Exploring the Nomological Net of Micro-breaks from a Cross-level Perspective

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by

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DEDICATION

This is dedicated to my loving wife Qiong Wu, my parents and my brother.
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EXPLORING THE NOMOLOGICAL NET OF MICRO-BREAKS FROM A CROSS-LEVEL PERSPECTIVE

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The concept of micro-breaks (i.e., short and informal breaks employees take in the workplace) has received increasing attention from occupational health researchers in recent years. However, research to date has dominantly focused on the outcomes of taking micro-breaks, leaving the antecedents of micro-breaks unexplored. Thus, the current study contributes to the micro-breaks and recovery literature from three perspectives. First, antecedents of micro-breaks are for the first time introduced and examined. Specifically, I conceptualize seven antecedents and investigate their relationships with micro-break quantity. The antecedents include both personal factors (i.e., the attitude toward micro-breaks and need for recovery) and contextual factors (i.e., supervisor norms, coworker norms, management support, work-break autonomy, perceptions of coworker micro-breaks). Second, for the first time in the literature the nomological network of micro-breaks (i.e., micro-break quantity) is examined from both
the between-person level and the within-person level. Last but not least, I conceptualize and suggest that micro-break quality could serve as a boundary condition for the relationship between micro-break quantity and employee well-being, which adds value to the literature studying the outcome of micro-breaks. In the results, most of the hypotheses were supported. Specifically, the attitude toward micro-breaks, supervisor norms, coworker norms, management support, and work-break autonomy were associated with micro-break quantity at the between-person level, and need for recovery was associated with micro-break quantity at the within-person level. On the outcome side, micro-break quantity was related to employee vitality at both the between-person level and the within-person level. However, the moderation effect of micro-break quality was found in neither the between-person level nor the within-person level. The theoretical and practical implications of the current study were discussed in detail.
INTRODUCTION

The demands associated with the contemporary working environment have resulted in an extraordinary increase in employee stress levels in many countries (White, 2008). Considerable research has shown the dramatic influence of workplace demands on employees’ psychological and physical well-being (e.g., Bakker & Demerouti, 2007; Lee & Ashforth, 1996). Organizational researchers have attempted to understand how to improve employee stress and well-being from two lenses. First, researchers explore the characteristics of work (e.g., work tasks or work environment) that cause or reduce strain (e.g., Bakker & Demerouti, 2014; Karasek, 1979). The leading theory is the Job-Demands Resources (JD-R) model (Bakker & Demerouti, 2007; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001). The second lens shifts attention from the work itself to off-work periods by investigating the role of recovery activities. Recovery refers to the process that offsets the negative effects of strain (Demerouti, Bakker, Geurts, & Taris, 2009) or the process during which an individuals’ functioning returns to the pre-stressor level (Sonnentag & Natter, 2004). Recovery typically occurs when employees are not expected or required to work, such as sleep at night (Barnes, Wagner, & Ghumman, 2012), evening physical exercise (Sonnentag, 2001), evening social activities (Sonnentag, 2001), and after work relaxation activities (Sonnentag & Fritz, 2007; Sonnentag, Binnewies, & Mojza, 2008), all of which can result in reduced strain and enhanced well-
being (for a review, see Trougakos & Hideg, 2009). The two lenses, although rarely combined together, enrich literature complementarily and provide practical guidance for improving employee well-being.

Nevertheless, work and life should not be treated in isolation from each other, especially at present, when the boundaries between work and nonwork domains are becoming blurred (e.g., Mazmanian, Orlikowski, & Yates, 2013; Tomlinson, 2007). On one hand, work is invading people’s lives. For example, some people are connected to work via email or phone calls during their personal hours, which makes it hard for them to detach from work (Fritz, Lam, & Spreitzer, 2011). On the other hand, recovery experience also takes place during working hours. Examples include, but are not limited to, checking Facebook, sharing lunch, a cup of coffee, or snacks with coworkers, stretching, or taking a quick nap by the desk. These behaviors are informal, momentary (Kim, Park, & Niu, 2016), nonwork-related (Fritz et al., 2011), and occur over the course of a typical workday. In the recovery literature, they are often referred as micro-breaks.

Micro-breaks in the current study are defined as nonwork activities that occur when work tasks are expected or required. Nonwork activities are essentially all kinds of behaviors performed by an employee that do not directly result in the accomplishment of his or her work tasks. The time when work tasks are expected or required normally refers to fixed work schedule. Conceivably, micro-breaks provide employees with

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1 An example of fixed work schedule is 9am to 12pm and 1pm to 6pm in a typical 9am to 6pm workday. The period between 12pm to 1pm is scheduled for lunch and therefore does not count for work schedule.
opportunities to momentarily disengage from work tasks and spend the time on their preferred activities².

Recovery scholars suggest that it is critical to study micro-breaks for at least three reasons. First, based on effort-recovery theory (Meijman & Mulder, 1998), micro-breaks may help employees recover from strain and restore energy for subsequent work tasks (Fritz et al., 2011; Kim et al., 2016). In the workplace, employees are expected to expend efforts continuously to deal with job demands, which may lead to acute load reactions – the short-term reactions to the threatening disruption of certain physiological or psychology balance. However, these load reactions are reversible if employees occasionally take micro-breaks from demanding job tasks (Meijman & Mulder, 1998). Second, as argued by Fritz et al. (2011) and briefly mentioned earlier, there are fewer opportunities today for employees to restore energy outside of work due to the blurring boundary between work and life, so it becomes critical for researchers to consider how employees can maintain their energy in doing their work. Finally, compared to recovery activities that occur outside of the workplace (e.g., evenings, weekends, vacations), micro-breaks, which occur at work, are especially important in that they enable employees to deal with job demands and recover from work stress in a timely manner (Kim et al., 2016). In fact, research suggests that fewer respite opportunities at work,

² Realistically speaking, micro-breaks do not perfectly apply to every job. In other words, an employee needs to have sufficient autonomy or job control in order to engage in nonwork related activities at will in the workplace. As suggested by Trougakos and Hideg (2009), compared to employees with highly repetitive and routine tasks, such as machine operators. Micro-breaks are more common and play a more important role for knowledge workers who have less repetitive tasks, tend to be involved in several projects and have different agendas every day. This is because knowledge workers can make better use of micro-breaks by fitting them into their flexible work schedule. Therefore, for the current study, knowledge workers are the target subjects given the higher level of relevance.
especially on an intensive workday, may lead to “slow unwinding” after work (Meijman & Mulder, 1998). Taken together, a thorough investigation of micro-breaks is desirable to provide researchers with a better understanding of employee well-being.

Despite its demonstrated importance, micro-breaks remain unexplored in organizational psychology with at least two substantial gaps for researchers to fill. First, research on micro-breaks to date has exclusively focused on testing the direct relationship between micro-break quantity and its outcomes, such as affective well-being (Kim et al., 2016), energy level (vitality and fatigue; Fritz et al., 2011; Zacher et al., 2014), and job satisfaction (Hunter & Wu, 2016). Given the relatively short history of research on micro-breaks, the focus on outcomes is reasonable in that organizational scholars need to confirm micro-breaks are meaningful phenomena and worthy of scientific investigation. As this research stream has revealed relatively consistent results with a general finding that spending more time on micro-breaks is beneficial to employee well-being, it seems the right time for organizational scholars to turn part of their attention to the antecedents of micro-break quantity. Specifically, I suggest it is important to understand what personal and contextual factors are associated with micro-breaks, as well as their duration, so that employers can be equipped with more knowledge and evidence in terms of when they need to encourage or discourage these behaviors. Therefore, the first contribution of the current study is to extend the nomological network by making the first attempt to investigate micro-break quantity’s antecedents.

3 In the current study, when talking about “micro-breaks”, I specifically refer to the activities taken during micro-breaks; when talking about “micro-break quantity”, I specifically refer to the amount of time a person spends on micro-breaks during a defined period (e.g., an hour, a day). Thus, the phrase “higher micro-break quantity” is equivalent to “spend more time on micro-breaks”.
Second, although it is evident that higher micro-break quantity benefits employee well-being, such an effect may not hold all the time. As mentioned, Fritz et al. (2011) found that some micro-breaks, such as “surf the web”, “check and send personal emails and text messages”, and “make plans for the evening or weekend”, were positively related to fatigue and negatively related to vitality. The authors suggested that boundary condition might be an important factor explaining this counterintuitive finding, although they did not specify any potential moderator to consider (Fritz et al., 2011). To directly respond to their call, I suggest that the relationship between micro-break quantity and employee well-being is contingent on the quality of micro-breaks taken, which potentially serves as the second contribution of the current study.

**An Extended Nomological Net of Micro-Break Quantity**

In what follows, the current study unfolds to fills the two gaps in micro-breaks research by extending the nomological network of micro-break quantity. The proposed model is presented in Figure 1 and Figure 2. Figure 1 is micro-break quantity’s nomological net at the between-person level, and Figure 2 focuses on the within-person level. In the literature, micro-breaks have been studied at both levels as they essentially answer different research questions. At the between-person level, research findings often take the form of “people who are high in variable ‘X’ in general spend more/less time on micro-breaks”. At the within-person level, the model explores an answer like “for an individual, on the days when he or she is high in variable ‘X’, he or she is likely to spend more/less time on micro-breaks”. Therefore, in the following, I discuss the nomological
network of micro-break quantity at both the between-person level and the within-person level, respectively.

Antecedents of micro-break quantity at the between-person level

In the current study, the theory of planned behavior (Ajzen, 1991) is employed to understand potential antecedents of micro-break quantity at the between-person level. The core proposition of this theory suggests behavioral intention (i.e., the readiness or motivation to perform the behavior in general) as the most proximal predictor of actual enactment of behavior at the between-person level. In addition, behavioral intention is further predicted by three distal antecedents, namely the attitude toward the behavior, subjective norms, and perceived behavioral control. Specifically, people who are higher in attitude toward the behavior, subjective norms, and perceived behavioral control are likely to spend more time on that behavior because they have a higher level of intention of doing so (Ajzen, 1985).

The theory of planned behavior has been a valid model for predicting a variety of behaviors in terms of quantity, such as health activities (e.g., physical activities, healthy eating; Chan, Prendergast, & Ng, 2016; Howland et al., 2016), technology adoption (e.g., e-learning adoption, SNS usage; Chu & Chen, 2016; Darvell, Walsh, & White, 2011), and career selection (Evers & Sieverding, 2015). Among the behaviors that have been successfully explained by the theory of planned behavior, one that is conceptually similar to micro-breaks is called cyberloafing. Cyberloafing refers to a set of electronically-mediated activities at work that employees engage in, particularly through the use of the internet, which are not in general considered job-related by organizations (Askew,
Buckner, Taing, Ilie, Bauer, & Coovert, 2014; Lim, 2002). By definition, cyberloafing could be classified as a means for employees to engage in micro-breaks (e.g., Kim et al., 2016). In order to predict employees’ cyberloafing quantity, Askew et al. (2014) adopted the theory of planned behavior model and found that the attitude toward cyberloafing, descriptive norms (i.e., a form of subjective norms), and ability to hide (i.e., a form of perceived control of cyberloafing) together explained a significant amount of variances of cyberloafing quantity (i.e., 32% and 37% in two studies respectively).

As cyberloafing is simply one type of micro-break and both concepts fall into the category of workplace withdrawal behaviors at a broader level (Askew et al., 2014; Trougakos & Hideg, 2009), it is reasonable to borrow the theory of planned behavior to explain micro-breaks. In what follows, I propose that based on the theory of planned behavior, the antecedents of micro-break quantity at the between-person level fall into two categories: personal factor and contextual factor.

**Personal factor: the attitude toward micro-breaks**

According to the theory of planned behavior, the first antecedent of an intentional behavior is the attitude toward the behavior. The attitude toward a behavior refers to the evaluation of an individual about the question of how favorable or unfavorable an act is (Ajzen, 1991). It is dependent on an individual’s beliefs and the evaluation of those beliefs. Such evaluations feature both affective and cognitive components (Breckler & Wiggins, 1989). Applied to micro-breaks, the affective component of evaluation reflects the emotional response and feeling yielded by micro-breaks (e.g., pleasant-unpleasant, enjoyable-unenjoyable). On the other hand, the cognitive component of evaluation
represents an individual’s beliefs about the consequences of micro-breaks (e.g., improved well-being) and the evaluation of these consequences (e.g., improved well-being is valuable for both employees and organizations). The two components of attitude have been found to increase the predictive power of this attitudinal factor of the theory of planned behavior (e.g., Blau, Tatum, & Cook, 2004; Foust, Elicker, & Levy, 2006; Elicker, Foust, O’Malley, & Levy, 2008). Thus, I propose that the attitude toward micro-breaks can explain micro-break quantity at the between-person level.

**Hypothesis 1**: The attitude toward micro-break is positively related to micro-break quantity at the between-person level, such that employees, who have a more positive (vs. negative) attitude toward micro-breaks, spend more (vs. less) time on micro-breaks in general.

**Contextual factor: micro-break climate**

Besides the personal factor, I propose a contextual component of micro-break quantity nomological network in the current study, which is called “micro-break climate”. Micro-breaks’ contextual component has been recognized in the literature: “future research in the area of work recovery would be well served to bear in mind that there are numerous individual differences and situational factors that might impact recovery… to maximize the prescriptive utility of this stream of research, a broader understanding of individual and contextual differences is necessary” (Trougakos & Hideg, 2009, p. 76). As mentioned, micro-breaks are essentially nonwork related activities that occur when work tasks are expected or required. Thus, organizations may differ on their acceptability of employees’ micro-breaks, which results in employees’
perception of how supportive their organizations are for micro-breaks. In alignment with this, the current study provides the first attempt in micro-break research to investigate the climate organizations create for micro-breaks. To understand micro-break climate, I begin by discussing organizational climate, which is conceptually at a broader level.

Organizational climate is generally defined as socially shared perceptions of work environment that focus on certain key organizational attributes informing employees of the kinds of behaviors to be rewarded or supported (Ostroff, Kinicki, & Muhammad, 2012; Schneider, 1975; Schneider, Ehrhart, & Macey, 2011; Zohar & Polachek, 2014). In other words, climate refers to how individuals in organizations make sense of their environment through their perceptions of formal and informal policies, practices, and procedures (Reichers & Schneider, 1990). Climate can be either conceptualized at the individual-level, which reflects individuals’ perceptions of organizational policies, practices, and procedures (James et al., 2008; James & James, 1989; James & Jones, 1974; Schneider, 1973), or at group-level and/or organizational-level reflecting shared perceptions (James, James, & Ashe, 1990). In the current study, I particularly refer to individuals’ perceptions as they pertain to micro-breaks (i.e., psychological climate). This approach is consistent with a significant body of research on organizational climate (for a review, see McGonagle, Walsh, Kath, & Morrow, 2014).

There are two primary paradigms for studying organizational climate: generic climate and facet-specific ones (Schneider, 1975; Schneider et al., 2011). As most research to date on organizational climate refers to the latter, I also use it as default when talking about climate. Thus, micro-break climate refers to individuals’ perception of how
micro-breaks, typically treated as a way for recovery and maintaining well-being, are prioritized with regards to other activities or job dimensions that occur in the workplace, such as work tasks or productivity. Relying on personal experiences, employees collect information regarding trade-offs between well-being and productivity. If productivity is more favored across most situations than recovery, it promotes a poor micro-break climate and allows individuals to align their behaviors accordingly.

Similar to other facets of organizational climate (e.g., safety climate; McGonagle et al., 2014; Schneider, 1975; Schneider et al., 2011), employees are able to use different cues to evaluate whether they perceive micro-breaks to be valued in their organization. For example, employees may have a feeling of how their organizations set policies and provide resources for their employees to take micro-breaks, how their managers communicate with them in terms of the benefits of micro-breaks, how coworkers take micro-breaks individually or together, and how one’s work is designed in a way to allow or even welcome micro-breaks. These cues could be manifested as different dimensions of micro-breaks climate. In line with McGonagle et al.’s (2010) typology of safety climate, I propose that employees tend to use four distinct cues to evaluate micro-break climate based on three primary elements of the working environment: the hierarchical social environment (i.e., management support and supervisor norms), the lateral social environment (i.e., coworker norms), and the job itself (i.e., work-break autonomy).

Supervisor norms and coworker norms are individuals’ perceptions of the extent to which supervisors and coworkers appear to value micro-breaks based on their behaviors and the extent to which their behaviors conform to their values. The concepts
of supervisor norms and coworker norms align with one of the core elements of the theory of planned behavior, namely subjective norms, referring to an individual’s perception of what most others who are important to him or her think or actually do (Ajzen, 1991). The “others who are important to him or her” are referents, and specifically refer to supervisors and coworkers in the context of micro-breaks.

According to the literature in social psychology, subjective norms can be broken down into two dimensions: injunctive norms and descriptive norms (Fishbein & Ajzen, 2010). Injunctive norms refer to individuals’ beliefs about what other people think they should do and the motivation to comply with the beliefs. In the context of micro-breaks, injunctive norms reflect an individual’s beliefs about how strongly his or her supervisors think he or she should take micro-breaks at work as needed, and how much he or she wants to conform to these expectations (Ajzen, 1991). For example, an employee might feel that his or her supervisor wants him or her to take micro-breaks frequently. The employee might be strongly motivated to comply with his or her supervisor, which would positively impact supervisor norms and eventually micro-break quantity. Therefore, it is reasonable to suggest that supervisor norms can function as injunctive norms that affect employees’ micro-breaks.

Coworker norms, on the other hand, reflect the nature of descriptive norms. Descriptive norms refer to an employee’s beliefs of what others have done, are doing, are likely to do, and how much the employee considers himself or herself similar to the referent (Fishbein & Ajzen, 2010). In the context of micro-breaks, if an employee finds his or her coworkers take micro-breaks regularly, to the extent that he or she identifies
with them, he or she is likely to do so as well. Descriptive norms may apply to coworker norms but not supervisor norms for two reasons. First, employees observe their coworkers’ micro-breaks more easily than their supervisors’ (e.g., coworkers often sit closer to each other). Second, the way employees identify with their coworkers (i.e., lateral relationship) is different from their supervisors (i.e., hierarchical relationship). Therefore, coworker norms, instead of supervisor norms, can influence micro-breaks by functioning as descriptive norms.

