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Eating Your Feelings? Testing a Model of Employees' Work-Related Stressors, Sleep Quality, and Unhealthy Eating

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Although organizational research on health-related behaviors has become increasingly popular, little attention has been paid to unhealthy eating. Drawing on the self-regulation perspective, we conducted 2 daily diary studies to examine the relationships between work-related stressors, sleep quality, negative mood, and eating behaviors. Study 1 sampled 125 participants from 5 Chinese information technology companies and showed that when participants experienced higher levels of job demands in the morning, they consumed more types of unhealthy food and fewer types of healthy food in the evening. In addition, sleep quality from the previous night buffered the effect of morning job demands on evening unhealthy food consumption. Study 2 used data from 110 customer service employees from a Chinese telecommunications company and further demonstrated a positive association between morning customer mistreatment and evening overeating behaviors, as well as the buffering effect of sleep quality. Results from Study 2 also supported afternoon negative mood as a mediator linking morning customer mistreatment to evening overeating behaviors. Finally, our findings revealed that the buffering effect of sleep quality was channeled through employees' vigor in the morning, which subsequently weakened the effect of customer mistreatment on negative mood.

Keywords: unhealthy eating, self-regulation, sleep quality, job demands, customer mistreatment

In the past several decades, the general public has grown particularly conscious of the importance of healthy lifestyles, which feature two critical aspects: healthy eating and sleeping habits

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(Hesslink, 2016). For instance, in the United States, there are national programs aimed at promoting healthy food choices among children (e.g., Fresh Fruit and Vegetable Program by the U.S. Department of Agriculture) and working adults (e.g., National Healthy Worksite Program by the Centers for Disease Control and Prevention), as well as promoting good sleeping habits (e.g., National Sleep Foundation). This is not surprising, given the important roles that eating and sleeping play in human daily functioning and health. In particular, research has shown various health consequences, such as obesity (e.g., Cappuccio et al., 2008; Ogden, Carroll, Kit, & Flegal, 2014), coronary heart disease (e.g., Cappuccio, Cooper, D'Elia, Strazzullo, & Miller, 2011; Casiero & Frishman, 2006), and inadequate physical energy (e.g., O'Dea, 2003; Reilly & Edwards, 2007) occur when individuals fail to eat healthily and/or sleep well. Of these consequences, obesity has been recognized as a worldwide phenomenon prevalent in both developing countries, such as China (e.g., Li et al., 2002; Y. Wang, Mi, Shan, Wang, & Ge, 2007), and developed countries, such as the United States (e.g., Flegal, Carroll, Kit, & Ogden, 2012; Y. Wang, Beydoun, Liang, Caballero, & Kumanyika, 2008). At work, employee obesity can generate substantial financial burdens (primarily in the forms of injury-related compensation claims and lost workdays) to employers (Østbye, Dement, & Krause, 2007). Thus, studying sleeping and eating has important implications to individual, organizational, and societal well-being.

As critical components of healthy living, eating and sleeping have become key research topics in a range of scientific disciplines, including nutrition, psychiatry, and medicine. These disciplines have accumulated an impressive amount of findings regarding the incidence and prevention of eating disorders (Adriaanse, Vinkers, De Ridder, Hox, & De Wit, 2011; Hoek & van Hoeken, 2003; Shepherd et al., 2006; Stice, 2002) and sleep disorders (Anders & Eiben, 1997; Espie, 2002). However, in organizational science, in which research has started to investigate antecedents and outcomes of employee sleep (for reviews, see Barnes, 2012; Mullins, Cortina, Drake, & Dalal, 2014), very little research has investigated employee eating behaviors, with few exceptions. Moreover, these exceptions have tended to narrowly focus on how *job design* factors (e.g., amount of time and time schedule of one's work; Allen & Armstrong, 2006; Jones, O'Connor, Conner, McMillan, & Ferguson, 2007) impact workers' eating behaviors. Likewise, other organizational research in this area has emphasized the unique work schedules of certain occupations, such as bus drivers (Tse, Flin, & Mearns, 2006) and nurses (Berger & Hobbs, 2006), as drivers of these employees' unhealthy eating habits. Not much is known about how workers' *psychological* experiences at work may shape their eating behaviors in a healthy or unhealthy way. Therefore, to better comprehend how work-related experiences may shape eating behaviors, as well as the role that sleep plays in this relation, the current article reports two daily diary studies that examine the associations among employees' daily work-related stressors, sleep quality, and eating behaviors, as well as the underlying psychological mechanisms that explain these associations.

