versus ladders: Anchoring events and a punctuated-equilibrium perspective on social exchange relationships. *The Academy of Management Review*, 373-391.

Baltes, B.B., Briggs, T.E., Huff, J.W., Wright, J.A., & Neuman, G.A. (1999). Flexible and compressed workweek schedules: A meta-analysis of their effects on work-related criteria. *Journal of Applied Psychology, 84*(4), 496-513.

Baran, B.E., Shanock, L.R., Rogelberg, S.G., & Scott, C.W. (2012). Leading group meetings: Supervisors actions, employee behaviors, and upward perceptions. *Small Group Research, 43*(3), 330 -355.

Barley, S.R., Meyerson, D.E., & Grodal, S. (2010). E-mail as a source and symbol of stress. *Organization Science, 22*(4), 887-906.

Baumeister, R.F. (1984). Choking under pressure: Self-consciousness and paradoxical effects of incentives on skillful performance. *Journal of Personality and Social Psychology, 46*(3), 610-620.

Baumeister, R.F., Bratslavsky, E., Muraven, M., & Tice, D.M. (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology, 74*(5), 1252-1265.

Baumeister, R.F., & Leary, M.R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*(3), 497-529.

Beal, D.J., Weiss, H.M., Barros, E., & MacDermid, S.M. (2005). An episodic process model of affective influences on performance. *Journal of Applied Psychology, 90*(6), 1054-1068.

Bechky, B.A., & Okhuysen, G.A. (2011). Expecting the unexpected? How swat officers and film crews handle surprises. *Academy of Management Journal, 54*(2), 239-261.

Belkin, L. (2007). Time wasted? Perhaps it's well spent. *New York Times.* from https://www.nytimes.com/2007/05/31/fashion/31work.html

Bennett, A.A., Gabriel, A.S., Calderwood, C., Dahling, J.J., & Trougakos, J.P. (2016). Better together? Examining profiles of employee recovery experiences. *Journal of Applied Psychology, 101*(12), 1635-1654.

Binnewies, C., Sonnentag, S., & Mojza, E.J. (2009). Feeling recovered and thinking about the good sides of one's work. *Journal of Occupational Health Psychology, 14*(3), 243-256.

Binnewies, C., Sonnentag, S., & Mojza, E.J. (2010). Recovery during the weekend and fluctuations in weekly job performance: A week-level study examining intra-individual relationships. *Journal of Occupational and Organizational Psychology, 83*(2), 419-441.

Bliese, P. (2013). *Multilevel: Multilevel functions*: R package version 2.5. http://CRAN.R-project.org/package=multilevel.

Bluedorn, A.C. (2002). *The human organization of time: Temporal realities and experience*. Standford, California: Standford University Press.

Bluedorn, A.C., Turban, D.B., & Love, M.S. (1999). The effects of stand-up and sit-down meeting formats on meeting outcomes. *Journal of Applied Psychology, 84*(2), 277-285.

Bollen, K.A. (1989). A new incremental fit index for general structural equation models. *Sociological Methods & Research, 17*(3), 303-316.

Bono, J.E., Glomb, T.M., Shen, W., Kim, E., & Koch, A.J. (2013). Building positive resources: Effects of positive events and positive reflection on work stress and health. *Academy of Management Journal, 56*(6), 1601 -1627.

Brislin, R.W. (1986). Research instruments. *Field methods in cross-cultural research, 8*, 137-164.

Brown, G.C. (1999). *The energy of life: The science of what makes our minds and bodies work*: Free Press New York.

Brown, S.P., Westbrook, R.A., & Challagalla, G. (2005). Good cope, bad cope: Adaptive and maladaptive coping strategies following a critical negative work event. *Journal of Applied Psychology, 90*(4), 792-798.

Buhrmester, M., Kwang, T., & Gosling, S.D. (2011). Amazon's mechanical turk: A new source of inexpensive, yet high-quality, data? *Perspectives on Psychological Science, 6*(1), 3 -5.

Bupa. (2011). Reclaim the lunch break report. from http://www.bupa.co.uk/reclaim-lunch

Burnham, K.P., & Anderson, D.R. (2002). *Model selection and multimodel inference: A practical information-theoretic approach*. New York: Springer.

Butts, M.M., Becker, W.J., & Boswell, W.R. (2015). Hot buttons and time sinks: The effects of electronic communication during nonwork time on emotions and work-nonwork conflict. *Academy of Management Journal, 58*(3), 763 -788.