In sum, the first two elements of micro-break climates both can be conceptualized as subjective norms (i.e., supervisor norms – injunctive norms, coworker norms – descriptive norms). As subjective norms have been validated as a predictor of behavior quantity, it is reasonable to suggest both supervisor norms and descriptive norms are potential antecedents of micro-break quantity.

**Hypothesis 2:** Supervisor norms are positively related to micro-break quantity at the between-person level, such that employees, who perceive stronger (vs. weaker) supervisor norms, spend more (vs. less) time on micro-breaks in general.

**Hypothesis 3:** Coworker norms are positively related to micro-break quantity at the between-person level, such that employees, who perceive stronger (vs. weaker) coworker norms, spend more (vs. less) time on micro-breaks in general.

The third aspect of micro-break climate is management support, referring to employees’ perception of the extent to which management provides resources for micro-breaks. There are two important points to note for the concept of management support. First, the resources provided by management cover both tangible resources and intangible
resources. Tangible resources include anything employees may use when they take micro-breaks, such as external Internet access (e.g., Facebook, YouTube), Barcaloungers in the resting area, free coffee, vending machines, magazines, and newspapers. Intangible resources include the formal or informal policies management creates for supporting or managing employees’ micro-breaks. When management provides more tangible resources and a supportive environment filled with intangible resources, management support for micro-breaks is stronger. Second, for stronger management support, not only should management provide various resources, it also needs to make the resources accessible to employees. Management can do this by placing the resources where they are more visible and easy for employees to access (e.g., put the vending machine in the kitchen rather than the corner of the hallway), or by effective communication to employees through emails, newsletters, or simply word of mouth.

The last element of micro-break climate proposed in the current study is work-break autonomy, which refers to employees’ perceptions of the extent to which they have the autonomy of when to take micro-breaks. In the workplace, employees are constantly under the pressure of performing work-related activities for better performance (Bommer, Johnson, Rich, Podsakoff, & Mackenzie, 1995; Singh, 2000). Employees who have high work-break autonomy can choose to take micro-breaks as needed. In other words, they have the discretion to balance between micro-breaks (i.e., the need for recovery) and work tasks (i.e., the need for performance) when they enjoy high work-break autonomy.

In the context of micro-breaks, management support and work-break autonomy can be conceptualized as perceived behavioral control, which is another element of the
theory of planned behavior (Ajzen, 1991). Perceived behavioral control refers to the skills, resources, and opportunities employees perceive to obtain to perform a behavior of interest (Ajzen, 2002). When a person perceives that he or she has the skills to take micro-breaks, has adequate resources to use for taking micro-breaks, and has plenty of opportunities to take micro-breaks, then his or her perceived behavioral control of micro-breaks is high. In organizations, it is reasonable to assume that employees in general perceive themselves to have the skills or capabilities to take micro-breaks. Then, the resources employees perceive for micro-breaks have been conceptualized as management support, and whether employees perceive they have opportunities for taking micro-breaks can be directly affected by whether they have work-break autonomy. Taken together, management support and work-break autonomy reflect an employee’s perceived behavioral control for micro-breaks, which may further predict the time spent on micro-breaks.

**Hypothesis 4:** Management support is positively related to micro-break quantity at the between-person level, such that employees, who perceive more (vs. less) management support, spend more (vs. less) time on micro-breaks in general.

**Hypothesis 5:** Work-break autonomy is positively related to micro-break quantity at the between-person level, such that employees, who perceive more (vs. less) work-break autonomy, spend more (vs. less) time on micro-breaks in general.

**Antecedents of micro-break quantity at the within-person level**

So far, five antecedents that may predict micro-break quantity at the between-person level have been introduced. These five predictors may collectively determine the
quantity of micro-breaks on average taken across situations. However, they cannot recognize or explain the within-person variation of micro-breaks across time. In other words, it is still unknown under what circumstances an employee may spend more or less time on micro-breaks. In fact, researchers have suggested that micro-breaks are characterized by within-person variation and more insights on this concept could be obtained through the efforts of explaining such variation (Trougakos & Hideg, 2009). In response to this, the current study aims to contribute to the literature by discussing factors that explain micro-break quantity’s within-person variation.

**Micro-breaks as a resource recovery process**

In order to explore the antecedents of micro-break quantity at the within-person level, I start off by discussing the role of micro-breaks in employee well-being. Consistent with previous studies on micro-breaks at the within-person level (Kim et al., 2016; Zacher et al., 2014), I conceptualize micro-breaks as a way for employees to recover their resources and manage their energies in a timely manner based on resource depletion theories. This set of theories include energy management theory (Pfeffer, 2010), effort-recovery theory (Meijman & Mulder, 1998), the conservation of resources theory (Hobfoll, 1998), theory of regulatory resources or ego-depletion theory (Muraven & Baumeister, 2000), and theory of positive emotion (Fredrickson, 1998, 2001). In general, these theories assume that an employee at work has a limited amount of resources on any typical workday. These resources, although conceptualized in different ways by different theories (e.g., vitality, positive affect, self-regulatory resource), are important for an employee’s everyday work in that they are the “fuel” for employees to
accomplish work tasks. Specifically, when employees are working on their daily tasks, especially the ones that are demanding and taxing, their resources are depleted in the process. This resource loss process can be stopped and reversed, however, if employees occasionally disengage from work and take micro-breaks (Meijman & Mulder, 1998), which provides opportunities for employees to recover their resources in a timely manner.

Similar to the antecedents at the between-person level, I categorize within-person level antecedents into two groups: personal factor and contextual factor.

**Personal factor: need for recovery**

On a typical workday, employees come to the workplace in the morning with adequate resources to deal with demanding work tasks, like a fully charged battery. Over the course of a workday, resources are gradually depleted due to work tasks. However, employees cannot allow their resource levels to go down forever. As suggested by Muraven and Baumeister (2000), when individuals’ self-regulatory resources are below a certain level, they cannot function properly and their job performance and well-being are significantly impaired. Fredrickson (1998) also suggested that most of employees’ positive emotion, such as joy, interest, contentment, and love would fade away when they are under unfavorable pressure at work. Thus, like a draining battery, employees should be red flagged if their resource levels are below a threshold. Then, a protection mechanism is triggered and employees are motivated to take actions (e.g., micro-breaks) to recover their resources, similar to the process of recharging the battery. Therefore,
when resource levels reach low, employees’ motivation for resource recovery seems to be a proximal predictor of the actual enactment of micro-breaks.

In the recovery literature, a concept that reflects employee’s motivation for resource recovery is called “need for recovery”. Need for recovery refers to an emotional state featured by a temporal reluctance to the present demands and any new demands (Sonnentag & Zijlstra, 2006). Jansen, Kant, and van den Brandt (2002) suggested that need for recovery is a “precursor of prolonged fatigue or psychological distress” (p. 324). Thus, need for recovery is often related to a desire for low baseline activity (Craig & Cooper, 1992). In other words, need for recovery reflects the expectation that “a break is necessary in order to be able and willing to confront future demands” (Sonnentag & Zijlstra, 2006, p. 331). In general, need for recovery can be described as “feelings of ‘wanting to be left in peace for a while,’ or ‘wanting to lay down for a while’” (Sluiter, Frings-Dresen, van der Beek, & Meijman, 2001, p. 29). In the earlier battery metaphor, employees express their need for recovery as a desire “to recharge their batteries” (Sonnentag & Zijlstra, 2006, p. 331). Therefore, in the current study, I conceptualize need for recovery as an employee’s subjective experience of desiring to relieve himself or herself from job demands and spend some time on micro-breaks. Furthermore, I propose that need for recovery is a proximal antecedent of micro-break quantity at the within-person level.

**Hypothesis 6:** Need for recovery is positively related to micro-break quantity at the within-person level, such that for an employee, when he or she has higher (vs. lower)
level of need for recovery, he or she is likely to spend more (vs. less) time on micro-breaks.

**Contextual factor: perceptions of coworker micro-breaks**

Among the contextual factors that may explain micro-breaks at the between-person level, supervisor norms (i.e., injunctive norms), management support, and work-break autonomy are unlikely to vary on a daily or even hourly basis based on their definitions. In contrast, coworker norms may be conceptually meaningful at both the between-person level and the within-person level. At the between-person level, coworker norms refer to an employee’s general beliefs about what their coworkers have done, are doing, and are likely to do with regards to micro-breaks and how much he or she identifies with coworkers. Although the way employees identify with coworkers is unlikely to change every day, their understandings of coworkers’ micro-breaks, which is based on their observations of coworkers, are subject to change on a daily or even hourly basis. Therefore, I use the term “perceptions of coworker micro-breaks” to refer to an employee’s perception of what their coworkers have done, are doing, and are likely to do with regards to micro-break quantity during a certain period of time.

Perceptions of coworker micro-breaks can impact an individual’s micro-breaks at the within-person level in two ways. First, when employees perceive their coworkers taking micro-breaks, they are actually being signaled that micro-breaks are socially acceptable or desirable, at least at that moment. Thus, from a social learning perspective, employee may treat their coworkers as role models and emulate their behaviors by taking similar micro-breaks (Bandura, 1977, 1986). Second, even though many micro-breaks are
individual behaviors (e.g., nap, daydream, stretch), many others are in nature relational and characterized by interplay between individuals, such as all kinds of social related activities. Specifically, one may easily be distracted by coworkers if they initiate a conversation about weekend plans or suggest getting coffee together. Taken together, it seems that perceptions of coworker micro-breaks may be an important factor explaining when employees take micro-breaks, and thus should be considered as an antecedent candidate for micro-break quantity at the within-person level.

**Hypothesis 7**: Perceptions of coworker micro-breaks are positively related to an employee’s micro-break quantity at the within-person level, such that for an employee, when he or she perceives that his or her coworkers spend more (vs. less) time on micro-breaks, he or she is likely to spend more (vs. less) time on micro-breaks as well.

**Outcomes of micro-break quantity**

As mentioned earlier, all published articles on micro-breaks to date focused exclusively on the outcomes of micro-break quantity, providing a good basis for the current discussion. In Fritz et al.’s (2011) study, the authors investigated the relationship between various types of micro-breaks (i.e., quantity) and two outcomes reflecting human energy, vitality and fatigue, from an energy management perspective. In their results, some frequently used micro-breaks such as “surf the web”, “check and send personal emails and text messages”, and “make plans for the evening or weekend”, were positively related to fatigue and negatively related to vitality. Using an hourly design, Zacher et al. (2014) examined micro-breaks as a formative construct and found that micro-breaks negatively predicted fatigue and positively predicted vitality at the within-person level.
Similarly, based on a daily diary design, Kim et al. (2016) also found that most types of micro-breaks (i.e., social related, nutrition-intake, relaxation) were positively associated with affective well-being at both the within-person and the between-person level. Taken together, a key take-away for these micro-breaks research results is that micro-breaks are in general beneficial to employees in terms of their well-being, although the effects might be different depending on how they take micro-breaks.

The main effect of micro-breaks on the outcomes can also be understood from the perspective of resource recovery. As mentioned, micro-breaks could be conceptualized as a process for employees to replenish their lost resources. Although different micro-breaks may help recover different types of resources, when taken as a whole, the effect of micro-breaks should be closely related to the collective effect of resources of all kinds. In other words, the outcomes of micro-break quantity could be examined by looking at the impact of resources on employees. As mentioned earlier, resources have been conceptualized in different ways under different theoretical frameworks, such as “energy” in energy management theory (Pfeffer, 2010), “resource” in effort-recovery theory (not clearly defined or specified; Meijman & Mulder, 1998), “object, conditions, personal characteristics, and energies” in the conservation of resources theory (Hobfoll, 1998), “regulatory resources” in the theory of regulatory resources or ego-depletion theory (Muraven & Baumeister, 2000), and “affective resources” in the theory of positive emotion (Fredrickson, 1998, 2001). Despite the distinction of resource conceptualization, a common effect of these resources is that they are positively related to employees’ well-being (Fredrickson, 1998, 2001; Hobfoll, 1998; Meijman & Mulder, 1998; Muraven &
Baumeister, 2000; Pfeffer, 2010). Moreover, this relationship has been validated at both the between-person level (Fritz et al., 2011) and the within-person level (Zacher et al., 2014). Therefore, the current study aims to replicate previous findings by suggesting micro-break quantity is positively related to employee well-being at both the between-person level and the within-person level.

**Hypothesis 8**: Micro-break quantity is positively related to employee well-being at the between-person level, such that employees, who spend more (vs. less) time on micro-breaks in general, have higher (vs. lower) levels of well-being.

**Hypothesis 9**: Micro-break quantity is positively related to employee well-being at the within-person level, such that for an employee, when he or she spends more (vs. less) time on micro-breaks, he or she is likely to have higher (vs. lower) level of well-being.

**Micro-break quality as a boundary condition**

Micro-break quality is defined as the extent to which micro-breaks function as expected to help employees recover lost resources. High micro-break quality indicates that micro-breaks effectively help people replenish their lost resources. Borrowing Sonnentag and Fritz’s (2007) conceptualization of recovery experiences, I propose high-quality micro-breaks are characterized by psychological detachment, relaxation, mastery experience, and control during micro-breaks.

Psychological detachment refers to the extent to which employees are mentally disengaged from the work situation (Etzion et al., 1998). Based on the effort-recovery theory, recovery occurs when job demands are removed from the functional systems
required during work (Meijman & Mulder, 1998). When individuals are not psychologically detached from work during micro-breaks, it is likely that job demands that are taxing continue to negatively impact the functional systems. Empirical evidence suggests that psychological detachment is important during one’s recovery process, such that when people experience higher levels of psychological detachment, their job stressors are less likely to lead to strain (Sonnentag, 2012).

Relaxation is a process characterized by a state of low activation and increased positive affect (Stone, Kennedy-Moore, & Neale, 1995). Relaxation can result from activities that relax body and mind, such as muscle relaxation (Jacobson, 1938), meditation (Grossman, Niemann, Schmidt, & Walach, 2004), and listening to music (Pelletier, 2004). Recovery experiences should achieve relaxation for two important reasons (Sonnentag & Fritz, 2007). First, relaxation is able to reduce prolonged activation caused by job stressors and restore the body to a pre-stressor state (Brosschot, Pieper, & Thayer, 2005). Second, positive emotions generated from relaxation are able to offset the effects of negative emotions. Taken together, micro-breaks that are characterized by relaxation could be particularly helpful to employee well-being.

Mastery micro-breaks are nonwork activities that provide challenging experiences or learning opportunities in other domains. Examples include reading newspapers, scanning information online, and helping out a colleague on a nonwork issue. Unlike job demands, even though mastery experiences require self-regulation (Sonnentag & Fritz, 2007), they do not overtax employees’ capabilities. Moreover, they could help employees recover resources because they provide opportunities to generate internal resources such
as skills and self-efficacy (Bandura, 1997; Hobfoll, 1998). Finally, mastery experiences during micro-breaks are also likely to improve employees’ positive moods through offering help to others (George, 1991).

Last but not least, control during micro-breaks refers to an employee’s ability to choose what to do during micro-breaks. Control is different from work-break autonomy. As mentioned, work-break autonomy refers to an employee’s perception of his or her autonomy as to when to take micro-breaks. Control during micro-breaks, however, reflects an employee’s discretion on what to do during micro-breaks. Control during micro-breaks may impact the quality of micro-breaks in two ways. First, if employees have control over what to do during micro-breaks, they can choose what is best for their resource recovery. Second, the experience of control during micro-breaks may increase one’s self-efficacy and competence (Sonnentag & Fritz, 2007), which are external resources promoting well-being (Bandura, 1997; Hobfoll, 1998). Therefore, in order to have a high-quality micro-break, control during the micro-break is potentially critical.

Taken together, a high-quality micro-break is characterized by a high level of psychological detachment, relaxation, mastery experiences, and control. Micro-break quality may not only directly relate to employee well-being, but also serve as a boundary condition that strengthens the effect of micro-break quantity on employee well-being because it enables a better resource recovery experience. Therefore, the last four hypotheses are stated as follows.
**Hypothesis 10**: Micro-break quality is positively related to employee well-being at the between-person level, such that employees who have higher (vs. lower) levels of micro-break quality in general, have higher (vs. lower) well-being.

**Hypothesis 11**: Micro-break quality is positively related to employee well-being at the within-person level, such that for a given employee, the higher (vs. lower) the quality of micro-breaks is associated with higher (vs. lower) well-being.

**Hypothesis 12**: Micro-break quality moderates the relationship between micro-break quantity and employee well-being at the between-person level, such that employees whose micro-break quality is in general higher (vs. lower), have a stronger (vs. weaker) relationship between micro-break quantity and well-being.

**Hypothesis 13**: Micro-break quality moderates the relationship between micro-break quantity and employee well-being at the within-person level, such that for a given employee, the relationship between micro-break quantity and well-being is stronger (vs. weaker) when he or she has higher (vs. lower) level of micro-break quality.
STUDY 1

Methods

Study 1 aimed to generate and validate a measure for assessing micro-break climate. For all four dimensions (i.e., management support, supervisor norms, coworker norms, work-break autonomy), I generated items that should capture the corresponding constructs. I generated 48 items in total, 14 for management support, 12 for supervisor norms, 11 for coworker norms, and 11 for work-break autonomy.

To examine content validity of these items, I provided 5 graduate students with descriptions of the four constructs and presented the items to them in a random order. The 5 graduate students were all psychology majors, and they were asked to classify each given item into one of the four groups or to an “other” category. All items that were correctly classified to the a priori category by at least 80% raters (i.e., 4 raters) were kept (Sonnentag & Fritz, 2007). Based on this decision criterion, all 48 items were successfully retained in this context validation process. Thus, I used all these 48 items for further measure development.