We aim to make three contributions to the literature. First, we develop and test a theoretical model regarding how work-related stressors shape day-to-day fluctuations in employee eating behaviors, with a particular emphasis on testing daily work experiences as unstudied risk factors of unhealthy eating (see Figure 1 for the theoretical model). This distinguishes the current research from research on eating behaviors in other scientific disciplines (e.g.,

nutrition), which has largely focused on clinical samples (e.g., patients with eating disorders) or taken an epidemiological approach (Canetti, Bachar, & Berry, 2002), without paying much attention to normal workers and risk factors in their day-to-day work experiences. Therefore, in the current research, we consider work-related stressors in both studies (job demands in Study 1 and customer mistreatment in Study 2) as the risk factors at work that make employees more likely to engage in unhealthy eating (i.e., unhealthy vs. healthy food consumption in Study 1 and overeating behaviors in Study 2). Such an emphasis on workers and their daily experiences can help identify new drivers of unhealthy eating and enrich our understanding of the psychological processes that predict employees' eating behaviors.

Second, although research in other disciplines has discovered various antecedents of unhealthy eating (for reviews, see Canetti et al., 2002; Ganley, 1989; Hofmann, Friese, & Wiers, 2008), a theoretical framework more germane to understanding the predictors of employees' eating behaviors is still missing. Considering that organizational researchers have often used the self-regulation perspective (e.g., Baumeister, Bratslavsky, Muraven, & Tice, 1998; Beal, Weiss, Barros, & MacDermid, 2005; Muraven & Baumeister, 2000) to understand other employee health-related behaviors (e.g., Lanaj, Johnson, & Barnes, 2014; Trougakos, Hideg, Cheng, & Beal, 2014; M. Wang, Liu, Zhan, & Shi, 2010), we apply the self-regulation perspective in the current research. In particular, we theorize that work-related stressors might induce employee unhealthy eating by increasing employees' maladaptive desire to engage in mood-regulating actions and by decreasing employees' effectiveness in exerting self-regulatory control. Drawing on the self-regulation perspective, we develop and test a theoretical model that links daily work-related stressors to employee eating behaviors. To more directly test our theoretical argument, in Study 2, we examined employee afternoon negative mood as a mediator between daily customer mistreatment and evening overeating behaviors.

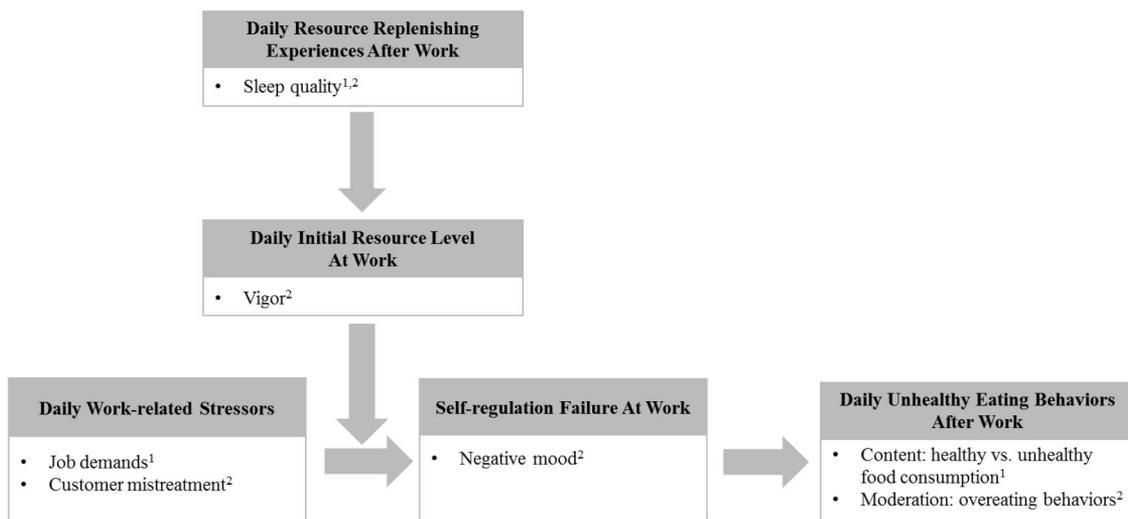


Figure 1. A self-regulation framework for understanding daily unhealthy eating behaviors. 1 = constructs examined in Study 1; 2 = constructs examined in Study 2.