Byrne, B.M. (2012). *Structural equation modeling with mplus: Basic concepts, applications, and programming*. New York: Routledge.

Carmeli, A., Ben-Hador, B., Waldman, D.A., & Rupp, D.E. (2009). How leaders cultivate social capital and nurture employee vigor: Implications for job performance. *Journal of Applied Psychology, 94*(6), 1553-1561.
Chen, B., Vansteenkiste, M., Beyers, W., Boone, L., Deci, E.L., Van der Kaap-Deeder, J., . . . Mouratidis, A. (2015). Basic psychological need satisfaction, need frustration, and need strength across four cultures. *Motivation and Emotion, 39*(2), 216-236.
Chinander, K.R., & Schweitzer, M.E. (2003). The input bias: The misuse of input information in judgments of outcomes. *Organizational Behavior and Human Decision Processes, 91*(2), 243-253.
Christian, M.S., Eisenkraft, N., & Kapadia, C. (2015). Dynamic associations among somatic complaints, human energy, and discretionary behaviors: Experiences with pain fluctuations at work. *Administrative Science Quarterly, 60*(1), 66 -102.
Christian, M.S., Garza, A.S., & Slaughter, J.E. (2011). Work engagement: A quantitative review and test of its relations with task and contextual performance. *Personnel Psychology, 64*(1), 89-136.
Collins, R. (1981). On the microfoundations of macrosociology. *American Journal of Sociology, 86*(5), 984-1014.
Collins, R. (1993). Emotional energy as the common denominator of rational action. *Rationality and Society, 5*(2), 203-230.
Collins, R. (2004). *Interaction ritual chains*. Princeton, NJ: Princeton University Press.
Cortina, L.M., Magley, V.J., Williams, J.H., & Langhout, R.D. (2001). Incivility in the workplace: Incidence and impact. *Journal of Occupational Health Psychology, 6*(1), 64-80.
Czeisler, C.A., Moore-Ede, M.C., & Coleman, R.H. (1982). Rotating shift work schedules that disrupt sleep are improved by applying circadian principles. *Science, 217*(4558), 460-463.
Dababneh, A.J., Swanson, N., & Shell, R.L. (2001). Impact of added rest breaks on the productivity and well being of workers. *Ergonomics, 44*(2), 164-174.
Dalton, D.R., & Mesch, D.J. (1990). The impact of flexible scheduling on employee attendance and turnover. *Administrative Science Quarterly, 35*(2), 370-387.
Davenport, T.H. (2013). *Thinking for a living: How to get better performances and results from knowledge workers*: Harvard Business Press.
Davidson, O.B., Eden, D., Westman, M., Cohen-Charash, Y., Hammer, L.B., Kluger, A.N., . . . Spector, P.E. (2010). Sabbatical leave: Who gains and how much? *Journal of Applied Psychology, 95*(5), 953-964.
deCharms, R. (1968). *Personal causation.* New York: Academic Press.
Deci, E.L. (1975). *Intrinsic motivation.* New York: Plenum.
Demerouti, E., Bakker, A.B., Geurts, S.A.E., & Taris, T.W. (2009). Daily recovery from work-related effort during non-work time. In S. Sonnentag, D. Ganster & P. Perrewe (Eds.), *Current perspectives on recovery from job stress*. Bradford, West Yorkshire, GBR: Emerald Group Publishing Ltd.
Demerouti, E., Bakker, A.B., Nachreiner, F., & Schaufeli, W.B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology, 86*(3), 499-512.
Demerouti, E., Bakker, A.B., Sonnentag, S., & Fullagar, C.J. (2012). Work-related flow and energy at work and at home: A study on the role of daily recovery. *Journal of Organizational Behavior, 33*(2), 276-295.

DeWall, C.N., Baumeister, R.F., Gailliot, M.T., & Maner, J.K. (2008). Depletion makes the heart grow less helpful: Helping as a function of self-regulatory energy and genetic relatedness. *Personality and Social Psychology Bulletin, 34*(12), 1653 -1662.

Diamantopoulos, A., & Siguaw, J.A. (2006). Formative versus reflective indicators in organizational measure development: A comparison and empirical illustration. *British Journal of Management, 17*(4), 263-282.

Dumas, T.L., & Sanchez-Burks, J. (2015). The professional, the personal, and the ideal worker: Pressures and objectives shaping the boundary between life domains. *The Academy of Management Annals, 9*(1), 803-843.

Dutton, J.E. (2003). *Energize your workplace: How to create and sustain high-quality connections at work* (Vol. 50). San Francisco, CA: Jossey-Bass.