Sample and Procedure

Participants for the scale validation were recruited from Amazon’s Mechanical Turk (www.mturk.com), which is an online labor system developed by Amazon. In total, 653 participants responded to the survey. On average, participants were 33.1 years old
(SD = 7.14), with an average organizational tenure of 91.0 months (SD = 52.04). The majority of the participants were female (52.1%) and had bachelor’s degree (79.3%). The sample represented a wide range of industries and job types, including education (10.0%), health (8.7%), government (8.4%), service (10.0%), manufacturing (10.7%), finance-insurance (11.6%), retailing (10.1%), advertising-publishing (10.9%), travel-transportation (9.0%), and human services (10.6%).

**Measures**

*Micro-break climate.* Micro-break climate was measured using a scale developed for this study. Participants were asked to rate 48 items asking the extent to which they agreed with each of the statements, based on a five-point scale (1 = *Strongly Disagree*, 5 = *Strongly Agree*).

*Micro-break quantity.* Micro-break quantity was measured using a single item asking participants how often they engage in micro-breaks in general (1 = *Never*, 5 = *Very Frequently*).

*Job autonomy.* Job autonomy was measured using a 4-item job autonomy scale in 2002 National Study of the Changing Workforce (NSCW), which was developed by the

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4 See the discussion in Appendix about why I suggested micro-breaks should not be treated as a formative construct, which is aggregated by items. Even though micro-breaks were measured by a single item, a detailed paragraph that describes what micro-breaks are and provides examples of micro-breaks was presented to participants to help them understand the construct we were measuring. Throughout the entire study (i.e., Study 1 – 3), this paragraph was presented to participants when necessary.

5 In the current study, micro-break quantity is defined as the total amount of time one spends on micro-breaks during a given amount of time. A further breakdown of “quantity” reveals the following equation: quantity = frequency × average length. Thus, both frequency of micro-breaks and average length of micro-breaks could be proxies of micro-break quantity. The current study used “frequency” to measure micro-break quantity for two reasons. First, total amount of time one spends on micro-breaks is usually hard to measure, as it could be too specific for one to recall. Second, the “frequency” anchors are widely used in organizational survey research and have demonstrated their validity. Thus, in the current study, I used “frequency” as a proxy for “quantity.”
Families and Work Institute in consultation with experts in the field (Thompson & Prottas, 2005). Participants were asked to rate the extent to which they agreed with each of the statement (1 = Strongly Disagree, 5 = Strongly Agree). A sample item was “I have the freedom to decide what I do on my job.” Cronbach’s alpha was .93.

*Perceived organizational support.* Perceived organizational support was assessed using an 8-item scale developed by Eisenberger, Cummings, Armelo, and Lynch (1997). Participants were asked to rate the extent to which they agreed with each of the statement (1 = Strongly Disagree, 7 = Strongly Agree). Sample items were “My organization really cares about my well-being” and “My organization shows very little concern for me (reversely coded).” Cronbach’s alpha was .84.

*Job satisfaction.* Job satisfaction was assessed using a 2-item scale adapted from Diener, Emmons, Larsen, and Griffin (1985). Participants were asked to rate the extent to which they agreed with each of the statement (1 = Strongly Disagree, 7 = Strongly Agree). A sample item was “All in all, I am satisfied with my job.” Cronbach’s alpha was .94.

**Results**

The measure of micro-break climate was validated based on the common practice of scale development (Gerbing & Anderson, 1988; Hinkin, 1998).

*Exploratory Factor Analysis (EFA)*

To consider the underlying factor structure of the scale items, I first conducted an EFA of the 48 items by randomly selecting 300 participants’ response, followed by a
confirmatory factor analysis (CFA) using the rest of participants’ responses (i.e., \( N = 353 \)). I carried out a series of EFAs to obtain a preliminary view of the overall relational structure of the items, as well as to eliminate items that were obvious outliers (i.e., no connections with other items in the same dimension) or conceptually ambiguous (i.e., representing multiple dimensions).

The first EFA with all 48 items using principal axis factoring with oblique rotation generated 7 factors with eigenvalues ranging from 1 to 6. One by one, I removed items that constituted a single-item factor or had high cross-loadings on multiple factors (i.e., the difference between cross-loadings is smaller than .3; Ferguson & Cox, 1993). Eventually, after I removed 28 items, the EFA resulted in a 21 item, 4-factor solution that explained 83.42% of the total item variance. The four factors showed eigenvalues of 4.57, 4.48, 4.44, and 4.04, respectively, and accounted for 21.76%, 21.31%, 21.13%, and 19.23% of the total variance, indicating that each of the four dimensions makes a fairly comparable and balanced contribution to the entire construct. The results of final factor loadings are shown in Table 1.
I also tested the underlying factor structure of the 21 items obtained from the EFA through a CFA using the responses from 353 participants. To validate the hypothesized four-dimension structure, I loaded the items on their corresponding dimensions (Arbuckle, 2005). The four-factor model exhibited a good model fit, with $\chi^2$/degrees of freedom ($df$) = 1.04, RMSEA = .01, CFI = .96, TFI = .95, and all items loaded significantly on their corresponding dimensions (all $ps < .05$; Gerbing & Anderson, 1988). Attempts to reduce the number of dimensions from four to three (i.e., six possibilities in total) all resulted in significantly worse fit, with the best three-factor model exhibiting $\chi^2/df = 19.78$, RMSEA = .17, CFI = .80 and TFI = .77. In addition, the difference between the two models is significant, with $\Delta \chi^2 (df = 3) = 3507, p < .01$. The detailed comparisons between four-factor model and all possible three-factor models are presented in Table 2. Furthermore, in order to test whether the four dimensions are a

**Table 1 Results for Exploratory Factor Analysis**

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>My colleagues and I are aware that micro-breaks are encouraged in my organization</td>
<td>0.658</td>
<td>0.232</td>
<td>0.213</td>
<td>0.199</td>
</tr>
<tr>
<td>Micro-breaks are frowned upon in my organization</td>
<td>0.624</td>
<td>0.311</td>
<td>0.198</td>
<td>0.310</td>
</tr>
<tr>
<td>My organization does not encourage employees to take micro-breaks</td>
<td>0.612</td>
<td>0.199</td>
<td>0.197</td>
<td>0.008</td>
</tr>
<tr>
<td>My organization offers a lot of resources (e.g., food, drink, comfortable office layout, external website access) for employees to take micro-breaks</td>
<td>0.627</td>
<td>0.252</td>
<td>0.317</td>
<td>0.121</td>
</tr>
<tr>
<td>The resources provided by my organization for micro-breaks are very limited and not accessible</td>
<td>0.617</td>
<td>0.300</td>
<td>0.258</td>
<td>0.221</td>
</tr>
<tr>
<td>My supervisor encourages me to take micro-breaks when I need to</td>
<td>0.121</td>
<td>0.840</td>
<td>0.321</td>
<td>0.110</td>
</tr>
<tr>
<td>I often chat with my supervisor on non-work related topics</td>
<td>0.019</td>
<td>0.775</td>
<td>0.222</td>
<td>-0.192</td>
</tr>
<tr>
<td>My supervisor considers it important to take micro-breaks at work</td>
<td>0.191</td>
<td>0.762</td>
<td>0.105</td>
<td>-0.231</td>
</tr>
<tr>
<td>My supervisor expects me to take micro-breaks when I need to</td>
<td>0.009</td>
<td>0.772</td>
<td>0.111</td>
<td>-0.381</td>
</tr>
<tr>
<td>My supervisor would not be unhappy with me for my micro-breaks</td>
<td>0.018</td>
<td>0.762</td>
<td>0.003</td>
<td>0.412</td>
</tr>
<tr>
<td>My coworkers often take micro-breaks when they need to</td>
<td>0.126</td>
<td>0.422</td>
<td>0.768</td>
<td>0.229</td>
</tr>
<tr>
<td>My coworkers often take micro-breaks with me</td>
<td>0.128</td>
<td>0.157</td>
<td>0.738</td>
<td>-0.423</td>
</tr>
<tr>
<td>My coworkers often chat with me on non-work related topics</td>
<td>0.196</td>
<td>-0.248</td>
<td>0.727</td>
<td>0.234</td>
</tr>
<tr>
<td>I often see my coworkers take micro-breaks in the workplace</td>
<td>-0.322</td>
<td>0.293</td>
<td>0.727</td>
<td>0.421</td>
</tr>
<tr>
<td>I think my coworkers and I are the same in terms of our right to take micro-breaks</td>
<td>-0.135</td>
<td>-0.321</td>
<td>0.796</td>
<td>0.321</td>
</tr>
<tr>
<td>I can take micro-breaks just like what my coworkers do</td>
<td>0.333</td>
<td>0.283</td>
<td>0.768</td>
<td>-0.232</td>
</tr>
<tr>
<td>When I want to take a micro-break in the workplace, I can do so</td>
<td>0.294</td>
<td>0.344</td>
<td>0.259</td>
<td>0.684</td>
</tr>
<tr>
<td>Taking micro-breaks when necessary is beneficial for my job performance</td>
<td>-0.121</td>
<td>0.291</td>
<td>0.389</td>
<td>0.645</td>
</tr>
<tr>
<td>I can balance between my time on working and taking micro-breaks</td>
<td>-0.609</td>
<td>0.329</td>
<td>0.290</td>
<td>0.645</td>
</tr>
<tr>
<td>My job is designed in a way that taking micro-breaks will hurt my performance</td>
<td>-0.601</td>
<td>0.291</td>
<td>0.277</td>
<td>0.626</td>
</tr>
<tr>
<td>I totally have no authority for micro-breaks</td>
<td>0.123</td>
<td>0.215</td>
<td>0.099</td>
<td>0.618</td>
</tr>
</tbody>
</table>

Note. $N$ = 300, Cronbach’s alpha for management support = 0.97, Cronbach’s alpha for supervisory norms = 0.82, Cronbach’s alpha for coworker norms = 0.97, and Cronbach’s alpha for work-break autonomy = 0.96.

**Confirmatory Factor Analysis (CFA)**

I also tested the underlying factor structure of the 21 items obtained from the EFA through a CFA using the responses from 353 participants. To validate the hypothesized four-dimension structure, I loaded the items on their corresponding dimensions (Arbuckle, 2005). The four-factor model exhibited a good model fit, with $\chi^2$/degrees of freedom ($df$) = 1.04, RMSEA = .01, CFI = .96, TFI = .95, and all items loaded significantly on their corresponding dimensions (all $ps < .05$; Gerbing & Anderson, 1988). Attempts to reduce the number of dimensions from four to three (i.e., six possibilities in total) all resulted in significantly worse fit, with the best three-factor model exhibiting $\chi^2/df = 19.78$, RMSEA = .17, CFI = .80 and TFI = .77. In addition, the difference between the two models is significant, with $\Delta \chi^2 (df = 3) = 3507, p < .01$. The detailed comparisons between four-factor model and all possible three-factor models are presented in Table 2. Furthermore, in order to test whether the four dimensions are a
good presentation of a single higher-level construct, I also specified a second-order model by loading the four constructs onto a higher-order construct. This model resulted in a slightly better fit, with $\chi^2/df = 1.03$, RMSEA = .01, CFI = .96, TFI = .96, and an insignificant difference with the four-factor model ($\Delta \chi^2 (df=2) = 2.43, p > .05$). This suggests that a four-dimension model of micro-break climate should be retained.

Table 2 Micro-break climate CFA results comparison

<table>
<thead>
<tr>
<th></th>
<th>$\chi^2/df$</th>
<th>RMSEA</th>
<th>CFI</th>
<th>TFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four-factor model</td>
<td>1.04</td>
<td>0.08</td>
<td>0.98</td>
<td>0.98</td>
</tr>
<tr>
<td>Alternative model 1</td>
<td>19.78</td>
<td>0.17</td>
<td>0.80</td>
<td>0.77</td>
</tr>
<tr>
<td>Alternative model 2</td>
<td>25.63</td>
<td>0.19</td>
<td>0.74</td>
<td>0.70</td>
</tr>
<tr>
<td>Alternative model 3</td>
<td>25.90</td>
<td>0.20</td>
<td>0.73</td>
<td>0.70</td>
</tr>
<tr>
<td>Alternative model 4</td>
<td>25.60</td>
<td>0.19</td>
<td>0.74</td>
<td>0.70</td>
</tr>
<tr>
<td>Alternative model 5</td>
<td>25.90</td>
<td>0.20</td>
<td>0.73</td>
<td>0.70</td>
</tr>
<tr>
<td>Alternative model 6</td>
<td>25.89</td>
<td>0.17</td>
<td>0.72</td>
<td>0.66</td>
</tr>
</tbody>
</table>

Note: $N = 353$; Alternative model 1 combines management support and supervisor norms; Alternative model 2 combines management support and coworker norms; Alternative model 3 combines management support and work-break autonomy; Alternative model 4 combines supervisor norms and coworker norms; Alternative model 5 combines supervisor norms with work-break autonomy; Alternative model 6 combines coworker norms and work-break autonomy.
Construct Validity

With the underlying factor structure validated, I further checked construct validity of the measurement, which involved an examination of the nomological network of the construct (Chen et al., 2004; Hinkin, 1998). To test whether micro-break climate’s dimensions demonstrate theoretically predicted relations with other established constructs (i.e., micro-break quantity, job autonomy, perceived organizational support, job satisfaction), I further examined their correlation coefficients with the entire sample, with results shown in Table 3.

Table 3 Micro-break climate scale construct validity

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Management support</td>
<td>3.24</td>
<td>1.21</td>
<td>(0.97)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Supervisor norms</td>
<td>3.73</td>
<td>1.52</td>
<td>0.16*</td>
<td>(0.81)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Coworker norms</td>
<td>3.22</td>
<td>2.11</td>
<td>0.23*</td>
<td>0.31**</td>
<td>(0.97)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Work-break autonomy</td>
<td>3.31</td>
<td>1.78</td>
<td>0.11</td>
<td>0.23*</td>
<td>0.02</td>
<td>(0.95)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Micro-Breaks</td>
<td>3.77</td>
<td>2.11</td>
<td>0.19*</td>
<td>0.13**</td>
<td>0.12*</td>
<td>0.10</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Job autonomy</td>
<td>2.87</td>
<td>2.10</td>
<td>0.14</td>
<td>0.14</td>
<td>0.11</td>
<td>0.24**</td>
<td>0.15*</td>
<td>(0.93)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. POS</td>
<td>3.00</td>
<td>1.32</td>
<td>0.23*</td>
<td>0.25**</td>
<td>0.09</td>
<td>0.04</td>
<td>0.24**</td>
<td>0.19*</td>
<td>(0.84)</td>
<td></td>
</tr>
<tr>
<td>8. Job satisfaction</td>
<td>3.21</td>
<td>1.23</td>
<td>0.12</td>
<td>0.13**</td>
<td>0.15**</td>
<td>0.09</td>
<td>0.22**</td>
<td>0.26*</td>
<td>0.26**</td>
<td>(0.94)</td>
</tr>
</tbody>
</table>

Note: N = 653; POS = Perceived Organizational Support; Micro-Breaks here were assessed by a single-item measure; All numbers in the parenthesis indicate Cronbach’s alpha of the variables; * p < .05; ** p < .01.

The results supported the construct validity of the four proposed dimensions of micro-break climate. As shown in the table, management support was positively correlated with micro-break quantity ($r = .19, p < .05$) and perceived organizational support ($r = .23, p < .05$). Both supervisor norms and coworker norms were positively associated with micro-break quantity and job satisfaction ($r = .13, p < .01$ and $r = .13, p < .01$, $r = .12, p < .05$ and $r = .15, p < .01$, respectively), but only supervisor norms were
positively related to perceived organizational support \((r = .25, p < .01)\). Finally, work-break autonomy was only positively correlated with job autonomy \((r = .24, p < .01)\). In sum, these findings suggest that the proposed four dimensions of micro-break climate are inherently related yet effectively capture distinctive aspects of the construct of micro-break climate.
STUDY 2

Methods

Sample and Procedure

Participants of Study 2 were recruited from several community websites in South Korea. These websites were among the 50 most popular websites in South Korea, with daily visits exceeding 1,000,000 according to Rankey.com. I posted recruitment advertisements on these websites, which contained eligibility for participation, procedure of the study, and compensation for completion of the study (a $3 Starbucks e-gift card). To qualify for the study, participants need to be full-time office workers (i.e., white-collar workers) with a relatively fixed work schedule and lunch hour.

The data collection process for Study 2 was a one-time online survey. Specifically, interested participants received a URL link via email, which directed them to an online survey measuring the attitude toward micro-breaks, supervisor norms, coworker norms, management support, work-break autonomy, micro-break quantity, micro-break quality, vitality, and fatigue. In total, 321 participants responded to the survey. In the final sample, all participants (54% male) were from South Korea, were 32.14 (SD = 6.24) years of age on average, and worked for an average of 78.2 months (SD = 10.01). A majority of participants (82.4%) held a bachelor’s degree. Participant

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6 In South Korea, the typical work schedule for white-collar workers is between 9 a.m. to 6 p.m., and they usually have a fixed one-hour lunch break from 12 p.m. to 1 p.m.
working industries cover service (26.4%), design and fashion (17.5%), manufacturing (23.2%), public service (18.1%), education (6.9%), finance (6.6%), and others (2.3%). Most participants (79.2%) worked at organizations with 100 – 999 employees.

**Measures**

For all measures, a translation-back translation procedure (Brislin, 1970) was used to translate the measures from English to Korean in order to ensure consistency in content across languages.

*The attitude toward micro-breaks.* The attitude toward micro-breaks was measured using a 5-item scale based on Ajzen’s (2002) instructions on how to construct a TPB (i.e., the theory of planned behavior) questionnaire. Sample items were “It is beneficial to take micro-breaks at work” and “It is valuable to take micro-breaks at work.” Participants rated on a response scale ranging from “1 = Strongly disagree” to “7 = Strongly agree.” Cronbach’s alpha was 0.88.

*Micro-break climate.* Micro-break climate was measured using a scale developed for this study. Participants were asked to rate 21 items asking the extent to which they agreed with each of the statements, based on a five-point scale (1 = Strongly Disagree, 5 = Strongly Agree). Cronbach’s alphas for management support, supervisor norms, coworker norms, and work-break autonomy were 0.94, 0.95, 0.91, and 0.91, respectively.