Third, we contribute to research on health-related behaviors by not only simultaneously examining employee eating and sleeping but also articulating the theoretical connections between the two health-related behaviors. In particular, we conceptualize unhealthy eating behaviors as consequences of problematic self-regulation processes and argue that sleep may function to replenish self-regulatory resource, which facilitates employees regulating their eating behaviors when exposed to work-related stressors. Accordingly, we examined whether sleep quality moderates the relationships between work-related stressors and unhealthy eating in both studies. Further, in Study 2, we examined whether morning vigor, conceptualized as employees' daily initial levels of self-regulatory resources, channels the moderation effect of sleep quality. Testing vigor as a mediator reflects the direct operationalization of the resource-replenishing effect of sleep and explains the psychological process through which sleep may buffer the effects of work-related stressors.

Our research also offers important methodological advantages over previous research. In particular, prior research on unhealthy eating was often conducted either in lab settings or via cross-sectional survey methods (O'Connor, Jones, Conner, McMillan, & Ferguson, 2008). Yet eating observed in the lab is largely constrained by the controlled settings and may not adequately capture how participants' eating behaviors occur in real-life situations (Beal, 2015). Moreover, the cross-sectional survey approach often asks participants to report their eating over an extended period of time, which may not be sensitive enough to reveal meaningful within-individual variability in eating behaviors and allow examinations of factors that can account for such variability (Beal & Weiss, 2003). As such, in the current study, by using data collected from field samples with a daily diary design, we provide better external validity and sensitivity in examining mechanisms associated with daily eating behaviors (Beal, 2015).

Eating Behaviors: The Content and Quantity of Eating

Eating behaviors refer to the ingestion of food that provides heterotrophic organisms energy and growth (Polivy, 1990) and are important to the functional operation of human bodies. Previous research has distinguished two aspects of eating behaviors: the content of eating and the quantity of eating (Canetti et al., 2002; Eertmans, Baeyens, & Van den Bergh, 2001). The content of eating focuses on what people eat. In the existing literature, the most common approach to characterize the content of individuals' eating behaviors is to distinguish healthy from unhealthy food (e.g., Allen & Armstrong, 2006; Conner, Norman, & Bell, 2002; D. M. Ng & Jeffery, 2003). On the one hand, healthy foods include foods that are less processed, more nutritionally balanced, and richer in vitamins, minerals, and fiber (e.g., fruits, vegetables, and whole grains), and have been linked to multiple positive health benefits, such as prevention of heart disease, cancer, and stroke (e.g., Hu & Willett, 2002; Van Duyn & Pivonka, 2000). On the other hand, unhealthy foods are characterized by high saturated and trans fat content (e.g., hamburgers, fried food, and salty snacks such as potato chips) and/or high sugar content (e.g., sugary drinks and sweetened processed food, such as cakes and candies), and have been linked to cardiovascular disease and obesity (e.g., Bray & Popkin, 1998; Brown, Dulloo, & Montani, 2008). Naturally, consuming more types of healthy food represents healthy eating

behaviors, whereas consuming more types of unhealthy food indicates unhealthy eating behaviors. Research on the content of eating often uses checklist measures to record participants' healthy and unhealthy food consumption (e.g., Allen & Armstrong, 2006; D. M. Ng & Jeffery, 2003).

In addition to the content of eating, previous research has also recognized the importance of quantity of eating, which focuses on how much people eat. After all, eating too much fruits and vegetables may be just as detrimental to our health as eating too little of them (D. A. Cohen, Sturm, Scott, Farley, & Bluthenthal, 2010). As such, healthy eating may also manifest as moderation in eating (i.e., eating only as much food as our body needs; Robinson, Paul, & Segal, 2014). The violation of eating in moderation is usually referred to as *overeating behaviors* (Herman, Polivy, & Leone, 2005), which include consuming food when not needed (e.g., feeling stuffed rather than satisfied) or eating on unnecessary occasions, such as eating late-night snacks (Colles, Dixon, & O'Brien, 2007). Overeating behaviors are generally associated with higher calorie intake. Not surprisingly, previous research has shown that overeating behaviors have multiple negative consequences (e.g., obesity and depression; Ackard, Neumark-Sztainer, Story, & Perry, 2003). Therefore, overeating also represents an important dimension of unhealthy eating. Research on the quantity of eating often uses Likert scales to measure the extent to which study participants engage in overeating behaviors (e.g., Arnow, Kenardy, & Agras, 1995; van Strien, Frijters, Bergers, & Defares, 1986).