Dutton, J.E., & Heaphy, E.D. (2003). The power of high-quality connections. *Positive organizational scholarship: Foundations of a new discipline, 3*, 263-278.

Eisenberger, R., & Aselage, J. (2009). Incremental effects of reward on experienced performance pressure: Positive outcomes for intrinsic interest and creativity. *Journal of Organizational Behavior, 30*(1), 95-117.

Elsbach, K.D., & Hargadon, A.B. (2006). Enhancing creativity through "mindless" work: A framework of workday design. *Organization Science, 17*(4), 470-483.

Feldman, M.S. (2004). Resources in emerging structures and processes of change. *Organization Science, 15*(3), 295-309.

Feldman, M.S., & Worline, M. (2012). Resources, resourcing, and ampliative cycles in organizations. In K. S. Cameron & G. M. Spreitzer (Eds.), *Oxford handbook of positive organizational scholarship* (pp. 629-641). New York: Oxford University Press.

Fisher, C.D., & To, M.L. (2012). Using experience sampling methodology in organizational behavior. *Journal of Organizational Behavior, 33*(7), 865-877.

Flaxman, P.E., Ménard, J., Bond, F.W., & Kinman, G. (2012). Academics' experiences of a respite from work: Effects of self-critical perfectionism and perseverative cognition on postrespite well-being. *Journal of Applied Psychology, 97*(4), 854-865.

Fritz, C., Lam, C.F., & Spreitzer, G.M. (2011). It's the little things that matter: An examination of knowledge workers' energy management. *The Academy of Management Perspectives, 25*(3), 28 -39.

Fritz, C., & Sonnentag, S. (2005). Recovery, health, and job performance: Effects of weekend experiences. *Journal of Occupational Health Psychology, 10*(3), 187-199.

Fritz, C., & Sonnentag, S. (2006). Recovery, well-being, and performance-related outcomes: The role of workload and vacation experiences. *Journal of Applied Psychology, 91*(4), 936-945.

Fritz, C., Sonnentag, S., Spector, P.E., & McInroe, J.A. (2010). The weekend matters: Relationships between stress recovery and affective experiences. *Journal of Organizational Behavior, 31*(8), 1137-1162.

Galinsky, T.L., Swanson, N.G., Sauter, S.L., Hurrell, J.J., & Schleifer, L.M. (2000). A field study of supplementary rest breaks for data-entry operators. *Ergonomics, 43*(5), 622-638.

Gardner, H.K. (2012). Performance pressure as a double-edged sword: Enhancing team motivation but undermining the use of team knowledge. *Administrative Science Quarterly, 57*(1), 1 -46.

George, J.M., & Zhou, J. (2001). When openness to experience and conscientiousness are related to creative behavior: An interactional approach. *Journal of Applied Psychology, 86*(3), 513-524.
Gersick, C.J.G., & Hackman, J.R. (1990). Habitual routines in task-performing groups. *Organizational Behavior and Human Decision Processes, 47*(1), 65-97.
Goffman, E. (1967). *Interaction ritual: Essays on face-to-face interaction.* New York: Doubleday.
Grady, D. (2013). How to save the world (or at least yourself) from bad meetings. *TED Talk.* from http://www.ted.com/talks/david_grady_how_to_save_the_world_or_at_least_yourself_from_bad_meetings
Grant, A.M., & Ashford, S.J. (2008). The dynamics of proactivity at work. *Research in Organizational Behavior, 28*, 3-34.
Grant, A.M., & Parker, S.K. (2009). Redesigning work design theories: The rise of relational and proactive perspectives. *The Academy of Management Annals, 3*(1), 317-375.
Gross, S., Semmer, N.K., Meier, L.L., Kälin, W., Jacobshagen, N., & Tschan, F. (2011). The effect of positive events at work on after-work fatigue: They matter most in face of adversity. *Journal of Applied Psychology, 96*(3), 654-664.
Hackman, J.R., & Oldham, G.R. (1975). Development of the job diagnostic survey. *Journal of Applied Psychology, 60*(2), 159-170.
Hagger, M.S., Wood, C., Stiff, C., & Chatzisarantis, N.L.D. (2010). Ego depletion and the strength model of self-control: A meta-analysis. *Psychological Bulletin, 136*(4), 495-525.
Halbesleben, J.R. (2010). A meta-analysis of work engagement: Relationships with burnout, demands, resources, and consequences. In A. B. Bakker & M. P. Leiter (Eds.), *Work engagement: A handbook of essential theory and research* (pp. 102-111): Psychology Press.
Halbesleben, J.R.B., Neveu, J.-P., Paustian-Underdahl, S.C., & Westman, M. (2014). Getting to the "cor": Understanding the role of resources in conservation of resources theory. *Journal of Management, 40*(5), 1334 -1364.
Harter, S. (1978). Effectance motivation reconsidered. Toward a developmental model. *Human Development, 21*(1), 34-64.
Henning, R.A., Jacques, P., Kissel, G.V., Sullivan, A.B., & Alteras-Webb, S.M. (1997). Frequent short rest breaks from computer work: Effects on productivity and well-being at two field sites. *Ergonomics, 40*(1), 78-91.
Hobfoll, S.E. (1988). *The egology of stress*. New York: Hemisphere.
Hobfoll, S.E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist, 44*(3), 513-524.
Hobfoll, S.E. (1998). *Stress, culture, and community: The psychology and physiology of stress*. New York: Plenum Press.
Hoffman, A.J., & Ocasio, W. (2001). Not all events are attended equally: Toward a middle-range theory of industry attention to external events. *Organization science, 12*(4), 414-434.
Hofmann, S.A., Griffin, M.A., & Gavin, M.B. (2000). The application of hierarchical linear modeling to organizational research. In K. J. Klein & S. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations: Foundations, extensions, and new directions* (pp. 467–511). San Francisco, CA: Jossey-Bass.