*Micro-break quantity.* Micro-break quantity was measured using a single item asking participants how often they engage in micro-breaks in general (1 = Never, 5 = Very Frequently).
**Micro-break quality.** Micro-break quality was measured using a 16-item scale adapted from Sonnentag and Fritz’s (2007) recovery experience scale, which captured all four aspects of recovery quality. Specifically, participants were asked to rate the extent to which they agreed with the statements in general (1 = *Strongly Disagree*, 5 = *Strongly Agree*). Sample items were “I get a break from the demands of work” and “I determine for myself how I will spend my break time.” In the current study, for parsimony, micro-break quality was treated as a unidimensional measure because all four aspects of recovery experience were significantly correlated in Sonnentag and Fritz’s (2007) study. Cronbach’s alpha was .76.

**Vitality.** Vitality was measured using a 6-item scale developed by McNair, Lorr, and Droppleman (1971). Specifically, participants were asked to what extent they agreed with the words that describe what they feel in general when they finish their everyday work (1 = *Strongly Disagree*, 5 = *Strongly Agree*). Sample items were “Lively,” “Energetic,” and “Cheerful.” Cronbach’s alpha was .82.

**Fatigue.** Fatigue was measured using a 5-item scale developed by McNair, Lorr, and Droppleman (1971). Specifically, participants were asked to what extent they agreed with the words that describe what they feel in general when they finish their everyday work (1 = *Strongly Disagree*, 5 = *Strongly Agree*). Sample items were “Fatigue,” “Exhausted,” and “Bushed.” Cronbach’s alpha was .81.

**Results**

Means, standard deviations, and inter-correlations of the focal study variables are presented in Table 4. As shown, the attitude toward micro-breaks (*r* = .21, *p* < .05),
management support \( (r = .24, p < .05) \), supervisor norms \( (r = .19, p < .05) \), coworker norms \( (r = .18, p < .05) \), and work-break autonomy \( (r = .16, p < .05) \) are all positively correlated with micro-break quantity, providing preliminary support to H1 to H5. Moreover, both micro-break quantity and micro-break quality are positively related to vitality \( (r = .23, p < .05 \text{ and } r = .18, p < .05, \text{ respectively}) \) and negatively related to fatigue \( (r = -.21, p < .05 \text{ and } r = -.17, p < .05, \text{ respectively}) \), thus providing support for H8 and H10.

I also conducted a path analysis to further confirm the findings, with results presented in Table 5. Specifically, I used Mplus 6.12 software (Muthén & Muthén, 2007) to specify the hypothesized model and estimated the path coefficients. In the results, the attitude toward micro-breaks was positively associated with micro-break quantity \( (\beta = .20, p < .05) \), providing further support for H1. Both supervisor norms \( (\beta = .22, p < .05) \) and coworker norms \( (\beta = .18, p < .05) \) were positively related to micro-break quantity, providing further support to H2 and H3. Management support was found to be positively correlated with micro-break quantity \( (\beta = .17, p < .05) \), providing support for H4. Work-break autonomy was positively correlated with micro-break quantity \( (\beta = .14, p < .05) \), providing further support for H5.
In terms of the outcomes of micro-breaks, micro-break quantity was found to be positively correlated with vitality ($\beta = .22, p < .05$) and negatively correlated with fatigue ($\beta = -.20, p < .05$), which provides support for H8. Similarly, micro-break quality was also positively correlated with vitality ($\beta = .16, p < .05$) and negatively correlated with fatigue ($\beta = -.17, p < .05$), which provided support for H10. However, the moderation effect of micro-break quantity and micro-break quality was not found on either vitality ($\beta = .02, p > .05$) or fatigue ($\beta = -.01, p > .05$), failing to provide evidence for H12. In sum, at the between-person level, most of the hypotheses of the current study were empirically evident, except H12.

Table 4 Descriptive statistics for Study 2

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The attitude toward micro-breaks</td>
<td>3.11</td>
<td>1.11</td>
<td>0.88</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Supervisor norms</td>
<td>3.03</td>
<td>1.79</td>
<td>0.14</td>
<td>0.94</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Coworker norms</td>
<td>2.98</td>
<td>1.21</td>
<td>0.11</td>
<td>0.09</td>
<td>0.95</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Management support</td>
<td>2.99</td>
<td>1.17</td>
<td>0.09</td>
<td>-0.02</td>
<td>0.11</td>
<td>0.91</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Work-break autonomy</td>
<td>2.77</td>
<td>0.98</td>
<td>0.17</td>
<td>0.10</td>
<td>0.08</td>
<td>0.02</td>
<td>0.91</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Micro-breaks</td>
<td>2.22</td>
<td>1.32</td>
<td>0.21</td>
<td>0.24</td>
<td>0.19</td>
<td>0.18</td>
<td>0.16</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Micro-break quality</td>
<td>2.56</td>
<td>1.23</td>
<td>0.19</td>
<td>0.15</td>
<td>0.16</td>
<td>0.12</td>
<td>0.09</td>
<td>-0.04</td>
<td>0.76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Vitality</td>
<td>3.21</td>
<td>1.88</td>
<td>0.24</td>
<td>0.22</td>
<td>0.21</td>
<td>0.20</td>
<td>0.31</td>
<td>0.23</td>
<td>0.18</td>
<td>0.82</td>
<td></td>
</tr>
<tr>
<td>9. Fatigue</td>
<td>3.12</td>
<td>1.31</td>
<td>-0.20</td>
<td>-0.18</td>
<td>-0.25</td>
<td>0.19</td>
<td>-0.33</td>
<td>-0.21</td>
<td>-0.17</td>
<td>-0.45</td>
<td>0.81</td>
</tr>
</tbody>
</table>

Note: $N = 321$; All numbers in the parenthesis indicate Cronbach’s alpha of the variables; * $p < .05$, ** $p < .01$. 

(Continued on the next page)
<table>
<thead>
<tr>
<th>Path Coefficient</th>
<th>Micro-break Quantity</th>
<th>Vitality</th>
<th>Fatigue</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The attitude toward micro-breaks</td>
<td>0.20*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Supervisor norms</td>
<td>0.22*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Coworker norms</td>
<td>0.18*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Management support</td>
<td>0.17*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Work-break autonomy</td>
<td>0.14*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Micro-breaks</td>
<td>0.22*</td>
<td>-0.20*</td>
<td></td>
</tr>
<tr>
<td>7. Micro-break quality</td>
<td>0.16*</td>
<td>-0.17*</td>
<td></td>
</tr>
<tr>
<td>8. Quantity × Quality</td>
<td>0.02</td>
<td>-0.01</td>
<td></td>
</tr>
</tbody>
</table>

Note: Note: N = 321; * p < .05.
STUDY 3

Methods

Sample and Procedure

Study 3 was conducted to empirically test the nomological network of micro-breaks at the within-person level. Participants were recruited in the same way as Study 2. Due to the greater time commitment, the compensation for Study 3 was raised to a $15 Starbucks e-gift card.

Data collection included an initial survey measuring demographic information and 9 hourly online surveys over the course of a typical workday. A Wednesday was chosen because Wednesday is in the middle of the workweek and employees tend to have a typical work schedule. On the data collection day, each participant received 9 online surveys at the following time: 10am, 11am, 12pm, 1pm, 2pm, 3pm, 4pm, 5pm, and 6pm. Each survey was accompanied by a text message as a reminder to complete the survey. All 9 surveys were identical in content, measuring need for recovery for the past hour, perceptions of coworker micro-breaks for the past hour, micro-break quantity for the past hour, micro-break quality for the past hour, and vitality at the moment. In each survey, participants were also asked to indicate whether they engaged in officially scheduled breaks (e.g., lunch) during the past hour. If a participant’s response to this question was “yes,” then his or her responses for that hour was entirely removed. The purpose of this
action is to prevent the effect of formally scheduled breaks from confounding the effect of micro-breaks on employee well-being.\(^7\)

In total, 135 participants responded to at least one hourly survey. At the end of the day, 24 participants failed to complete at least 50\% of the hourly assessments, so they were removed from our sample. Hence, 121 participants’ data were retained for further data analysis. Multiple independent t-tests were conducted to compare these 121 participants and those who dropped out (i.e., 24 participants) in terms of age, tenure, and education, and no significant differences were found (\(ps > .10\)). In the final sample, all participants (51\% male) were from South Korea, were 35.21 (\(SD = 6.28\)) years of age on average, and worked for an average of 95.6 months (\(SD = 13.02\)). A majority of participants (88.6\%) held a bachelor’s degree. Participants represented a wide variety of industries, including service (21.0\%), design and fashion (12.5\%), manufacturing (22.1\%), public service (10.3\%), education (7.6\%), finance (6.7\%), and others (19.8\%). Most participants (91.3\%) worked at organizations with 100 – 999 employees.

**Measures**

A translation-back translation procedure (Brislin, 1970) was used to translate all measures from English to Korean in order to ensure consistency in content across languages.

\(^7\) A comparison was made between the responses from the formal break hours and the rest of the hours. Paired t-tests revealed that micro-breaks taken during formal break hours were significantly lower than the average of the rest of the hours (\(t_{120} = 2.47, p < .05\)), and vitality at the end of formal break hours was marginally higher than the average of the rest of the hours (\(t_{120} = 1.98, p = .05\)). These findings suggest that formally scheduled breaks may confound the effect of micro-breaks on employee well-being.
Need for recovery. Need for recovery was measured using a 3-item scale adapted from Van Veldhoven and Broersen’s (2003) measurement. A sample item was “In the past hour, I felt rather exhausted because of my work.” Participants rated on a response scale ranging from “1 = Strongly Disagree” to “5 = Strongly Agree.” Across 9-time measures for the day, the averaged Cronbach’s alpha was .90.

Perceptions of coworker micro-breaks. Perceptions of coworker micro-breaks was measured using a 2-item scale created for this study. The two items were “In the past hour, my coworkers took micro-breaks” and “In the past hour, my coworkers asked me to take micro-breaks with them.” Participants rated on a response scale ranging from “1 = Strongly disagree” to “5 = Strongly agree.”

Micro-break quantity. Micro-break quantity was measured using a single item asking participants how often they engaged in micro-breaks in the past hour (1 = Never, 5 = Very Frequently).

Micro-break quality. Micro-break quality was measured using a 4-item scale adapted from Sonnentag and Fritz’s (2007) recovery experience scale, with each item representing one aspect of recovery quality. Specifically, participants were asked to rate the extent to which they agreed with the statements that described what they felt during micro-breaks in the past hour (1 = Strongly Disagree, 5 = Strongly Agree). Sample items were “I used the time to relax” and “I felt like I could decide for myself what to do.” Across 9-time measures for the day, the averaged Cronbach’s alpha was .82.

Vitality. Vitality was measured using a 6-item scale developed by McNair, Lorr, and Droppleman (1971). Specifically, participants were asked to what extent they agreed
with the words that describe what they feel at the moment (1 = Strongly Disagree, 5 = Strongly Agree). Sample items were “Lively,” “Energetic,” and “Cheerful.” Averaged Cronbach’s alpha of 9 measures was .79.

**Results**

Means, standard deviations, and inter-correlations of the focal study variables are presented in Table 6. As shown, at the within-person level, both need for recovery \( (r = .29, p < .01) \) and perceptions of coworker micro-breaks \( (r = .26, p < .01) \) were positively correlated with micro-break quantity, providing preliminary support for H6 to H7. In addition, both micro-break quantity and micro-break quality are positively related to vitality \( (r = .25, p < .05 \text{ and } r = .21, p < .05, \text{ respectively}) \) at the within-person level, and thus providing support for H9 and H11.

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>Within-person SD</th>
<th>Between-person SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Need for recovery</td>
<td>2.89</td>
<td>0.79</td>
<td>0.45</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Coworker micro-breaks</td>
<td>2.87</td>
<td>0.44</td>
<td>0.46</td>
<td>0.12</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Micro-break quantity</td>
<td>2.55</td>
<td>0.96</td>
<td>0.48</td>
<td>0.20**</td>
<td>0.26**</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Micro-break quality</td>
<td>2.74</td>
<td>0.81</td>
<td>0.47</td>
<td>0.11</td>
<td>0.19*</td>
<td>0.13</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>5. Vitality</td>
<td>2.59</td>
<td>0.83</td>
<td>0.42</td>
<td>0.18*</td>
<td>0.18*</td>
<td>0.25**</td>
<td>0.21*</td>
<td>--</td>
</tr>
</tbody>
</table>

Note: All variables are within-person variables; Correlations below the diagonal represent within-person correlations \( (n = 968) \).

\*Standard deviations at the person level.

\*\*Standard deviations at the hour level.

**Analytic Strategy**

I analyzed the data using Mplus 6.12 software (Muthén & Muthén, 2007) and specified a multilevel model due to the nested nature of the data. At the within-person
level, the following seven random effects were specified in the model: 1) random effect of need for recovery on micro-break quantity, 2) random effect of perceptions of coworker micro-breaks on micro-break quantity, 3) random effect of micro-break quantity on vitality, 4) random effect of micro-break quality on vitality, 5) random effect of the interaction term between micro-break quantity and micro-break quality on vitality, 6) random effect of need for recovery on vitality, and 7) random effect of perceptions of coworker micro-breaks on vitality. In addition, as the intervals between measures in the current study were relatively short (i.e., one hour), I also specified an autoregressive term in the model. In other words, the random effect of vitality at time (T-1) on vitality at time (T) was also specified. The multilevel model estimated reads as follows.

\[
\text{(Micro-Break Quantity)} = \beta_0 + \beta_1 \text{(Need for Recovery)} + \beta_2 \text{(Perceptions of Coworker Micro-Breaks)} + \mu \\
\text{(Vitality)}_T = \beta_0 + \beta_1 \text{(Micro-Break Quantity)} + \beta_2 \text{(Micro-Break Quality)} + \beta_3 \text{(Quantity × Quality)} + \beta_4 \text{(Vitality)}_{T-1} + \beta_5 \text{(Need for Recovery)} + \beta_6 \text{(Perceptions of Coworker Micro-Breaks)} + \mu
\]

To facilitate the interpretation of the findings, all variables except vitality at time (T) were group-mean centered to get unbiased estimates of the within-person level main effects (Hofmann & Gavin, 1998).

**Hypotheses Testing**

Unstandardized coefficients for the model are presented in Table 7. Snijiders and Bosker’s (1999) formulas were used to calculate pseudo-$R^2$ ($\sim R^2$) for the effect sizes in
predicting outcome. Predictors included in the model accounted for 37% of the total variance of micro-break quantity and 39% of the total variance in vitality, suggesting the model can explain sizable portions of variations in the outcome variable.

Table 7 Multilevel analysis results for Study 3

<table>
<thead>
<tr>
<th></th>
<th>Micro-breaks</th>
<th>Vitality(τ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Need for recovery</td>
<td>0.11* (0.03)</td>
<td></td>
</tr>
<tr>
<td>2. Perceptions of coworker micro-breaks</td>
<td>0.03 (0.04)</td>
<td></td>
</tr>
<tr>
<td>3. Micro-breaks</td>
<td></td>
<td>0.09* (0.04)</td>
</tr>
<tr>
<td>4. Micro-break quality</td>
<td></td>
<td>0.10* (0.03)</td>
</tr>
<tr>
<td>5. Quantity × Quantity</td>
<td></td>
<td>0.01 (0.01)</td>
</tr>
<tr>
<td>6. Vitality(τ,τ)</td>
<td></td>
<td>0.19** (0.04)</td>
</tr>
</tbody>
</table>

Note: All variables are within-person variables; N = 968; All numbers in parenthesis are standard deviations.

In the results, the weight for need for recovery on micro-break quantity is significant (γ = .11, p < .05), providing support for H6. The weight for perceptions of coworker micro-breaks on micro-break quantity is not significant (γ = .03, p < .05), which fails to support H7. These results indicate that, in the hour that an employee has a stronger need for recovery, his or her own micro-break quantity during that hour would be higher. After controlling for the autoregressive effect, both micro-break quantity (γ = .09, p < .05) and micro-break quality (γ = .10, p < .05) are significant related to vitality, supporting H9 and H11. These results indicate that, in the hour that an employee spends more time on micro-breaks, his or her vitality level at the end of that hour would be higher; in the hour that an employee’s micro-break quality was higher, his or her vitality
level at the end of that hour would be higher. Similar to the finding of Study 2, the within-person level moderating effect of micro-break quality on the within-person relationship between micro-break quantity and vitality is not significant ($\gamma = .01, p < .05$), which fails to support H13.
DISCUSSION

Discussion of results and contributions

The main goals of the current study are all directly aligned with extending the nomological network of micro-break quantity. First, the antecedents of micro-break quantity, at both the between-person level and the within-person level, were explored for the first time in micro-breaks literature. Second, the current study also replicated previous findings on the outcome of micro-break quantity, which is without doubt an important element of the nomological network. Last but not least, the boundary condition of the relationship between micro-break quantity and outcomes were proposed and examined. Overall, these attempts were successful in that majority of the hypotheses of the current study were supported.

Antecedents of micro-break quantity at the between-person level were tested based on the theory of planned behavior (Ajzen, 1991), which was for the first time employed to recovery research. Five antecedents, namely the attitude toward micro-breaks, supervisor norms, coworker norms, management support, and work-break autonomy were all found significantly associated with micro-break quantity at the between-person level. In other words, both personal (i.e., the attitude toward micro-breaks) and contextual factors (i.e., micro-break climate) were effective in explaining the individual differences with regards to micro-break quantity in general. There are some
important implications in these findings. Theoretically, the theory of planned behavior was found to be successful in predicting behaviors that are more micro in nature, compared to many other behaviors that are more stable and macro (Ajzen, 1991). To some extent, the current study answers the call of expending the scope of behaviors explained or predicted by the theory of planned behavior (Ajzen, 2002). Practically, the findings of the current study provide employers with some evidence that employees’ micro-breaks can be encouraged or discouraged by changing their attitudes toward micro-breaks or the environment where they are exposed to. Therefore, organizational policy makers are equipped with more knowledge and tools to shape their employees’ behaviors by helping them balance between work and recovery.