Self-Regulation and Eating Behaviors

The self-regulation perspective argues that individuals regulate their attitudes and behaviors with self-regulatory resources, and such resources can be impaired by regulatory demands from the external environment (Baumeister et al., 1998; Baumeister & Vohs, 2003). For example, in the working context, work-related stressors can detract employees' attention from their focal tasks, which create demands for employees to regulate the potential negative appraisal and redirect attention back to focal tasks (Beal et al., 2005). Engagement in such self-regulation consumes *self-regulatory resources*, which refer to the amount of mental capacity available to control and alter naturally occurring emotions, behaviors, and mental states (Baumeister & Vohs, 2003; Halbesleben, Neveu, Paustian-Underdahl, & Westman, 2014). This self-regulatory activity, while consuming resources, is essential for employees' effective functioning at work, because it helps employees override aversive emotional states (e.g., Muraven & Baumeister, 2000), redirect their attention back to work (e.g., Beal et al., 2005), and refocus on work-related goals (e.g., Grandey, Fisk, & Steiner, 2005).

The self-regulation process has also been shown to play a critical role in maintaining healthy dietary habits (e.g., Bagozzi, Moore, & Leone, 2004) and suppressing individuals' impulses for unhealthy eating (e.g., Tice & Bratslavsky, 2000; Tice, Bratslavsky, & Baumeister, 2001). As such, the occurrence of unhealthy eating may be particularly salient when individuals experience self-regulation failure. Based on the self-regulation perspective, we propose two reasons why unhealthy eating may occur because of self-regulation failure. First, as stated in the popular phrase "eating one's feelings," eating is sometimes used as an activity to relieve and alter one's negative mood (Canetti et al.,

2002; Heatherton & Baumeister, 1991). In particular, the presence of negative mood creates an internal need for mood regulation, because individuals instinctually avoid aversive feelings and approach desirable feelings (Gross, 1998). Tice and her colleagues (Tice & Bratslavsky, 2000; Tice et al., 2001) have shown that in the face of undesirable experiences, individuals prioritize mood regulation by searching for immediate pleasure (e.g., unhealthy eating) rather than maintaining their long-term goals (e.g., health maintenance). Therefore, individuals experiencing negative mood are more likely to engage in unhealthy eating, because such behaviors can satisfy their desire for mood regulation (Tice & Bratslavsky, 2000; Tice et al., 2001). However, it is important to note that unhealthy eating only brings temporary comfort or serves as a quick escape from any experienced tension. Unhealthy eating cannot effectively alleviate the problem (e.g., work-related stressor) that caused the tension in the first place (Heatherton & Baumeister, 1991; Herman & Polivy, 2011). Thus, unhealthy eating as a coping strategy can be maladaptive in nature.

Second, research has also suggested that unhealthy eating is a consequence of diminished self-control (Adriaanse et al., 2011; Hofmann et al., 2008). Specifically, according to the self-regulation perspective, individuals only have a finite amount of regulatory resources that are available for inhibiting undesirable behavioral intentions (Baumeister et al., 1998; Beal et al., 2005). When facing resource-demanding stimuli from the environment (e.g., work-related stressors), individuals are likely to experience resource drain and consequently suffer from self-control impairment, which refers to individuals' decreased capacity to exert effective control over their cognitions and behaviors to be aligned with personal goals and social norms (Baumeister & Vohs, 2003; Muraven & Baumeister, 2000; M. Wang, Liao, Zhan, & Shi, 2011). Therefore, when experiencing significant resource drain, individuals may find it very difficult to resist the temptation to eat unhealthy food and be more likely to lose behavioral control in maintaining healthy eating.