Hülsheger, U.R. (2016). From dawn till dusk: Shedding light on the recovery process by investigating daily change patterns in fatigue. *Journal of Applied Psychology, 101*(6), 905-914.
Hunter, E.M., & Wu, C. (2016). Give me a better break: Choosing workday break activities to maximize resource recovery. *Journal of Applied Psychology, 101*(2), 302-311.
Ilies, R., Wilson, K.S., & Wagner, D.T. (2009). The spillover of daily job satisfaction onto employees' family lives: The facilitating role of work-family integration. *Academy of Management Journal, 52*(1), 87-102.
Kim, S., Park, Y., Headrick, L. (2018). Daily micro-breaks and job performance: General work engagement as a cross-level moderator. *Journal of Applied Psychology*. Advanced Online Publication.
Kronos Inc. (2017). The employee burnout crisis: Study reveals big workplace challenge in 2017. from https://www.kronos.com/about-us/newsroom/employee-burnout-crisis-study-reveals-big-workplace-challenge-2017
Kahneman, D., Fredrickson, B.L., Schreiber, C.A., & Redelmeier, D.A. (1993). When more pain is preferred to less: Adding a better end. *Psychological science, 4*(6), 401-405.
Kaplan, R. (1993). The role of nature in the context of the workplace. *Landscape and Urban Planning, 26*(1–4), 193-201.
Kaplan, R., & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. New York: Cambridge University Press.
Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology, 15*(3), 169-182.
Kark, R., & Carmeli, A. (2009). Alive and creating: The mediating role of vitality and aliveness in the relationship between psychological safety and creative work involvement. *Journal of Organizational Behavior, 30*(6), 785-804.
Kelly, E.L., Ammons, S.K., Chermack, K., & Moen, P. (2010). Gendered challenge, gendered response. *Gender & Society, 24*(3), 281-303.
Kelly, E.L., & Moen, P. (2007). Rethinking the clockwork of work: Why schedule control may pay off at work and at home. *Advances in developing human resources, 9*(4), 487-506.
Knight, A.P., & Baer, M. (2014). Get up, stand up: The effects of a non-sedentary workspace on information elaboration and group performance. *Social Psychological and Personality Science, 5*(8), 910 -917.
Köhler, T., Cramton, C.D., & Hinds, P.J. (2012). The meeting genre across cultures: Insights from three german american collaborations. *Small Group Research, 43*(2), 159 -185.
Korkki, P. (2012). To stay on schedule, take a break. *New York Times.* Retrieved March, 7 2018 from http://www.nytimes.com/2012/06/17/jobs/take-breaks-regularly-to-stay-on-schedule-workstation.html
Kreft, I., & de Leeuw, J. (1998). *Introducing multilevel modeling*. London: Sage.
Kühnel, J., & Sonnentag, S. (2011). How long do you benefit from vacation? A closer look at the fade-out of vacation effects. *Journal of Organizational Behavior, 32*(1), 125-143.
La Guardia, J.G., Ryan, R.M., Couchman, C.E., & Deci, E.L. (2000). Within-person variation in security of attachment: A self-determination theory perspective on attachment, need fulfillment, and well-being. *Journal of Personality and Social Psychology, 79*(3), 367-384.