At the within-person level, based on resource-depletion theories (Fredrickson, 1998, 2001; Hobfoll, 1998; Meijman & Mulder, 1998; Muraven & Baumeister, 2000; Pfeffer, 2010), need for recovery was found to relate to micro-break quantity, suggesting that personal factor is able to predict micro-break quantity across situations. In other words, when a person’s need for recovery is stronger, he or she is more likely to spend time on micro-breaks. This finding also has both theoretical and practical implications. For the theoretical aspect, the finding is able to provide more empirical evidence that micro-breaks could inherently be conceptualized as a resource-recovery process, which serves as a solid theoretical foundation for micro-break researchers. For the practical aspect, the conclusion that need for recovery is closely associated with micro-break quantity informs that one of the important reasons for employees to take breaks momentarily and from time to time is that they really need the breaks.
The only hypothesis on the antecedents of micro-break quantity that was not supported is H7, which depicts the within-person relationship between perceptions of coworker micro-breaks and micro-break quantity. A closer look at the data suggests that a possible explanation of the insignificance might be the small within-person variance of the focal variable (i.e., perceptions of coworker micro-breaks). As is shown in Table 6, the within-person variance of perceptions of coworker micro-breaks is relatively small ($SD = .44$), compared to the within-person variance of need for recovery ($SD = .79$). Such a small variance may be caused by two reasons. First, in some organizations, employees may not be able to easily and accurately identify what their coworkers are doing all the time. For instance, some office layout may prevent employees from seeing each other’s computer screens so one may not be able to catch when his or her coworkers are checking Facebook. One may also not be able to observe coworkers’ behaviors if he or she is busy working on work tasks. In the current study, participants were directly asked about their observations of their coworkers, so it is possible that a lot of information was missing and the measure was not very accurate. Second, even if participants were good at observing their coworkers’ behaviors, such observations may not always be successful if coworkers deliberately hid when they took micro-breaks. Based on signaling theory (for a review, see Connelly, Certo, Ireland, & Reutzel, 2011), when someone takes micro-breaks, he or she is actually sending out signals to the people around, which may be interpreted in different ways. If someone is afraid that the signals from micro-breaks might be negatively interpreted by colleagues or supervisors, then probably micro-breaks may be hidden and therefore hard to detect. Taken together, a take-away is that a more solid way
to measure perceptions of coworker micro-breaks needs to be developed to solve these problems.

The second theme of extending micro-break quantity’s nomological network is the relationship between micro-break quantity and its outcomes. Specifically, the current study focused on the association between micro-break quantity and employee well-being, which is the most widely examined outcome of micro-breaks (Fritz et al., 2011). In the results, micro-break quantity was found to be significantly related to vitality at both the between-person level and the within-person level. At the between-person level, people who took more micro-breaks in general were found to have higher level of vitality, which suggests that micro-breaks are beneficial to people from a long term perspective. On the other hand, when people take more micro-breaks during a short period of time, they are more likely to have higher level of vitality at the end of the period, indicating a within-person relationship between micro-break quantity and well-being. This finding is important in that it entails an imminent beneficial effect of micro-breaks on well-being. Even though the relationship between micro-break quantity and employee well-being has been validated in the literature, the current study is the first one that explicitly examined and compared such relationships at the between-person and within-person levels, though which process important insights were obtained about micro-breaks’ effect.

Last but not least, another goal of the current study is to extend the nomological network of micro-break quantity by adding the boundary condition of the relationship between micro-break quantity and employee well-being. Specifically, micro-break quality was hypothesized to moderate the relationship between micro-break quantity and
employee well-being, at both the between-person level and the within-person level. Results suggested the even though micro-break quality was directly related to employee well-being at both levels, unfortunately such moderation effect was found at neither the between-person level or the within-person level. In other words, more time on micro-breaks and better micro-breaks are both helpful for employees’ resource recovery, but the two factors do not interact to affect employee well-being. I suggest that a possible reason for this is the study design. As the intervals between measures were quite small (i.e., one hour), an autoregressive term was specified in the model as a control variable. Thus, the effect between any variable and outcome is the effect that is over and above the effect of the autoregressive effect. As is shown in Table 7, the autoregressive term was significantly related to the outcome, which means that it explained a substantial amount of variance of vitality. Thus, a possible reason for the insignificance of moderation effects (i.e., H12 & H13) might be that the moderation effects were overridden by the autoregressive effects. More studies should be conducted to test the moderation effects using a half-daily dairy or daily diary design.

**Methodological issues**

Although the theories and practical implications are critical, it is without doubt that one cannot avoid dealing with methodological issues in research on micro-breaks. Specifically, how to conceptualize, define, and measure micro-breaks are all closely tied to each other, and a clear theme should be adopted in each micro-break research because it allows researchers to have a better understanding about the phenomenon they are studying. In what follows, I discuss some issues on the conceptualization of micro-breaks.
and how to measure micro-breaks in general, based on both the current study and previous studies on micro-breaks in the literature.

Micro-breaks in the current study are defined as nonwork activities that occur when work tasks are expected or required. When measuring micro-breaks, the current study focused on the quantity aspect of micro-breaks, which is ideally the total amount of time a person spends on micro-breaks during a given amount of time. Besides, micro-break quantity was assessed once every hour over the course of a workday. In fact, there could be a lot of ways of measuring micro-breaks, and no best practice has been put forward in the literature. Although how micro-breaks were measured in previous studies has been briefly mentioned in the earlier literature review, I summarize them here again for gaining more insights. Specifically, Fritz et al. (2011) and Kim et al. (2016) both measured the frequency of each micro-break activity, using a list of pre-validated micro-break activities. The process of content validation of their measures was asking a group of subject matter experts to identify which activities could be counted as micro-breaks. Then, Fritz et al. (2011) linked each micro-break to outcome variables, and Kim et al. (2016) aggregated items of micro-breaks for each category and linked each category to outcome variables. Zacher et al. (2014) used a slightly different approach by measuring how many different types of micro-breaks occurred. They asked participants to select which micro-breaks they engaged during the past hour (0 = did not use strategy, 1 = used strategy) from a pre-validated list, and then aggregated the items for an overall score representing micro-breaks. Lastly, in Hunter and Wu’s (2016) study, the authors recorded what naturally happened for participants using an experience sampling approach (instead
of using a pre-validated scale), and measured many characteristics of each micro-break, including whether it was less effortful, individually preferred, time of break, location of breaks (i.e., outside vs. inside the office), number of breaks per day, and break length. In sum, the measurements of micro-breaks were quite different in previous studies.

There are many reasons why previous measures of micro-breaks were so different. First, based on our definition of micro-breaks, there is such a large number of possible micro-breaks that people can engage in the workplace, and micro-breaks are often contingent on the job. Micro-breaks vary across industries. Office workers may take a micro-break by doing online shopping, whereas construction workers may take a micro-break by smoking a cigarette. Micro-breaks also vary in different organizations, as some organizations are equipped with soda fountains while others may offer free coffee. People who work at different positions may also use different ways to take micro-breaks. For instance, managers often have their own offices and subordinates may sit in a shared cubical area. Thus, it is more convenient for managers to gaze out of the window (because they have one), take a nap, or do some stretches in the office, and it may be easier for subordinates to chat with their coworkers sitting at the next table. Employees may also take different types of micro-breaks in different situations. On the days with higher workloads, employees may not have the luxury to take a walk outside of the office, and may only have time to do some quick stretches in their chairs.

Given the wide variety of micro-breaks at work and their highly contingent nature on the job, it is important for researchers to choose carefully the target of their study. Specifically, they can focus on one particular type of micro-break (or a few types of
micro-breaks; e.g., Fritz et al., 2011), a category of micro-breaks (or a few categories of micro-breaks; e.g., Kim et al., 2016), or micro-breaks as a whole (i.e., all kinds of micro-breaks all together; e.g., Zacher et al., 2014). Measurement is straightforward if researchers choose to study one type of micro-break, because they can directly measure the micro-break of interest (e.g., the frequency of “go to bathroom” within a workday). However, things are different when measuring a category of micro-breaks or micro-breaks as a single construct. To date, a common approach is to use a formative construct to represent a category of micro-breaks (e.g., social related micro-breaks; Kim et al., 2016) or micro-breaks as a whole. When doing so, individual micro-breaks are measured and aggregated to represent the category of micro-breaks or micro-breaks as a whole. However, for this approach, researchers have to make sure the micro-break items they choose to represent micro-breaks are mutually exclusive and collectively exhaustive enough for that specific category. Otherwise, the formative construct may be biased and Type II error is increased due to measurement insufficiency (Diamantopoulos & Siguaw, 2006). Unfortunately, given the nature of micro-breaks, exhausting all micro-breaks for a specific category or micro-breaks as a whole is almost impossible. Thus, treating micro-breaks as a formative construct by aggregating a list of selective micro-breaks may not be the ideal way to measure micro-breaks.

The second reason why previous measures of micro-breaks were so different is because micro-breaks have so many measureable characteristics. As mentioned above, the characteristics that have been measured by previous studies include frequency, variety, level of effortful, preference, time, location, and length. Evidently, the
relationship between micro-breaks and their outcomes may be totally different when measuring different characteristics of micro-breaks. For example, Hunter and Wu (2006) found that break activities that were individually preferred were predictive of somatic symptoms, whereas the location and break length were not. Taking a closer look at the characteristics of micro-breaks, I propose that they actually can be classified into two categories, namely the ones that depict the quantity of micro-breaks and the ones that depict the quality of micro-breaks. The quantity of micro-breaks can be defined as the total amount of time employees spend on micro-breaks within a certain period of time (i.e., a typical workday). A further breakdown of “quantity” results in the frequency of micro-breaks and the average length of each micro-break (i.e., quantity = frequency × average length), which have both been examined in previous studies (Fritz et al., 2011; Kim et al., 2016; Hunter & Wu, 2016). The quality of micro-breaks, on the other hand, refers to whether the psychological experiences underlying micro-breaks capture the core functional aspects of recovery. A high quality micro-break means that it helps employees to recover from strain, whereas a low quality micro-break does not function in a similar way. Sonnentag and Fritz (2007) suggested that the best recovery experience should have four attributes: psychological detachment from work, relaxation, mastery, and control. Based on these four equally weighted criteria, Sonnentag and Fritz (2007) also created and validated a measure to assess the quality of recovery experience. In previous studies on micro-breaks, the assessment on variety (i.e., control), level of effortful (i.e., relaxation and psychological detachment), preference (i.e., control), time (i.e., control), location (i.e., control) all tapped into the quality of micro-breaks to some extent. Taken
together, when measuring micro-breaks, it is suggested that one should follow a two-step approach: First, choose between the quantity and the quality aspect of micro-breaks; second, select specific characteristics to measure within that chosen aspect.
APPENDIX

Appendix A: AMR-style introduction (for proposal)

The demands associated with the contemporary working environment have resulted in an extraordinary increase in employee stress levels in many countries (White, 2008). Considerable research has shown the dramatic influences of workplace demands on employees’ psychological and physical well-being (e.g., Bakker & Demerouti, 2007; Lee & Ashforth, 1996). Organizational researchers have attempted to understand how to improve employee stress and well-being from two lenses. First, researchers explore the characteristics of work (e.g., work tasks or work environment) that cause or reduce strain (e.g., Bakker & Demerouti, 2014; Karasek, 1979). The leading theory is the Job-Demands Resources (JD-R) model (Bakker & Demerouti, 2007; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001), the core proposition of which is job demands serve as the unique predictor of strain, whereas job resources buffer the relationship between job demands and strain. The second lens shifts attention from the work itself to off-work periods by investigating the role of recovery activities. Recovery refers to the process that offsets the negative effects of strain (Demerouti, Bakker, Geurts, & Taris, 2009) or the process during which an individuals’ functioning returns to the pre-stressor level (Sonnentag & Natter, 2004). Recovery typically occurs on occasions when employees are not expected or required to work, such as sleep at night (Barnes, Wagner, & Ghumman,
2012), evening physical exercise (Sonnentag, 2001), evening social activities (Sonnentag, 2001), and after work relaxation activities (Sonnentag & Fritz, 2007; Sonnentag, Binnewies, & Mojza, 2008), all of which can result in reduced strain and enhanced well-being (for a review, see Trougakos & Hideg, 2009). The two lenses, although rarely combined together, enrich literature complementarily and provide practical guidance for improving employee well-being.

Nevertheless, work and life should not be treated in isolation from each other, especially for nowadays when the boundaries between work and nonwork domains are becoming blurred (e.g., Mazmanian, Orlikowski, & Yates, 2013; Tomlinson, 2007). On one hand, work is invading people’s lives. These days, employees are working extended hours, which leaves them less time for recovery. Some people are connected to work via email or phone calls during their personal hours, which makes it hard for them to detach from work (Fritz, Lam, & Spreitzer, 2011). Plenty of research has consistently found that failing to be psychologically detached from work (i.e., thinking of one’s work) during off-work time plays an important role in the deterioration of well-being during both longer respite periods (e.g., vacations; Etzion, Eden, & Lapidot, 1998) and shorter respite periods (e.g., evenings; Sonnentag & Bayer, 2005). In other words, lack of psychological detachment during off-work time results in poor recovery experience (Sonnentag, 2011). On the other hand, recovery experience can also take place during working hours. Some examples are, but not limited to, employees take a short break from work and check their Facebook pages using company computers or their personal smartphones; a person walks with coworkers to the kitchen for lunch, a cup of coffee, or some snacks at the vending
machine; people do some stretches or take a quick nap lying on the desk. These behaviors are informal, momentary (Kim, Park, & Niu, 2016), usually nonwork-related (Fritz et al., 2011), and occur throughout a typical workday. In the recovery literature, they are often referred as micro-breaks. Conceivably, micro-breaks provide employees with opportunities to momentarily disengage from work tasks and spend the time on their preferred activities.

Recovery scholars suggest that it is critical to understand micro-breaks for at least three reasons. First, based on effort-recovery theory (Meijman & Mulder, 1998), micro-breaks may help employees recover from strain and restore energy for subsequent work tasks (Fritz et al., 2011; Kim et al., 2016). In the workplace, employees are expected to expend efforts continuously to deal with job demands, which may lead to acute load reactions – the short-term reactions to the threatening disruption of certain physiological or psychology balance. However, these load reactions are reversible if employees occasionally take micro-breaks from demanding job tasks (Meijman & Mulder, 1998). Second, as argued by Fritz et al. (2011) and briefly mentioned earlier, there are fewer opportunities today for employees to restore energy outside of work due to the blurring boundary between work and life, so it becomes critical for researchers to consider how employees can maintain their energy in doing their work. Finally, compared to recovery

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8 Realistically speaking, micro-breaks do not perfectly apply to every job. In other words, an employee needs to have sufficient autonomy or job control in order to engage in nonwork related activities at will in the workplace. As suggested by Trougakos and Hideg (2009), compared to employees with highly repetitive and routine tasks, such as machine operators, micro-breaks are more common and play a more important role for knowledge workers who have less repetitive tasks, tend to be involved in several projects and have different agendas every day. This is because knowledge workers can make better use of micro-breaks by fitting them into their flexible work schedule. Therefore, for the current study, knowledge workers are the target subjects given the higher level of relevance.
activities that occur outside of the workplace (e.g., evenings, weekends, vacations), micro-breaks (which occur at work) are especially important in that they enable employees to deal with job demands and recover from work stress in a timely manner (Kim et al., 2016). In fact, research suggested that fewer respite opportunities at work, especially on an intensive workday, may lead to “slow unwinding” after work (Meijman & Mulder, 1998). Taken together, a thorough investigation of micro-breaks is needed to provide researchers with better understanding of employee well-being.

Despite the demonstrated importance of micro-breaks, this concept remains largely unexplored in organizational psychology, with several substantial gaps for researchers to fill. First, there has been a lack of understanding of the concept of “micro-breaks”. Surprisingly, among the four published articles relevant to micro-breaks so far (i.e., Fritz et al., 2011; Hunter & Wu, 2016; Kim et al., 2016; Zacher, Brailsford, & Parker, 2014), none of them provided a formal definition or clear conceptualization of micro-breaks before investigating micro-breaks’ relationship with other variables. Thus, as is detailed later, researchers seem to refer to similar but slightly different concepts when talking about “micro-breaks”. Therefore, the first contribution of the current study is to offer a clear, meaningful, and useful conceptualization of micro-breaks for both current and future research endeavors.

Second, without a clear conceptualization, it is not unexpected that the nomological net of micro-breaks is far from being complete. To date, research on micro-breaks has primarily focused on their outcomes, such as affective well-being (Kim et al., 2016), energy level (vitality and fatigue; Fritz et al., 2011; Zacher et al., 2014), and job
satisfaction (Hunter & Wu, 2016). Given the relatively short history of research on micro-breaks, the dominating focus on outcomes is reasonable in that organizational scholars need to make sure that micro-breaks are meaningful phenomena and worthy of scientific investigation. However, as research on the outcomes of micro-breaks have revealed relatively consistent findings with a general caveat that micro-breaks are beneficial to employee well-being and health, it seems that it is time for organizational scholars to turn part of their attention to the antecedents of micro-breaks. Specifically, it is important to understand what personal and contextual factors are associated with or lead to more or less micro-breaks for employees in the workplace, so that organizational policy makers can be equipped with more knowledge and evidence in terms of when they need to encourage or discourage these behaviors. Therefore, the second theoretical contribution of the current study is to extend the nomological network of micro-breaks by making the first attempt in the literature to investigate their antecedents.

With these goals in mind, the current introduction is going to unfold as follows. First, a literature review on micro-breaks in the context of recovery is provided. In this part, the previous literature on micro-breaks is discussed and compared in detail, and several gaps in these articles are pointed out. I then put forward a formal conceptualization of micro-breaks by building on previous literature, with a comprehensive discussion on its definition, characteristics, underlying theories, and measurements issues. In this part, I point out the importance of studying micro-breaks from a cross-level perspective, namely why and how micro-breaks should be examined at both the between-person level and within-person level. Next, I make an effort to create a
relatively comprehensive nomological network of micro-breaks by discussing the antecedents and outcomes of micro-breaks at both the between-person level and within-person level, based on relevant theories. This theoretical model is the core of the current study and the most important goal to achieve. Finally, I propose three studies to empirically test the theoretical model. Throughout my discussion propositions for the theoretical model and hypotheses for the empirical model are offered.