Taken together, in the current article, we build and examine a theoretical model, shown in Figure 1, to guide our understanding of how daily work-related stressors shape unhealthy eating. Figure 1 also summarizes the variables included in the two studies reported in the article. In particular, we studied daily work-related stressors as the antecedents in our model, because work-related stressors have been identified as one of the most demanding experiences at work and can often induce negative emotions and erode employees' self-regulatory resources (e.g., Bono, Glomb, Shen, Kim, & Koch, 2013; M. Wang et al., 2010, 2013). Daily unhealthy eating was captured by the content of eating (i.e., healthy vs. unhealthy food consumption) in Study 1, and the quantity of eating (i.e., overeating behaviors) in Study 2, because both are important aspects of unhealthy eating (Canetti et al., 2002; Eertmans et al., 2001). Further, in Study 2, we measured employee afternoon negative mood at work to directly operationalize and test how work-related stressors induce unhealthy eating via self-regulation failure. Finally, our model also incorporates variables related to resource replenishment as moderators that buffer the negative effects of work-related stressors. Specifically, sleep quality from the previous night was included in both studies as a resource-replenishing experience. In Study 2, morning vigor was studied as a more proximal resource-based moderator that could channel the buffering effect of sleep quality.

Study 1: Hypotheses Development

In the work domain, one of the major reasons that employees experience undesirable emotional states and resource drain is their exposure to work-related stressors, such as job demands (e.g., Gilboa, Shirom, Fried, & Cooper, 2008; N. P. Podsakoff, LePine, & LePine, 2007; Scheibe, Stamov-Roßnagel, & Zacher, 2015). *Job demands* include those "physical, psychological, social, or organizational aspects of the job that requires sustained physical and/or psychological (i.e., cognitive or emotional) effort" (Schaufeli & Bakker, 2004, p. 296) and thus are particularly taxing on employees' resources (for a review, see Bakker & Demerouti, 2007). Based on our discussion of self-regulation and eating behaviors, we argue that job demands can lead to unhealthy eating for two reasons.

First, high levels of job demands are likely to induce negative mood because such demanding experiences are typically appraised by employees as negative and threatening (Beal et al., 2005; Hobfoll, 2002). As a result, negative mood may increase employees' desire to use unhealthy eating to experience momentary pleasure as an escape from aversive feelings (Tice & Bratslavsky, 2000; Tice et al., 2001). Therefore, in the face of high job demands, unhealthy eating may serve as an effective but maladaptive mood-altering action for employees. Second, experiencing high job demands drives employees to continuously invest resources into their task-related regulation; otherwise, employees will not be able to meet those high demands (Bakker & Demerouti, 2007; Beal et al., 2005). Such an investment process is likely to consume a significant amount of resources, leading to resource depletion and self-control impairment. Consequently, with impaired self-control, individuals may find it difficult to resist the maladaptive desire to eat and are likely to engage in unhealthy eating (Bagozzi et al., 2004).

In Study 1, we concentrate on the content aspect of eating and explore how many different types of healthy and unhealthy food employees consume on a day-to-day basis. Focusing on types of healthy/unhealthy food consumption is consistent with the self-regulation perspective, which argues that people prefer more tempting and palatable objects (e.g., more types of unhealthy food) rather than their counterpart (e.g., more types of healthy food) as a result of ineffective self-regulation (Baumeister & Vohs, 2003; Heatherton & Baumeister, 1991; Muraven & Baumeister, 2000). In particular, previous research has suggested that unhealthy food items are usually more tempting and satisfying than healthy food items (e.g., Dewall, Baumeister, Stillman, & Gailliot, 2007). Therefore, people may expect that consuming unhealthy food will be more effective in altering one's negative mood than consuming healthy food. Accordingly, resisting a type of unhealthy food will require more self-regulation than resisting a type of healthy food. In addition, time and effort have been identified as primary barriers to consuming healthy food because healthy food is not always available or easy to access compared with unhealthy food, which can usually be purchased in ready-made formats (e.g., Treiman et al., 1996). Therefore, selecting a type of healthy food requires more self-regulatory efforts than opting to consume a type of unhealthy food. Taken together, these arguments suggest that food consumption types could reflect one's level of self-regulation such that consuming a more diverse set of healthy food indicates a higher level of self-regulation, whereas consuming a more diverse set of unhealthy food indicates a

lower level of self-regulation. As such, we expect that in the face of high levels of job demands, employees are likely to consume more types of unhealthy food, but fewer types of healthy food. We hypothesize the following:

Hypothesis 1a: On days that employees experience higher levels of morning job demands, they will consume fewer types of healthy food in the evening.

Hypothesis 1b: On days that employees experience higher levels of morning job demands, they will consume more types of unhealthy food in the evening.