Lam, C.F., Wan, W.H., & Roussin, C.J. (2016). Going the extra mile and feeling energized: An enrichment perspective of organizational citizenship behaviors. *Journal of Applied Psychology, 101*(3), 379-391.

Lanaj, K., Johnson, R.E., & Barnes, C.M. (2014). Beginning the workday yet already depleted? Consequences of late-night smartphone use and sleep. *Organizational Behavior and Human Decision Processes, 124*(1), 11-23.

Landy, F.J., & Becker, W.S. (1987). Motivation theory reconsidered. *Research in organizational behavior, 9*, 1-38.

Leach, D.J., Rogelberg, S.G., Warr, P.B., & Burnfield, J.L. (2009). Perceived meeting effectiveness: The role of design characteristics. *Journal of Business and Psychology, 24*(1), 65-76.

Little, L.M., Nelson, D.L., Wallace, J.C., & Johnson, P.D. (2011). Integrating attachment style, vigor at work, and extra-role performance. *Journal of Organizational Behavior, 32*(3), 464-484.

Loehr, J., & Schwartz, T. (2003). *The power of full engagement: Managing energy, not time, is the key to high performance and personal renewal*. New York: The Free Press.

Mandel, M. (2005). The real reasons you're working so hard . . . And what you can do about it. *Business Week, October 3*, 60-66.

Mankins, M.C., Brahm, C., & Caimi, G. (2014). Your scarcest resource. *Harvard Business Review* (May 2014).

Marks, S.R. (1977). Multiple roles and role strain: Some notes on human energy, time and commitment. *American Sociological Review, 42*(6), 921-936.

Matta, F.K., Erol-Korkmaz, H.T., Johnson, R.E., & Biçaksiz, P. (2014). Significant work events and counterproductive work behavior: The role of fairness, emotions, and emotion regulation. *Journal of Organizational Behavior, 35*(7), 920-944.

McLean, L., Tingley, M., Scott, R.N., & Rickards, J. (2001). Computer terminal work and the benefit of microbreaks. *Applied Ergonomics, 32*(3), 225-237.

McNair, D.M., Lorr, M., & Droppleman, L.F. (1971). *Profile of mood states*. San Diego, CA: Educational and Industrial Testing Service.

Meijman, T.F., & Mulder, G. (1998). Psychological aspects of workload. In P. J. D. Drenth & H. Thierry (Eds.), *Handbook of work and organizational psychology* (pp. 5–33). Hove, England: Psychology Press.

Michel, A. (2011). Transcending socialization: A nine-year ethnography of the body's role in organizational control and knowledge workers' transformation. *Administrative Science Quarterly, 56*(3), 325 -368.

Moen, P., Kelly, E.L., Fan, W., Lee, S.-R., Almeida, D., Kossek, E.E., & Buxton, O.M. (2016). Does a flexibility/support organizational initiative improve high-tech employees' well-being? Evidence from the work, family, and health network. *American Sociological Review, 81*(1), 134 -164.

Morgeson, F.P., & DeRue, D.S. (2006). Event criticality, urgency, and duration: Understanding how events disrupt teams and influence team leader intervention. *The Leadership Quarterly, 17*(3), 271-287.

Morgeson, F.P., & Humphrey, S.E. (2006). The work design questionnaire (wdq): Developing and validating a comprehensive measure for assessing job design and the nature of work. *Journal of Applied Psychology, 91*(6), 1321-1339.