A Literature Review on Micro-Breaks

In order to build sustainable organizations, researchers have suggested that maintaining sustainable human energy is as important as a sustainable environment and economics (Brown, 1999; Pfeffer, 2010). Human energy, just like a battery, is utilized to meet ongoing job demands and is depleted gradually over the course of the workday (Hobfoll, 1989; Hobfoll & Shirom, 2001). Thus, timely recovery becomes critical in order to maintain employees’ energy at a sustainable level. Given the number of academic publications that are relevant to micro-breaks is quite small, in what follows, I provide a detailed review of these articles for the purpose of improving the research in this area by building on these pioneer works.

Micro-breaks have a relatively long history in the ergonomics literature before landing in the organizational field. Researchers in ergonomics have in general treated micro-breaks as short breaks that occur between work tasks, and mainly examined frequency, timing, and length of micro-breaks and obtained rich findings about their effects on reducing worker fatigue and enhancing well-being (e.g., Boucsein & Thum, 1997; Dababneh, Swanson, & Shell, 2001; Henning, Kissel, & Maynard, 1994; Lisper &
Eriksson, 1980; McLean, Tingley, Scott, & Rickards, 2001). The first time “micro-breaks” was mentioned in the organizational literature was Trougakos and Hideg’s (2009) book chapter on “within-day work breaks”. Without a detailed discussion, the phenomenon of micro-breaks was only recognized in their chapter as a type of break at work that employees utilize to recover from strain.

The first study that specifically examined micro-breaks in organizational psychology was finished by Fritz and her colleagues (Fritz et al., 2011). From an energy management perspective, Fritz and colleagues (2011) considered micro-breaks as a type of nonwork related energy management strategy employees often use in the workplace. They classified micro-breaks into four categories, namely physical (e.g., drink water, have a snack, go to the bathroom, drink a caffeinated beverage), relational (e.g., talk to someone about common interests, check in with a friend or family member), mental (e.g., make plans for the evening or weekend), and spiritual micro-breaks (e.g., meditate). In total, they generated 22 items to measure the four types of micro-breaks. For each item, they asked participants to rate the extent to which they used this behavior to manage their energy at work on a 5-point scale (1 = not at all, 5 = frequently). In their results, they found that the most commonly used energy management strategies (e.g., browsing the Internet) were not related to higher levels of human energy at work (i.e., higher level of vitality and lower level of fatigue). Rather, strategies associated with learning, with the meaning of one’s work, and with positive workplace relationships were most strongly linked to employees’ energy.
Fritz et al.’s (2011) cross-sectional approach provided a preliminary answer to micro-breaks’ effect on employee well-being at the between-person level, such that whether individuals who take more micro-breaks in general are more likely to be those with higher levels of well-being. Their study was later challenged and improved by Zacher and colleagues. They suggested that micro-breaks should also be investigated at the within-person level (Zacher et al., 2014), which could provide answers to the important question “what is the direct or immediate effect of micro-breaks on well-being for an individual”. They used the same micro-break taxonomy as Fritz et al. (2011) did but conducted their own content validation when generating items. Three things need particularly to be noted in their study design. First, they collected data every hour in a typical workday. Studies using hourly surveys in organizational research are quite rare, due to the difficulty of data collection and the possibility of failing to observe enough within-person variance in the variable of interest. However, Zacher et al. (2014) successfully measured micro-breaks with a sample of 124 participants who provided 829 hourly data points (i.e., 6.7 per person), and observed adequate variance for micro-breaks ($M = 0.15, SD = 0.10$) and other outcome variables to test their hypotheses. Second, in their hourly surveys, participants were asked to indicate which strategies they had used within the past hour (0 = did not use strategy, 1 = used strategy). Thus, these measures “tapped the number of energy management strategies employees had used in the previous hour at work” (Zacher et al., 2014, p. 290). In other words, they captured the variety or diversity of energy management strategies, which is different from Fritz et al.’s (2011) focus (i.e., frequency). Third, compared to Fritz et al.’s (2011) study, Zacher et al. (2014)
aggregated the individual items into overall scores for micro-breaks to avoid Type I error. They argued that the measure of micro-breaks was in nature assumed to be formative (i.e., any change of response to any individual item results in the change of the measurement to the overall construct) rather than reflective (i.e., any change of the overall construct changes the responses to the individual items), so they did not use structural equation modeling for their data analysis. In their results, they found that micro-breaks as a whole negatively predict fatigue and positively predicted vitality on an hourly basis.

There are two more recent publications relevant to micro-breaks. For the first one, Kim and his colleagues (2016) suggested a slightly different approach to categorize micro-breaks based on a literature review and their own content validation. Specifically, they grouped micro-breaks into relaxation activities (e.g., stretch, walk around the office), nutrition-intake activities (e.g., drink caffeinated beverages, drink non-caffeinated beverages, snack), social activities (e.g., text, chat with coworkers on non-work related topics, check personal SNS), and cognitive activities (read non-work related books, newspapers, and magazines, surf the web for non-work purposes). Similar to Fritz et al.’s (2011) measure, participants were asked how often they engaged in these activities on a 5-point scale (1 = never, 5 = very frequently). Drawing on effort-recovery theory (Meijman & Mulder, 1998) and the conservation of resources theory (Hobfoll, 1989) and using a daily diary design, they found that social, relaxation, and nutrition-intake (only caffeinated beverages) buffered job demands’ positive effects on negative affect, whereas
cognitive activities and non-caffeinated nutrition-intake activities did not have such an effect.

Another recent article that is relevant to micro-breaks is Hunter and Wu’s (2016) study of the characteristics of breaks at work, which include all possible breaks that occur in the workplace and is a broader concept than micro-breaks. Specifically, they focused on several characteristics of breaks in the workplace: less effortful, individually preferred, nonwork-related, time of break, location of breaks (i.e., outside vs. inside the office), number of breaks per day, and break length. The authors utilized an experience sampling methodology (Beal & Weiss, 2003), and asked participants to respond to a survey right after every break they took during the workday. In their multilevel analysis, they found that individually preferred activities and earlier breaks in the work shift were associated with more resource recovery, and further were related to better health symptoms. In addition, the length of break and the number of breaks per day interactively predicted resource recovery, such that longer breaks and frequent short breaks increased personal resources more than infrequent short breaks.

The literature review above reveals the difference between previous studies on micro-breaks in terms of conceptualization and measurement. In fact, there has been no guidance or discussion on the definition of micro-breaks (i.e., what processes, behaviors, or experiences should be included or excluded from general breaks), how to construct the measure for micro-breaks, or how to design studies for micro-breaks. Thus, in what follows, I propose a new way to conceptualize, measure, and design studies for micro-breaks based on the earlier summarization of previous studies.
A New Conceptualization of Micro-Breaks

To start off, I first discuss the concept of “break”, which is conceptually broader than “micro-breaks”. As mentioned earlier, breaks include breaks at work and breaks during off-work periods. Conceivably, micro-breaks should be a subcategory of breaks at work, so I focus on discussing breaks that occur in the workplace. In the recovery literature, breaks at work are generally defined as periods of time during which work-relevant tasks are not required or expected (Trougakos et al., 2008; Trougakos & Hideg, 2009). There are two critical elements in this definition: 1) a break at work reflects a period of time, and 2) work-related tasks are not required or expected during breaks. Put differently, a break is a period of time between work tasks.

I suggest, however, conceptualizing breaks at work in this way may cause some confusions about the understanding of both breaks at work and micro-breaks, for two reasons. First, if breaks at work represents a period of time between tasks, then by its literal meaning, it seems that the focus of a break is the period of time it refers to. However, among studies on breaks at work, only Hunter and Wu (2016) tapped on the characteristics associated with the the “time” element of breaks, such as the length of break and time of break, whereas the majority of research actually focused on the activities or behaviors people engage during breaks. For example, Trougakos and Hideg (2009) suggested that whether the activities during breaks are individually preferred has an important implication on the effect of breaks at work. As mentioned earlier, Hunter and Wu (2016) found that preferred activities during breaks were associated with more resource recovery and improved well-being. In fact, some research explicitly used “break
activities” or “work break activities” instead of “breaks” in order to emphasize that “activities”, instead of “breaks”, should be the center of the concept (Kim et al., 2016; Hunter & Wu, 2016). Therefore, it seems that the definition of breaks at work should be revised to reflect this shift of focus. Second, defining a break at work as a period of time between work tasks seems to suggest that breaks and work tasks are mutually exclusive with each other. In other words, it means that one cannot take a break while a work task is ongoing. However, many breaks studied by previous research can overlap with work tasks. For instance, Fritz et al. (2011) suggested “listen to music” as a type of micro-break. In reality, it is conceivable that employees can play some music using their smartphones while working on their work tasks on computers. This is inherently a multitasking process where people may sacrifice the quality of both activities as literature suggests that people cannot really multitask (Coens, Degryse, Senecaute, Cottyn, & Clarebout, 2011; Coens, Reynvoet, & Clarebout, 2011). Some other examples are employees may also intensively think about their work tasks during micro-breaks such as “look out of window”, “smoke”, and “go to the bathroom”. In other words, even though sometimes employees are not actually doing the work, they fail to be mentally detached from work during breaks, and in which case work tasks and breaks overlap. Thus, a revised definition of breaks at work is needed to reflect the potential overlap between breaks and work tasks.

Therefore, breaks at work in the current study are defined as all nonwork activities that occur in the workplace. Nonwork activities are essentially all kinds of behaviors performed by an employee that do not directly result in the accomplishment of
his or her work tasks. A nonwork activity could be as small as a three-second daydream and as large as a one-hour lunch. If we take a closer look at the time employees spend at work, it is conceivable that it can be divided into two parts: the time when breaks are expected and the time when breaks are not expected by organizations/employers. For the breaks that occur when they are expected (i.e., formally scheduled breaks by organizations such as lunch breaks and breaks between work shifts), I refer them as “macro-breaks”. Macro-breaks have been studied in the recovery literature. For instance, in Trougakos et al.’s (2008) study, the breaks studied were officially scheduled breaks between camp sessions; in Trougakos et al.’s (2014)’s study, the breaks studied were lunch breaks and also fit into the definition of macro-breaks.

Finally, breaks that occur during the time when they are not expected (i.e., when work tasks are expected) are called “micro-breaks”. Micro-breaks in the current study are therefore defined as nonwork activities that occur when work tasks are expected or required. Let’s take a typical workday as an example. If a person’s fixed work schedule is 9am to 12pm and 1pm to 6pm, with 12pm to 1pm scheduled for lunch, then macro-breaks refer to the nonwork activities employee engage in during the lunch hour (e.g., have lunch), and micro-breaks are nonwork activities that occur during morning working hours (i.e., 9am to 12pm) and afternoon working hours (i.e., 1pm to 6pm). This definition of micro-breaks, as illustrated in the following, has important implications on the measurement and study design for micro-breaks.

**Measurement of Micro-Breaks**
Although how micro-breaks were measured in previous studies has been briefly mentioned in the earlier literature review, I summarize them here again for gaining more insights. Specifically, Fritz et al. (2011) and Kim et al. (2016) both measured the frequency of each micro-break activity, using a list of pre-validated micro-break activities. The process of content validation of their measures was asking a group of subject matter experts to identify which activities could be counted as micro-breaks. Then, Fritz et al. (2011) linked each micro-break to outcome variables, and Kim et al. (2016) aggregated items of micro-breaks for each category and linked each category to outcome variables. Zacher et al. (2014) used a slightly different approach by measuring how many different types of micro-breaks occurred. They asked participants to select which micro-breaks they engaged during the past hour (0 = did not use strategy, 1 = used strategy) from a pre-validated list, and then aggregated the items for an overall score representing micro-breaks. Lastly, in Hunter and Wu’s (2016) study, the authors recorded what naturally happened for participants using an experience sampling approach (instead of using a pre-validated scale), and measured many characteristics of each micro-break, including whether it was less effortful, individually preferred, time of break, location of breaks (i.e., outside vs. inside the office), number of breaks per day, and break length. In sum, the measurements of micro-breaks were quite different in previous studies.

There are many reasons why previous measures of micro-breaks were so different. First, based on our definition of micro-breaks, there is such a large number of possible micro-breaks that people can engage in the workplace, and micro-breaks are often contingent on the job. Micro-breaks vary across industries. Office workers may take
a micro-break by doing online shopping, whereas construction workers may take a micro-break by smoking a cigarette. Micro-breaks also vary in different organizations, as some organizations are equipped with soda fountains while others may offer free coffee. People who work at different positions may also use different ways to take micro-breaks. For instance, managers often have their own offices and subordinates may sit in a shared cubical area. Thus, it is more convenient for managers to gaze out of the window (because they have one), take a nap, or do some stretches in the office, and it may be easier for subordinates to chat with their coworkers sitting at the next table. Employees may also take different types of micro-breaks in different situations. On the days with higher workloads, employees may not have the luxury to take a walk outside of the office, and may only have time to do some quick stretches in their chairs.

Given the wide variety of micro-breaks at work and their highly contingent nature on the job, it is important for researchers to choose carefully the target of their study. Specifically, they can focus on one particular type of micro-break (or a few types of micro-breaks; e.g., Fritz et al., 2011), a category of micro-breaks (or a few categories of micro-breaks; e.g., Kim et al., 2016), or micro-breaks as a whole (i.e., all kinds of micro-breaks all together; e.g., Zacher et al., 2014). Measurement is straightforward if researchers choose to study one type of micro-break, because they can directly measure the micro-break of interest (e.g., the frequency of “go to bathroom” within a workday). However, things are different when measuring a category of micro-breaks or micro-breaks as a single construct. To date, a common approach is to use a formative construct to represent a category of micro-breaks (e.g., social related micro-breaks; Kim et al.,
2016) or micro-breaks as a whole. When doing so, individual micro-breaks are measured and aggregated to represent the category of micro-breaks or micro-breaks as a whole. However, for this approach, researchers have to make sure the micro-break items they choose to represent micro-breaks are mutually exclusive and collectively exhaustive enough for that specific category. Otherwise, the formative construct may be biased and Type II error is increased due to measurement insufficiency (Diamantopoulos & Siguaw, 2006). Unfortunately, given the nature of micro-breaks, exhausting all micro-breaks for a specific category or micro-breaks as a whole is almost impossible. Thus, treating micro-breaks as a formative construct by aggregating a list of selective micro-breaks may not be the ideal way to measure micro-breaks.

The second reason why previous measures of micro-breaks were so different is because micro-breaks have so many measurable characteristics. As mentioned above, the characteristics that have been measured by previous studies include frequency, variety, level of effortful, preference, time, location, and length. Evidently, the relationship between micro-breaks and their outcomes may be totally different when measuring different characteristics of micro-breaks. For example, Hunter and Wu (2006) found that break activities that were individually preferred were predictive of somatic symptoms, whereas the location and break length were not. Taking a closer look at the characteristics of micro-breaks, I propose that they can be classified into two categories, namely the ones that depict the \textit{quantity} of micro-breaks and the ones that depict the \textit{quality} of micro-breaks. The quantity of micro-breaks can be defined as the total amount of time employees spend on micro-breaks within a certain period of time (i.e., a typical
workday). A further breakdown of “quantity” results in the frequency of micro-breaks and the average length of each micro-break (i.e., quantity = frequency × average length), which have both been examined in previous studies (Fritz et al., 2011; Kim et al., 2016; Hunter & Wu, 2016). The quality of micro-breaks, on the other hand, refers to whether the psychological experiences underlying micro-breaks capture the core functional aspects of recovery. A high quality micro-break means that it helps employees to recover from strain, whereas a low quality micro-break does not function in a similar way.

Sonnentag and Fritz (2007) suggested that the best recovery experience should have four attributes: psychological detachment from work, relaxation, mastery, and control. Psychological detachment from work assesses whether one can be mentally disengaged from work during recovery periods (Etzion et al., 1998). Relaxation is a process that is usually associated with leisure activities, and is often characterized by a low-activation state and high level of positive affect (Stone, Kennedy-Moore, & Neale, 1995). Mastery indicates whether the recovery process could provide individuals with challenge experiences and learning opportunities in other areas or domains. Control means individual’s ability to choose their actions during recovery process. Based on these four equally weighted criteria, Sonnentag and Fritz (2007) also created and validated a measure to assess the quality of recovery experience. In previous studies on micro-breaks, the assessment on variety (i.e., control), level of effortful (i.e., relaxation and psychological detachment), preference (i.e., control), time (i.e., control), location (i.e., control) all tapped into the quality of micro-breaks to some extent. Taken together, when measuring micro-breaks, I propose that one should follow a two-step approach: First,
choose between the quantity and the quality aspect of micro-breaks; second, select specific characteristics to measure within that chosen aspect.

To summarize, I propose two suggestions in terms of the measurement of micro-breaks. First, it is inappropriate to treat micro-breaks (or subcategories of micro-breaks) as a formative construct, and aggregating individual micro-breaks for an overall score of micro-breaks could cause statistical issues such as increased Type II error. Second, there are many characteristics of micro-breaks one should think about when measuring micro-breaks, and starting by choosing from the quantity of micro-breaks and quality of micro-breaks is a good idea. With these in mind, I now move to the study design of micro-breaks because it is closely tied to the measurement issues.