Morgeson, F.P., Mitchell, T.R., & Liu, D. (2015). Event system theory: An event-oriented approach to the organizational sciences. *Academy of Management Review, 40*(4), 515 - 537.
Morrison, E.W. (2014). Employee voice and silence. *Annual Review of Organizational Psychology and Organizational Behavior, 1*(1), 173-197.
Muraven, M., & Baumeister, R.F. (2000). Self-regulation and depletion of limited resources: Does self-control resemble a muscle? *Psychological Bulletin, 126*(2), 247-259.
Muthén, L.K., & Muthén, B.O. (1998-2012). *Mplus user's guide* (Seventh Edition ed.). Los Angeles, CA: Muthén & Muthén.
Niederman, F., & Volkema, R.J. (1999). The effects of facilitator characteristics on meeting preparation, set up, and implementation. *Small Group Research, 30*(3), 330 -360.
Nix, G.A., Ryan, R.M., Manly, J.B., & Deci, E.L. (1999). Revitalization through self-regulation: The effects of autonomous and controlled motivation on happiness and vitality. *Journal of Experimental Social Psychology, 35*(3), 266-284.
Ohly, S., Sonnentag, S., Niessen, C., & Zapf, D. (2010). Diary studies in organizational research: An introduction and some practical recommendations. *Journal of Personnel Psychology, 9*(2), 79-93.
Okhuysen, G.A., & Bechky, B.A. (2009). Coordination in organizations: An integrative perspective. *The Academy of Management Annals, 3*(1), 463-502.
Owens, B.P., Baker, W.E., Sumpter, D.M., & Cameron, K.S. (2016). Relational energy at work: Implications for job engagement and job performance. *Journal of Applied Psychology, 101*(1), 35-49.
Paolacci, G., & Chandler, J. (2014). Inside the turk: Understanding mechanical turk as a participant pool. *Current Directions in Psychological Science, 23*(3), 184 -188.
Parker, S.K. (2014). Beyond motivation: Job and work design for development, health, ambidexterity, and more. *Annual review of psychology, 65*, 661-691.
Perlow, L.A. (2012). *Sleeping with your smartphone: How to break the 24/7 habit and change the way you work*. Boston, MA: Harvard Business Press.
Pfeffer, J. (2010). Building sustainable organizations: The human factor. *Academy of Management Perspectives, 24*(1), 34-45.
Pierce, J.L., & Dunham, R.B. (1992). The 12-hour work day: A 48-hour, eight-day week. *The Academy of Management Journal, 35*(5), 1086-1098.
Pinder, C.C. (1998). *Motivation in work organizations*. Upper Saddle River, NJ: Prentice-Hall.
Pink, D.H. (2018). How to be healthier, happier and more productive: It's all in the timing. Retrieved March 7, 2018, from https://www.wsj.com/articles/how-to-be-healthier-happier-and-more-productive-its-all-in-the-timing-1514560647
Pronk, S.J., Pronk, N.P., Sisco, A., Ingalls, D.S., & Ochoa, C. (1995). Impact of a daily 10-minute strength and flexibility program in a manufacturing plant. *American Journal of Health Promotion, 9*(3), 175-178.
Qin, X., DiRenzo, M.S., Xu, M., & Duan, Y. (2014). When do emotionally exhausted employees speak up? Exploring the potential curvilinear relationship between emotional exhaustion and voice. *Journal of Organizational Behavior, 35*(7), 1018-1041.
Quinn, R.W. (2005). Flow in knowledge work: High performance experience in the design of national security technology. *Administrative Science Quarterly, 50*(4), 610-641.

Quinn, R.W., Spreitzer, G.M., & Lam, C.F. (2012). Building a sustainable model of human energy in organizations: Exploring the critical role of resources. *The Academy of Management Annals, 6*(1), 337-396.

Raudenbush, S.W., & Bryk, A.S. (2002). *Hierarchical linear models: Applications and data analysis methods*. Thousand Oaks, CA: Sage.

Reid, E. (2015). Embracing, passing, revealing, and the ideal worker image: How people navigate expected and experienced professional identities. *Organization Science, 26*(4), 997-1017.

Reid, E., & Ramarajan, L. (2016). Managing the high-intensity workplace. *Harvard Business Review, June 2016*, 4-8.

Reis, H.T. (1994). Domains of experience: Investigating relationship processes from three perspectives. In R. Erber & R. Gilmour (Eds.), *Theoretical fromeworks for personal relationships* (pp. 87-110). Hillsdale, NJ: Erlbaum.

Reis, H.T., Sheldon, K.M., Gable, S.L., Roscoe, J., & Ryan, R.M. (2000). Daily well-being: The role of autonomy, competence, and relatedness. *Personality and Social Psychology Bulletin, 26*(4), 419-435.

Rogelberg, S.G., Leach, D.J., Warr, P.B., & Burnfield, J.L. (2006). 'Not another meeting!' Are meeting time demands related to employee well-being? *Journal of Applied Psychology, 91*(1), 83-96.

Rosen, C.C., Slater, D.J., Chang, C.-H.D., & Johnson, R.E. (2013). Let's make a deal: Development and validation of the ex post i-deals scale. *Journal of Management, 39*(3), 709 -742.

Rossiter, J.R. (2002). The c-oar-se procedure for scale development in marketing. *International journal of research in marketing, 19*(4), 305-335.