**Study Design for Micro-Breaks**

Study design could mean a lot of things. For the current study, I specifically refer to the level of measurement for micro-breaks. In previous studies, micro-breaks have been measured at both the between-person level (Fritz et al., 2011; Zacher et al., 2014) and the within-person level (Kim et al., 2016; Zacher et al., 2014). At the between-person level, researchers used a cross-sectional design for studying micro-breaks (i.e., one-time measure). At the within-person level, micro-breaks have been measured both on a daily basis (Kim et al., 2016) and hourly basis (Zacher et al., 2014). Thus, it is quite obvious that previous studies differed a lot in their study designs. Thus, it may be worthwhile to take a look at the pros and cons for each study design and see if there is a better or best approach. In the following, I present two propositions in terms of study design for micro-breaks based on what we can learn from existing literature.
The first proposition answers the question of whether micro-breaks should be studied using a cross-sectional design or a longitudinal design. In other words, should micro-breaks be measured at the between-person level or the within-person level? In fact, some researchers have argued that examining micro-breaks at the within-person level has several advantages over the between-person level, such as more realistic, more accurate, and stronger causal inference (for a review, see Trougakos & Hideg, 2009). However, I suggest in the current study that studying micro-breaks at both the within-person level and the between-person level are reasonable because inherently they allow researchers to answer different research questions. If researchers use a cross-sectional design and find micro-breaks and well-being are positively correlated at the between-person level, their conclusion might be: compared to those who spend less time on micro-breaks, those who spend more time on micro-breaks in general will report better well-being. In contrast, if researchers use a daily diary design by measuring micro-breaks and well-being multiple times during the data collection period, their positive relationship may thus indicate: an individual’s well-being is better off on the day he or she spends more time on micro-breaks. Therefore, even though a longitudinal design may have some advantages over a cross-sectional design, both designs are meaningful if researchers choose the relevant questions to ask and draw proper and accurate inferences based on the study design.

The second study design proposition pertains to the frequency of measurement in the longitudinal design. In previous studies of micro-breaks that used a longitudinal design, micro-breaks have been measured daily (Kim et al., 2016), hourly (Zacher et al., 2014), and whenever they occurred (i.e., experience sampling, Hunter & Wu, 2016), and
there has been a lack of discussion on which one fits better for micro-breaks research. Thus, in order to fill in this gap, I propose that there are two things researchers should consider before they determine the frequency of measurement. First, measurement intervals should be selected in a way that participants are able to correctly recall the micro-breaks between any adjacent measurements. Then, if micro-breaks in the workplace have significant within-day variation as suggested by Trougakos and Hideg (2009), the frequency of measurement should be determined in a way that such variation could be effectively observed.

Based on these two standards, I propose that an hourly diary design for studying micro-breaks may be a better choice than daily diary design and experience sampling methodology. Specifically, a daily (or even longer period) design necessitates employees’ reflection of what they did during micro-breaks throughout the day. Given the fact that some micro-breaks are indeed very “micro” in terms of time, measuring micro-breaks at the end of every day is not conducive for employees to reflect correctly on the details of micro-breaks. On the other hand, an experience sampling approach may not be the best approach because many micro-breaks are simply too short to motivate participants to stop their work and provide a response for researchers (e.g., fill out a survey). One extreme example is that if a 15-second mind wondering (i.e., work task unrelated thoughts) has to be followed by a 5-minute survey response, then it is conceivable that a normal workday is to some extent disturbed by the research study. In addition, measuring repeatedly too frequently also makes it hard to observe adequate variance due to measuring effect
Therefore, conceptually, it seems that an hourly diary design might be a better choice for micro-breaks than daily diary design and experience sampling approach.

There is some preliminary empirical evidence suggesting the advantage of an hourly diary design. Specifically, in Kim et al.’s (2016) daily diary study, the coefficient of variation (i.e., within-person variance divided by the mean, which is a measure of spread that describes the amount of variability relative to the mean) for the four types of micro-breaks they examined were 0.26, 0.35, 0.30, and 0.32. In Hunter and Wu’s (2016) experience sampling design, the coefficient of variation for “less effortful”, “preferred”, “nonwork-related”, “outside the office”, “break length”, and “time of break” were 0.46, 0.19, 0.48, 1.41, 0.90, and 0.51, respectively. Finally, the coefficient of variation for micro-breaks in Zacher et al.’s (2014) study (i.e., hourly design) was 0.67, which is higher than most coefficients of variation in the other two studies. Even though the coefficient of variation is not a well-validated criterion to determine whether a variable has sufficient variance to avoid Type II error, it at least provides some preliminary insights. Therefore, based on the conceptual reasoning and empirical evidence, an hourly design seems to fit better for micro-breaks studies than experience sampling approach and daily diary design.

So far, I have discussed the conceptualization of micro-breaks and the issues for measurement and study design for micro-breaks. Based on the propositions mentioned above, I now move to the discussion of the nomological network of micro-breaks, with a focus on micro-break quantity.

**An Extended Nomological Net of Micro-Break Quantity**
The proposed nomological network of micro-break quantity is presented in Figure 1 and Figure 2 (i.e., the theoretical model). Even though micro-break quality is also an important element of this model, I focus on micro-break quantity in the current study in align with most previous studies (Fritz et al., 2011; Kim et al., 2016; Zacher et al., 2014). This model potentially has two contributions. First, besides the outcomes of micro-break quantity, which have been widely studied in previous studies, the theoretical model for the current study is the first to date that attempts to investigate antecedents of micro-break quantity. Given the relatively consistent findings on the effect of micro-break quantity, I propose that understanding the causes of micro-break quantity is important because it provides insights for employers to understand micro-break quantity from a different angle. Second, by drawing on several social cognition theories, the theoretical model is the first one that investigates micro-break quantity using a cross-level approach. At the between-person level (i.e., cross-sectional design), the model is intended to conclude “people who are high in variable ‘X’ in general spend more time on micro-breaks”. At the within-person level (e.g., a daily design), the model explores an answer like “on the days when people are high in variable ‘X’, they spend more time on micro-breaks”. Therefore, in the following, I discuss the nomological network of micro-break quantity at the between person level and the within-person level, respectively.
Antecedents of micro-break quantity at the between-person level

The introduction of the between-person level nomological network starts from the relationship between antecedents of micro-break quantity and actual enactment of micro-breaks. Among the considerable amount of literature with a focus on predicting health-related behaviors (i.e., quantity of behaviors, or total amount of time, specifically), a collection of social cognition theories has been dominantly adopted (for a review, see Conner & Norman, 2015) including protection motivation theory (Maddux & Rogers, 1983), social cognitive theory (Bandura, 2000), theory of planned behavior (Ajzen, 1991), and prototype-willingness model (Gibbons, Gerrard, Blanton, & Russell, 1998). From these theories, a converging point of view suggests intention (i.e., the readiness or
motivation to perform the behavior in general) as the most proximal predictor of actual enactment of behavior at the between-person level. In other words, people who have a stronger intention to do something are likely to engage in that behavior (i.e., higher quantity). In addition, based on the theory of planned behavior (Ajzen, 1991), behavioral intention is further predicted by three distal antecedents, namely the attitude toward the behavior, subjective norms, and perceived behavioral control. Putting it differently, people who have a more positive attitude toward the behavior, who perceive stronger subjective norms, and who have a higher level of perceived behavioral control are likely to engage in more of that behavior (i.e., quantity) because they have a higher level of intention of doing so (Ajzen, 1985).

![Figure 2 Nomological network of micro-breaks at the within-person level](image)
The theory of planned behavior has been a valid model for predicting a variety of behaviors in terms of quantity, such as health activities (e.g., physical activities, healthy eating; Chan, Prendergast, & Ng, 2016; Howland et al., 2016), technology adoption (e.g., e-learning adoption, SNS usage; Chu & Chen, 2016; Darvell, Walsh, & White, 2011), and career selection (Evers & Sieverding, 2015). Among the behaviors that have been successfully explained by the theory of planned behavior, there is one that is conceptually similar to micro-breaks, which is called cyberloafing. Cyberloafing refers to a set of electronically-mediated activities at work that employees engage in, particularly through the use of the internet, which are not in general considered job-related by organizations (Askew, Buckner, Taing, Ilie, Bauer, & Coover, 2014; Lim, 2002). By definition, cyberloafing could be classified as a means for employees to engage in micro-breaks (e.g., Kim et al., 2016). In order to predict employees’ cyberloafing quantity, Askew et al. (2014) adopted the theory of planned behavior model and found that the attitude toward cyberloafing, descriptive norms (i.e., a form of subjective norms), and ability to hide (i.e., a form of perceived control of cyberloafing) together explained a significant amount of variances of cyberloafing quantity (i.e., 32% and 37% in two studies respectively).

As cyberloafing is simply one type of the micro-breaks and both concepts fall into the category of workplace withdrawal behaviors at a broader level (Askew et al., 2014; Trougakos & Hideg, 2009), it is reasonable to borrow the theory of planned behavior to explain micro-breaks. Thus, in what follows, I discuss in detail how the theory of planned behavior could be employed to predict micro-break quantity at work. Specifically, I propose that based on the theory of planned behavior, the antecedents of micro-break
quantity at the between-person level fall into two categories: personal factor and contextual factor.

*Personal factor: the attitude toward micro-breaks*

According to the theory of planned behavior, the first antecedent of an intentional behavior is the attitude toward the behavior. The attitude toward a behavior refers to the evaluation of an individual about the question of how favorable or unfavorable an act is (Ajzen, 1991). It is dependent on an individual’s beliefs and the evaluation of those beliefs. Such evaluations feature both affective and cognitive components (Breckler & Wiggins, 1989). Applied to micro-breaks, the affective component of evaluation reflects the emotional response and feeling yielded by micro-breaks (e.g., pleasant-unpleasant, enjoyable-unenjoyable). On the other hand, the cognitive component of evaluation represents an individual’s beliefs about the consequences of micro-breaks (e.g., improved well-being) and the evaluation of these consequences (e.g., improved well-being is valuable for both employees and organizations). The two components of attitude have been found to increase the predictive power of this attitudinal factor of the theory of planned behavior (e.g., Blau, Tatum, & Cook, 2004; Foust, Elicker, & Levy, 2006; Elicker, Foust, O’Malley, & Levy, 2008). Thus, I propose that the attitude toward micro-breaks is able to predict micro-break quantity at the between-person level, which is stated in the following proposition below.

**Proposition 1:** The attitude toward micro-break is positively related to micro-break quantity at the between-person level, such that employees, who have a more
positive (vs. negative) attitude toward micro-breaks, spend more (vs. less) time on micro-breaks in general.

**Contextual factor: micro-break climate**

Another important component of micro-break quantity nomological network is the contextual factor, which is referred as “micro-break climate” in the current study. As discussed, micro-breaks are essentially nonwork related activities that occur when work tasks are expected or required. Thus, it is conceivable that organizations may differ on the acceptability of taking micro-breaks. Based on singling theory (for a review, see Connelly, Certo, Ireland, & Reutzel, 2011), organizations send out signals in different ways to their employees about their acceptability of taking micro-breaks, which may result in employees’ perception of how supportive their organizations are in terms of micro-breaks or how friendly their work environment are for micro-breaks. The importance of the contextual component of micro-breaks has been mentioned in previous studies. For instance, Trougakos and his colleague discussed in their book chapter “future research in the area of work recovery would be well served to bear in mind that there are numerous individual differences and situational factors that might impact recovery. Exploring these variables is likely to result in an understanding that activities leading to work recovery are not a ‘one size fits all’ proposition. Therefore, in order to maximize the prescriptive utility of this stream of research, a broader understanding of individual and contextual differences is necessary.” (Trougakos & Hideg, 2009, p. 76). Thus, to directly respond to their call, the current study provides the first attempt in micro-break research that investigates the contextual factor of micro-breaks: micro-break climate. To
understand micro-break climate, I start off by discussing organizational climate, which is conceptually at a broader level.

Organizational climate is generally defined as socially shared perceptions of work environment that focus on certain key organizational attributes informing employees of the kinds of behaviors to be rewarded or supported (Ostroff, Kinicki, & Muhammad, 2012; Schneider, 1975; Schneider, Ehrhart, & Macey, 2011; Zohar & Polachek, 2014). In other words, climate refers to how individuals in organizations make sense of their environment through their perceptions of formal and informal policies, practices, and procedures (Reichers & Schneider, 1990). Climate can be either conceptualized at the individual-level, which reflects individuals’ perceptions of organizational policies, practices, and procedures (James et al., 2008; James & James, 1989; James & Jones, 1974; Schneider, 1973), or at group-level and/or organizational-level reflecting shared perceptions (James, James, & Ashe, 1990). In the current study, I particularly refer to individuals’ perceptions as they pertain to micro-breaks (i.e., psychological climate). This approach is consistent with a significant body of research on organizational climate (for a review, see McGonagle, Walsh, Kath, & Morrow, 2014).

There are two primary paradigms for studying organizational climate: generic climate and facet-specific ones (Schneider, 1975; Schneider et al., 2011). As most research to date on organizational climate refers to the latter one, I also use it as default when talking about climate. As suggested by Zohar and Polachek (2014, p. 114): “Considering organizational climate as a facet-specific construct referring to a specific job dimension or task demand, its perceived priority by comparison with other relevant
demands constitutes a proximal indicator informing employees of the kinds of role behavior likely to be rewarded.” In the literature on micro-breaks, micro-break climate then refers to individuals’ perception of how micro-breaks, typically treated as a way for recovery and maintaining well-being (which will be discussed later), are prioritized with regards to other activities or job dimensions that occur in the workplace, such as work tasks or productivity. Relying on personal experiences, employees collect information regarding trade-offs between well-being and productivity, whereas a conflict between the two is also possible. If productivity is more favored across most situations (i.e., a higher priority) than recovery, it will promote a poor micro-break climate and allow individuals to align their behaviors accordingly.

Similar to other facets of organizational climate (e.g., safety climate; McGonagle et al., 2014; Schneider, 1975; Schneider et al., 2011), employees are able to use different cues to evaluate whether they perceive micro-breaks to be valued in their organization. For example, employees may have a feeling of how their organizations set policies and provide resources for their employees to take micro-breaks, how their managers communicate with them in terms of the benefits of micro-breaks, how coworkers take micro-breaks individually or together, and how one’s work is designed in a way to allow or even welcome micro-breaks. These cues could be manifested as different dimensions of micro-breaks climate. In line with McGonagle et al.’s (2010) typology of safety climate, I propose that employees tend to use four distinct cues to evaluate micro-break climate based on three primary elements of the working environment: the hierarchical
social environment (i.e., management support and supervisor norm), the lateral social environment (i.e., coworker norm), and the job itself (i.e., work-break autonomy).

Supervisor norm and coworker norm are individuals’ perceptions of the extent to which supervisors and coworkers appear to value micro-breaks based on their behaviors and the extent to which their behaviors conform to their values. The concepts of supervisor norm and coworker norm align with one of the core elements of the theory of planned behavior, namely subjective norms, referring to an individual’s perception of what most others who are important to him or her think or actually do (Ajzen, 1991). The “others who are important to him or her” are referents in the theory of planned behavior, and specifically refer to supervisors and coworkers under the context of micro-breaks. In what follows, I discuss in detail how supervisor norms and coworker norms are related to subjective norms specifically.

According to the literature in social psychology, subjective norms can be broken down into two dimensions: injunctive norms and descriptive norms (Fishbein & Ajzen, 2010). Injunctive norms refer to individuals’ beliefs about what other people think they should do and the motivation to comply with the beliefs. In the context of micro-breaks, injunctive norms reflect an individual’s beliefs about how strongly his or her supervisors think he or she should take micro-breaks at work as needed, and how much he or she wants to conform to these expectations (Ajzen, 1991). For example, an employee might feel that his or her supervisor want him or her to take micro-breaks frequently. The employee might be strongly motivated to comply with his or her supervisor, which would positively impact supervisor norms and eventually micro-break quantity. Therefore, it is
reasonable to suggest that supervisor norms function as injunctive norms. It is also important to note that coworker norms cannot be treated as injunctive norms because an employee’s beliefs and compliance motivations differ between supervisors and coworkers. Specifically, even though supervisors and coworkers may both have opinions or expectations on whether one should engage in micro-breaks as needed, it is intuitive that one would normally comply with supervisors more likely than coworkers.

Coworker norms reflect the nature of the second dimension of subjective norms, namely descriptive norms. Descriptive norms refer to an employee’s beliefs on what others have done, are doing, and likely to do and how much he or she considers himself or herself similar to the referent (Fishbein & Ajzen, 2010). In the context of micro-breaks, if an employee finds his or her coworkers take micro-breaks regularly, to the extent that he or she identifies with them, he or she is likely to do so as well. Descriptive norms may apply to coworker norms but not supervisor norms for two reasons. First, as mentioned earlier, employees are able to observe their coworkers’ micro-break activities more frequently than their supervisors, probably due to office layout (i.e., coworkers often sit closer to each other and supervisors often have their own office area) or supervisors’ intention to hide (i.e., supervisors may not want their subordinates to observe their micro-breaks and learn from them). Second, in the workplace, it is conceivable that the way employees identify with their coworkers (i.e., lateral relationship) is different from the way employees identify with their supervisors (i.e., hierarchical relationship). Thus, descriptive norms conceptually apply to coworker norms but not supervisor norms.
In sum, the first two elements of micro-break climates both can be conceptualized as subjective norms (i.e., supervisor norms – injunctive norms, coworker norms – descriptive norms). As subjective norms have been well validated as a predictor of behavior quantity, it is reasonable to suggest both supervisor norms and descriptive norms are potential antecedents of micro-break quantity. Therefore, the second and third propositions of the current study are as follows.

**Proposition 2:** Supervisor norms are positively related to micro-break quantity at the between-person level, such that employees, who perceive stronger (vs. weaker) supervisor norms, spend more (vs. less) time on micro-breaks in general.

**Proposition 3:** Coworker norms are positively related to micro-break quantity at the between-person level, such that employees, who perceive stronger (vs. weaker) coworker norms, spend more (vs. less) time on micro-breaks in general.

The third aspect of micro-break climate is management support, referring to employees’ perception of the extent to which management provides resources for micro-breaks. There are two important points to note for the concept of management support. On one hand, the resources provided by management cover both tangible resources and intangible resources. Tangible resources include everything employees could use when they take micro-breaks, such as external Internet access (e.g., Facebook, YouTube), Barcaloungers in the resting area, free coffee, vending machines, magazines, and newspapers. Intangible resources include the formal or informal policies management creates for supporting or managing employees’ micro-breaks. When management provides more tangible resources and a supportive environment filled with intangible
resources, the management support for micro-breaks is stronger. On the other hand, for stronger management support, not only management does need to provide various resources, it also needs to make the resources accessible to employees. Management can do this by placing the resources where they are more visible and easy for employees to access (e.g., put the vending machine in the kitchen rather than the corner of the hallway), or by effective communication to employees through emails, newsletters, or simply word of mouth.