Rousseau, D.M., & Fried, Y. (2001). Editorial: Location, location, location: Contextualizing organizational research. *Journal of Organizational Behavior, 22*(1), 1-13.

Ryan, R.M., & Deci, E.L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*, 68-78.

Ryan, R.M., & Frederick, C. (1997). On energy, personality, and health: Subjective vitality as a dynamic reflection of well-being. *Journal of Personality, 65*(3), 529-565.

Schmeichel, B.J., Vohs, K.D., & Baumeister, R.F. (2003). Intellectual performance and ego depletion: Role of the self in logical reasoning and other information processing. *Journal of personality and social psychology, 85*(1), 33.

Schwartzman, H.B. (1986). The meeting as a neglected social form in organizational studies. *Research in Organizational Behavior, 8*, 233-258.

Scott, C., Allen, J.A., Rogelberg, S.G., & Kello, A. (2015). Five theoretical lenses for conceptualizing the role of meetings in organizational life (pp. 634-662): Cambridge University Press New York, NY.

Scott, C.W., Shanock, L.R., & Rogelberg, S.G. (2012). Meetings at work: Advancing the theory and practice of meetings. *Small Group Research, 43*(2), 127 -129.

Scott, S.G., & Bruce, R.A. (1994). Determinants of innovative behavior: A path model of individual innovation in the workplace. *Academy of Management Journal, 37*(3), 580-607.

Sedek, G., & Kofta, M. (1990). When cognitive exertion does not yield cognitive gain: Toward an informational explanation of learned helplessness. *Journal of personality and Social Psychology, 58*(4), 729.

Shanock, L.R., Allen, J.A., Dunn, A.M., Baran, B.E., Scott, C.W., & Rogelberg, S.G. (2013). Less acting, more doing: How surface acting relates to perceived meeting effectiveness and other employee outcomes. *Journal of Occupational and Organizational Psychology, 86*(4), 457-476.

Sheldon, K.M., Ryan, R., & Reis, H.T. (1996). What makes for a good day? Competence and autonomy in the day and in the person. *Personality and Social Psychology Bulletin, 22*(12), 1270-1279.

Shrout, P.E., & Lane, S.P. (2011). Psychometrics. In M. R. Mehl & T. A. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 302-320). New York: Guilford Press.

Snijders, T.A., & Bosker, R.J. (1994). Modeled variance in two-level models. *Sociological methods & research, 22*(3), 342-363.

Society for Human Resource Management. (2009). Pressure to work: Employee perspective. from http://www.shrm.org/Research/SurveyFindings/Articles/Documents/OEwork.pdf.

Sonenshein, S. (2014). How organizations foster the creative use of resources. *Academy of Management Journal, 57*(3), 814-848.

Sonnentag, S. (2001). Work, recovery activities, and individual well-being: A diary study. *Journal of Occupational Health Psychology, 6*(3), 196-210.

Sonnentag, S. (2003). Recovery, work engagement, and proactive behavior: A new look at the interface between nonwork and work. *Journal of Applied Psychology, 88*(3), 518-528.

Sonnentag, S., & Fritz, C. (2007). The recovery experience questionnaire: Development and validation of a measure for assessing recuperation and unwinding from work. *Journal of Occupational Health Psychology, 12*(3), 204-221.

Sonnentag, S., & Fritz, C. (2015). Recovery from job stress: The stressor-detachment model as an integrative framework. *Journal of Organizational Behavior, 36*(S1), S72-S103.

Sonnentag, S., Mojza, E.J., Demerouti, E., & Bakker, A.B. (2012). Reciprocal relations between recovery and work engagement: The moderating role of job stressors. *Journal of Applied Psychology, 97*(4), 842-853.

Sonnentag, S., & Natter, E. (2004). Flight attendants' daily recovery from work: Is there no place like home? *International Journal of Stress Management, 11*(4), 366-391.

Sonnentag, S., Niessen, C., & Neff, A. (2012). Recovery: Nonwork experiences that promote positive states. In K. S. Cameron & G. M. Spreitzer (Eds.), *The oxford handbook of positive organizational scholarship* (pp. 867-881). New York: Oxford University Press.

Sonnentag, S., & Zijlstra, F.R.H. (2006). Job characteristics and off-job activities as predictors of need for recovery, well-being, and fatigue. *Journal of Applied Psychology, 91*(2), 330-350.

Sprouse, J. (2011). A validation of amazon mechanical turk for the collection of acceptability judgments in linguistic theory. *Behavior Research Methods, 43*(1), 155-167.