The last element of micro-break climate proposed in the current study is work-break autonomy, which refers to employees’ perceptions of the extent to which they have the autonomy to take micro-breaks. In the workplace, employees are constantly under the pressure of performing work-related activities for higher productivity and better quality (Bommer, Johnson, Rich, Podsakoff, & Mackenzie, 1995; Lazear, 1996; Singh, 2000). If an employee has work-break autonomy, it means that he or she has the choice to take a micro-break as needed. In other words, an employee has the discretion to balance between micro-breaks (i.e., the need for recovery) and work tasks (i.e., the need for performance) when he or she enjoys work-break autonomy provided by the organization.

In the context of micro-breaks, I propose that management support and work-break autonomy can be conceptualized as perceived behavioral control, which is another important element of the theory of planned behavior used to predict behavior quantity (Ajzen, 1991). Based on the theory of planned behavior, perceived behavioral control refers to the skills, resources, and opportunities employees perceive to obtain to perform a behavior of interest (Ajzen, 2002). When an employee perceives that he or she has the
skills to take micro-breaks, has adequate resources to use for taking micro-breaks, and has plenty of opportunities to take micro-breaks, then his or her perceived behavioral control of micro-breaks in the workplace is high. In organizations, it is realistic to assume that employees in general have and perceive themselves to have the skills to take micro-breaks, as micro-breaks are essentially some individually preferred activities that are not related to work. The resources employees perceive as existing for micro-breaks have been conceptualized as management support, which is defined as employees’ perception of the extent to which management provides resources for micro-breaks. Finally, whether employees perceive they have opportunities for taking micro-breaks can be directly affected by whether they have work-break autonomy. Specifically, if an employee perceives autonomy to take a micro-break when in need of a micro-break, he or she can take a micro-break by creating an opportunity for himself or herself. Taken together, the level of management support and work-break autonomy an employee has reflects his or her perceived behavioral control for micro-breaks, which predicts the actual enactment of micro-breaks in terms of quantity. Thus, it is reasonable to propose that both management support and work-break autonomy, which are two elements of micro-break climate, are two other antecedents of micro-break quantity.

**Proposition 4**: Management support is positively related to micro-break quantity at the between-person level, such that employees, who perceive more (vs. less) management support, spend more (vs. less) time on micro-breaks in general.
**Proposition 5**: Work-break autonomy is positively related to micro-break quantity at the between-person level, such that employees, who perceive more (vs. less) work-break autonomy, spend more (vs. less) time on micro-breaks in general.

**Antecedents of micro-break quantity at the within-person level**

So far, five antecedents have been introduced in detail that may predict micro-breaks at the between-person level (i.e., the attitude toward micro-breaks, supervisor norms, coworker norms, management support, work-break autonomy). That said, for a given individual, these five predictors may collectively (yet not exhaustively) determine the quantity of micro-breaks on average taken across situations. However, what they cannot do is recognize and explain the within-person variation of micro-breaks across time. In other words, it is still unknown what factors determine whether an employee spends more or less time on micro-breaks each hour or each day. In fact, researchers have suggested that micro-breaks, or breaks at work in general, are characterized by within-person variation and more insights on these concepts could be provided through the efforts of explaining such variation (Trougakos & Hideg, 2009). To respond to this, the current study also aims to contribute to the literature by discussing factors that may drive micro-break quantity variation for a given individual.

**Micro-breaks as a resource recovery process**

In order to develop an understanding of the antecedents of micro-break quantity at the within-person level, I start off by discussing the role of micro-breaks in employee well-being. Specifically, consistent with previous studies that examined micro-breaks at the within-person level (Kim et al., 2016; Zacher et al., 2014), I conceptualize micro-
breaks as a way for employees to recover their resources and manage their energies in a timely manner based on resource depletion theories. This set of theories include energy management theory (Pfeffer, 2010), effort-recovery theory (Meijman & Mulder, 1998), the conservation of resources theory (Hobfoll, 1998), theory of regulatory resources or ego-depletion theory (Muraven & Baumeister, 2000), and theory of positive emotion (Fredrickson, 1998, 2001). In general, these theories assume that an employee at work has a limited amount of resources on any typical workday. These resources, although conceptualized in different ways by different theories (e.g., vitality, positive affect, self-regulatory resource), are important for an employee’s everyday work in that they are the “fuel” for employees to accomplish work tasks. Specifically, when employees are working on their daily tasks, especially the ones that are demanding and taxing, their resources are depleted in the process. This resource loss process can be stopped and reversed, however, if employees occasionally disengage from work and take micro-breaks (Meijman & Mulder, 1998), which provides opportunities for employees to recover their resources in a timely manner.

Similar to the antecedents at the between-person level, I categorize within-person level antecedents into two groups: personal factor and contextual factor.

**Personal factor: need for recovery**

So far, I have conceptualized an employee’s resources as the power of a battery, and micro-breaks as a process for charging the battery. On a typical workday, an employee comes to the workplace in the morning with adequate resources to deal with demanding work tasks, like a fully charged battery. Over the course of a workday, his or
her resources are gradually depleted due to work tasks. However, the employee cannot allow his or her resources to go down forever. As suggested by Muraven and Baumeister (2000), when individuals’ self-regulatory resources are below a certain level, they cannot function properly and their job performance and well-being will be significantly impaired. Fredrickson (1998) also suggested that most of employees’ positive emotion, such as joy, interest, contentment, and love would fade away when they are under unfavorable pressure at work. Thus, like a draining battery, an employee should be red flagged if his or her resource level is below a threshold. Then, a protection mechanism is triggered and employees are motivated to take actions (e.g., micro-breaks) to recover their resources, similar to the process of recharging the battery. It is important to note that even though different people may have different thresholds to trigger the resource recovery process, their resource protection mechanisms are similar (Hobfoll, 2002). When resource levels reach low, employee’s motivation for resource recovery may be a proximal predictor of whether employees take micro-breaks as soon as possible.

In the recovery literature, a concept that reflects employee’s motivation for resource recovery is called “need for recovery”. Need for recovery refers to an emotional state featured by a temporal reluctance to the present demands and any new demands (Sonnentag & Zijlstra, 2006). Jansen, Kant, and van den Brandt (2002) suggested that need for recovery is a “precursor of prolonged fatigue or psychological distress” (p. 324). Thus, need for recovery is often related to a desire for low baseline activity (Craig & Cooper, 1992). In other words, need for recovery reflects the expectation that “a break is necessary in order to be able and willing to confront future demands” (Sonnentag &
Zijlstra, 2006, p. 331). In general, need for recovery can be described as “feelings of ‘wanting to be left in peace for a while,’ or ‘wanting to lay down for a while’” (Sluiter, Frings-Dresen, van der Beek, & Meijman, 2001, p. 29). In the earlier battery metaphor, employees express their need for recovery as a desire “to recharge their batteries” (Sonnentag & Zijlstra, 2006, p. 331). Therefore, in the current study, I conceptualize need for recovery as an employee’s subjective experience of desiring to relieve himself or herself from job demands and for having some time for micro-breaks. Furthermore, I propose that need for recovery is a proximal antecedent of micro-break quantity at the within-person level.

**Proposition 6**: Need for recovery is positively related to micro-break quantity at the within-person level, such that for an employee, when he or she has higher (vs. lower) level of need for recovery, he or she is likely to spend more (vs. less) time on micro-breaks.

*Contextual factor: perceptions of coworker micro-breaks*

At the within-person level, the personal factor discussed above (i.e., need for recovery) is not the sole reason for employees to take micro-breaks, because certain contextual factors may also be able to explain micro-break quantity’s within-person variability. Looking back at the contextual factors that may explain micro-breaks at the between-person level, it is reasonable to argue that supervisor norms (i.e., injunctive norms), management support, and work-break autonomy are unlikely to vary on a daily or even hourly basis. However, there is one contextual construct that can be conceptualized at both the between-person level and the within-person level, namely
coworker norms. At the between-person level, coworker norms refer to an employee’s general beliefs about what their coworkers have done, are doing, and likely to do with regards to micro-breaks and how much he or she identifies with coworkers. Despite the way an employee identifies with coworkers is unlikely to change frequently, his or her understanding of coworkers’ micro-breaks, which is based on the observation of coworkers, is subject to change every day. Thus, I use the term “perceptions of coworker micro-breaks” to refer to an employee’s perception of what their coworkers have done, are doing, and likely to do with regards to micro-break quantity during a certain period of time.

As a contextual factor, perceptions of coworker micro-breaks can impact an individual’s micro-breaks at the within-person level in two ways. First, when an employee perceives that his or her coworkers are taking micro-breaks, he or she is actually being signaled that what they do during micro-breaks (e.g., check Facebook or watch a YouTube video) or the behavior of taking micro-breaks in general is socially acceptable or desirable, at least at that specific moment. Thus, from a social learning perspective, the employee may treat his or her coworkers as role models and emulate their behaviors by taking similar micro-breaks (Bandura, 1977, 1986). Second, even though many micro-breaks are individual behaviors (e.g., nap, daydream, stretch), a significant portion of micro-breaks are in nature relational and characterized by interplay between employees, such as communications on all kinds of nonwork related topics. Even though sometimes an employee is concentrating on his or her work, he or she is likely to take a micro-break because the coworker next to him or her initiates a micro-
break such as asking about weekend plans, talking about an article online, or inviting him or her to grab a coffee together. Taken together, it seems that perceptions of coworker micro-breaks may be an important factor explaining why employees sometimes take micro-breaks whether they have a need for recovery or not, and thus should be considered as a candidate for micro-break quantity antecedent at the within-person level.

**Proposition 7**: Perceptions of coworker micro-breaks are positively related to an employee’s micro-break quantity at the within-person level, such that for an employee, when he or she perceives that his or her coworkers spend more (vs. less) time on micro-breaks, he or she is likely to spend more (vs. less) time on micro-breaks as well.

**Outcomes of micro-break quantity**

Unlike antecedents of micro-break quantity, there have been some research findings about the outcomes of micro-break quantity. In fact, all published articles on micro-breaks to date focused on the outcomes of micro-break quantity, which provides a good foundation for the current discussion. In Fritz et al.’s (2011) study, the authors investigated the relationship between various types of micro-break quantity and two outcomes reflecting human energy, vitality and fatigue, from an energy management perspective. In their results, some frequently used micro-breaks such as “surf the web”, “check and send personal emails and text messages”, and “make plans for the evening or weekend”, were positively related to fatigue and negatively related to vitality. Using an hourly design, Zacher et al. (2014) examined micro-breaks as a formative construct and found that micro-breaks negatively predicted fatigue and positively predicted vitality at the within-person level. Similarly, based on a daily diary design, Kim et al. (2016) also
found that most types of micro-breaks (i.e., social related, nutrition-intake, relaxation) were positively associated with affective well-being at both the within-person and the between-person level. Taken together, a key caveat for these micro-breaks research results is that micro-breaks are in general beneficial to employees in terms of their well-being, although the effects might be different depending on how they take micro-breaks.

With this caveat in mind, I propose that the understanding of outcomes of micro-break quantity could be further developed from the perspective of resource recovery. As mentioned, micro-breaks could be conceptualized as a process or opportunity for employees to replenish their lost resources. Although different micro-break activities may have implications for different types of resources recovered, when taking micro-breaks as a whole, the effect of micro-breaks should be closely related to the collective effect of resources of all kinds. In other words, the outcomes of micro-break quantity could be examined by looking at the impact of resources on employees. As mentioned earlier, resources have been conceptualized in different ways under different theoretical frameworks, such as “energy” in energy management theory (Pfeffer, 2010), “resource” in effort-recovery theory (not clearly defined or specified; Meijman & Mulder, 1998), “object, conditions, personal characteristics, and energies” in the conservation of resources theory (Hobfoll, 1998), “regulatory resources” in the theory of regulatory resources or ego-depletion theory (Muraven & Baumeister, 2000), and “affective resources” in the theory of positive emotion (Fredrickson, 1998, 2001). Despite the distinction of resource conceptualization, a common effect of these resources is that they are positively related to employees’ well-being (Fredrickson, 1998, 2001; Hobfoll, 1998;
Meijman & Mulder, 1998; Muraven & Baumeister, 2000; Pfeffer, 2010). Moreover, this relationship has been validated at both the between-person level and the within-person level. At the between-person level, people have higher levels of well-being generally spend more time on micro-breaks. At the within-person level, for an individual, his or her level of well-being is enhanced when he or she spends more time on micro-breaks. Therefore, it is reasonable to suggest that micro-break quantity is positively related to employee well-being at both the between-person level and the within-person level.

**Proposition 8**: Micro-break quantity is positively related to employee well-being at the between-person level, such that employees, who spend more (vs. less) time on micro-breaks in general, have higher (vs. lower) levels of well-being.

**Proposition 9**: Micro-break quantity is positively related to employee well-being at the within-person level, such that for an employee, when he or she spends more (vs. less) time on micro-breaks, he or she is likely to have higher (vs. lower) level of well-being.

*Micro-break quality*

Even though it is proposed that micro-break quantity is beneficial to employee well-being, evidence suggests that such a relationship may not hold all the time. As mentioned, Fritz et al. (2011) found that some micro-breaks, such as “surf the web”, “check and send personal emails and text messages”, and “make plans for the evening or weekend”, were positively related to fatigue and negatively related to vitality. Although many possible reasons might account for this counterintuitive finding, the authors suggested that boundary conditions might be an important factor explaining the effect of
micro-break quantity (Fritz et al., 2011), although they did not figure out which boundary conditions might work. In the current study, I propose that the effect of micro-breaks on employee well-being is not only determined by the quantity of micro-breaks taken, but also the quality of micro-breaks taken.

Micro-break quality in the current study is defined as the extent to which micro-breaks function as expected to help employees recover lost resources. High micro-break quality indicates that the micro-breaks one takes effectively help him or her to replenish the resources as he or she expects. To illustrate the components of micro-break quality, I borrow Sonnentag and Fritz’s (2007) conceptualization of recovery experiences. Specifically, I propose that a high-quality micro-break has four characteristics: psychology detachment, relaxation, mastery experience, and control during micro-breaks.

Psychological detachment refers to the extent to which employees are mentally disengaged from the work situation (Etzion et al., 1998). Based on the effort-recovery theory, recovery occurs when job demands are removed from the functional systems required during work (Meijman & Mulder, 1998). When individuals are not psychologically detached from work during micro-breaks, it is likely that job demands that are taxing will continue to negatively impact individuals’ functional systems. Empirical evidence suggests that psychological detachment is important during one’s recovery process. Specifically, when people experienced higher level of psychological detachment, their job stressors were less likely to lead to strain (Sonnentag, 2012).

Relaxation is a process characterized by a state of low activation and increased positive affect (Stone, Kennedy-Moore, & Neale, 1995). Relaxation can result from
activities that relax body and mind, such as muscle relaxation (Jacobson, 1938), meditation (Grossman, Niemann, Schmidt, & Walach, 2004), and listening to music (Pelletier, 2004). As suggested, by Sonnentag and Fritz (2007), recovery experiences should achieve relaxation for two important reasons. First, relaxation is able to reduce prolonged activation caused by job stressors and restore the body to a pre-stressor state (Brosschot, Pieper, & Thayer, 2005). Second, positive emotions generated from relaxation are able to offset the effects of negative emotions. Taken together, it seems that a micro-break that is characterized by relaxation is particularly helpful to employee well-being.

Mastery micro-breaks are nonwork activities that provide challenging experiences or learning opportunities in other domains. Examples include reading newspapers, scanning information online, and helping out a colleague on a nonwork issue. Unlike job demands, even though mastery experiences require some degree of self-regulation (Sonnentag & Fritz, 2007), they do not overtax employees’ capabilities. However, these experiences may help employees recover resources because they provide opportunities to generate internal resources such as skills and self-efficacy (Bandura, 1997; Hobfoll, 1998). Besides, mastery experiences during micro-breaks are also likely to improve employees’ positive moods through offering help to others (George, 1991).

Finally, control during micro-breaks refers to an employee’s ability to choose what to do during micro-breaks from two or more options. This concept is different from work-break autonomy, which has been introduced as the predictor of micro-breaks at the between-person level. As mentioned, work-break autonomy refers to an employee’s
perception of his or her autonomy as to when to take micro-breaks, after balancing between focusing on work tasks and taking a break from work. The control during micro-breaks, however, reflects an employee’s discretion on what to do during micro-breaks. Control during micro-breaks may impact the quality of micro-breaks in two ways. First, if an employee has control over what to do during micro-breaks, he or she can choose and stick to what is best for his or her resource recovery, instead of conforming to what his or her coworkers do. Second, as suggested by Sonnentag and Fritz (2007), the experience of control during micro-breaks may increase one’s self-efficacy and competence, which are external resources that in turn promote well-being (Bandura, 1997; Hobfoll, 1998). Therefore, in order to have a high-quality micro-break, control during the micro-break is potentially critical.

Taken together, a high-quality micro-break is characterized by a high level of psychological detachment, relaxation, mastery experiences, and control. High micro-break quality may not only be directly related to better micro-break outcome, but also serve as a boundary condition that buffers the effect of micro-break quantity on employee well-being because it ensures a better resource recovery process. Therefore, the propositions with regards to micro-break quality are as follows.

**Proposition 10:** Micro-break quality is positively related to employee well-being at the between-person level, such that employees who have higher (vs. lower) levels of micro-break quality in general, have higher (vs. lower) well-being.
Proposition 11: Micro-break quality is positively related to employee well-being at the within-person level, such that for a given employee, the higher (vs. lower) the quality of micro-breaks is associated with higher (vs. lower) well-being.

Proposition 12: Micro-break quality moderates the relationship between micro-break quantity and employee well-being at the between-person level, such that employees whose micro-break quality is in general higher (vs. lower), have a stronger (vs. weaker) relationship between micro-break quantity and well-being.

Proposition 13: Micro-break quality moderates the relationship between micro-break quantity and employee well-being at the within-person level, such that for a given employee, the relationship between micro-break quantity and well-being is stronger (vs. weaker) when he or she has higher (vs. lower) level of micro-break quality.
REFERENCES