Ten Brummelhuis, L.L., & Bakker, A.B. (2012). Staying engaged during the week: The effect of off-job activities on next day work engagement. *Journal of Occupational Health Psychology, 17*(4), 445-455.

Ten Brummelhuis, L.L., & Trougakos, J.P. (2014). The recovery potential of intrinsically versus extrinsically motivated off-job activities. *Journal of Occupational and Organizational Psychology, 87*(1), 177-199.

Thayer, R.E. (1989). *The biopsychology of mood and arousal*. New York: Oxford University Press.

Treviño, L.K., Webster, J., & Stein, E.W. (2000). Making connections: Complementary influences on communication media choices, attitudes, and use. *Organization Science, 11*(2), 163-182.
Trougakos, J.P., Beal, D.J., Cheng, B.H., Hideg, I., & Zweig, D. (2015). Too drained to help: A resource depletion perspective on daily interpersonal citizenship behaviors. *Journal of Applied Psychology, 100*(1), 227-236.
Trougakos, J.P., Beal, D.J., Green, S.G., & Weiss, H.M. (2008). Making the break count: An episodic examination of recovery activities, emotional experiences, and positive affective displays. *Academy of Management Journal, 51*(1), 131 -146.
Trougakos, J.P., & Hideg, I. (2009). Momentary work recovery: The role of within-day work breaks. In S. Sonnentag, D. Ganster & P. Perrewe (Eds.), *Current perspectives on recovery from job stress* (pp. 37-84). Bradford, West Yorkshire, GBR: Emerald Group Publishing Ltd.
Trougakos, J.P., Hideg, I., Cheng, B.H., & Beal, D.J. (2014). Lunch breaks unpacked: The role of autonomy as a moderator of recovery during lunch. *Academy of Management Journal, 57*(2), 405 -421.
Uy, M.A., Foo, M.-D., & Aguinis, H. (2010). Using experience sampling methodology to advance entrepreneurship theory and research. *Organizational Research Methods, 13*(1), 31 -54.
Van der Linden, D., Frese, M., & Meijman, T.F. (2003). Mental fatigue and the control of cognitive processes: Effects on perseveration and planning. *Acta Psychologica, 113*(1), 45-65.
Van Dyne, L., & LePine, J.A. (1998). Helping and voice extra-role behaviors: Evidence of construct and predictive validity. *Academy of Management Journal, 41*(1), 108-119.
Volkema, R.J., & Niederman, F. (1995). Organizational meetings: Formats and information requirements. *Small Group Research, 26*(1), 3 -24.
Weiss, H.M., & Cropanzano, R. (1996). Affective events theory: A theoretical discussion of the structure, causes, and consequences of affective experiences at work. *Research in Organizational Behavior, 18*, 1–74.
Welsh, D.T., & Ordóñez, L.D. (2014). The dark side of consecutive high performance goals: Linking goal setting, depletion, and unethical behavior. *Organizational Behavior and Human Decision Processes, 123*(2), 79-89.
Westman, M., & Eden, D. (1997). Effects of a respite from work on burnout: Vacation relief and fade-out. *Journal of Applied Psychology, 82*(4), 516-527.
White, R.W. (1963). *Ego and reality in psychoanalytic theory*. New York: International Universities Press, Inc.
Williams, J. (2001). *Unbending gender: Why family and work conflict and what to do about it*. Oxford: Oxford University Press.
Williams, J.C. (1989). Deconstructing gender. *Michigan Law Review, 87*(4), 797-845.
Williams, L.J., & Anderson, S.E. (1991). Job satisfaction and organizational commitment as predictors of organizational citizenship and in-role behaviors. *Journal of Management, 17*(3), 601 -617.
Wollan, M. (2016). Failure to lunch: The lamentable rise of desktop dining. *New York Times.* from https://www.nytimes.com/2016/02/28/magazine/failure-to-lunch.html?_r=0

Yates, J., & Orlikowski, W.J. (1992). Genres of organizational communication: A structurational approach to studying communication and media. *Academy of Management Review, 17*(2), 299 -326.

Zacher, H., Brailsford, H.A., & Parker, S.L. (2014). Micro-breaks matter: A diary study on the effects of energy management strategies on occupational well-being. *Journal of Vocational Behavior, 85*(3), 287-297.

Zedeck, S., Jackson, S.E., & Summers, E. (1983). Shift work schedules and their relationship to health, adaptation, satisfaction, and turnover intention. *The Academy of Management Journal, 26*(2), 297-310.