Given the central role of self-regulatory resources in inhibiting undesirable emotional states and behavioral intentions (Baumeister & Vohs, 2003; Beal et al., 2005; Halbesleben et al., 2014), the association between job demands and unhealthy eating may become weaker if employees have more self-regulatory resources. One common and natural way to replenish self-regulatory resources is through a good night's sleep. Sleep, defined as a homeostatic process featuring periodic suspension of consciousness and reduction of responsiveness that is easy to reverse (Siegel, 2005), has gained recent prominence in organizational research. According to Barnes (2012), sleep is a natural driver of day-to-day regulatory resource fluctuations and therefore has been examined as an important predictor of regulatory capability. For instance, Schnyer, Zeithamova, and Williams (2009) found that lack of sleep led to dramatic drops in glucose levels and cerebral metabolic rates in the prefrontal cortex, which plays a critical role in human executive functioning, including self-regulation.

In the current research, we investigate the moderating role of sleep quality on the relationships between job demands and eating behaviors. Barnes (2012) referred to *sleep quality* as the level of "difficulty of falling asleep, staying asleep, and the number of awakenings experienced in the night" (p. 236), and suggested that sleep quality is a critical indicator of the restoration level of one's self-regulatory capability. High-quality sleep replenishes individuals' resource pool available for self-regulation and makes individuals more ready to effectively respond to potential demands in the coming workday (Barnes, 2012; Hagger, 2010). This is consistent with previous findings showing that sleep had a lasting effect on employees' mental states and behaviors throughout the next day at work (e.g., Barnes, Ghumman, & Scott, 2013; Barnes, Schaubroeck, Huth, & Ghumman, 2011; Lanaj et al., 2014). Therefore, we argue that a good night's sleep can make employees more capable of handling stressful events at work, attenuating the negative association between job demands and healthy food consumption as well as the positive association between job demands and unhealthy food consumption. We hypothesize the following:

Hypothesis 2a: Previous night's sleep quality will moderate the negative relationship between morning job demands and healthy food consumption in the evening such that this negative relationship will be weaker when previous night's sleep quality is high (vs. low).

Hypothesis 2b: Previous night's sleep quality will moderate the positive relationship between morning job demands and

unhealthy food consumption in the evening such that this positive relationship will be weaker when previous night's sleep quality is high (vs. low).

Method

Sample and procedure. Data were collected from five information technology companies in China, approved by the institutional review board of the University of Florida (Approval No. IRB201602220). The human resource department in each company assisted us in distributing the study announcement to all employees, along with a letter assuring that all responses would only be used for third-party research purposes and kept confidential. A total of 125 participants (average response rate = 27.78%, ranging from 25.56% to 31.11% across companies) responded to the survey (ranging from 23 to 28 employees responding per company), among which 23.4% were female. Participants had an average age of 34.01 years ($SD = 4.44$) and an average organizational tenure of 6.03 years ($SD = 4.48$).

We conducted daily surveys four times per workday (i.e., morning, noon, afternoon, and evening) for three consecutive weeks. All surveys were distributed and collected by two on-site research assistants who were not affiliated with any of these companies. Data of the current study were collected as part of a larger project and have been used in Y. Liu et al. (2015). For the current study's purpose, we only used data from three of the four survey times (i.e., morning, noon, and evening). Specifically, before participants started their work each day, the morning survey assessed their previous night's sleep quality. After participants finished their morning work and before they started their lunch break, they completed the noon survey, which measured job demands they experienced that morning at work. Finally, participants filled out a survey before they went to bed, reporting their healthy and unhealthy food consumption in the evening. Participants handed in their completed evening surveys as soon as they arrived at work the next morning (the only exception was that Friday evenings' surveys were collected on the following Monday morning).

Out of the potential 1,875 reporting days (125 participants \times 15 days), participants responded 10.20 days on average (range = 2–14 days, $SD = 2.01$) and submitted a total of 1,275 matched daily reports (compliance rate = 68.0%). At the between-person level, there were no significant correlations between number of response days and any of our studied variables, suggesting that the nonresponse pattern did not affect our results (Goodman & Blum, 1996).

Measures. We translated the measures from English to Chinese following Brislin's (1980) translation-back translation procedure. We did not measure all variables at all times in order to reduce participant burden. Instead, each variable was only measured once, the timing of which was determined based on the research question and the period in which the constructs logically might happen (Fisher & To, 2012). Therefore, sleep quality from the previous night was measured in the morning survey, the timing of which was most proximal to participants' wake-up time. Job demands were measured in the noon survey after participants had

been working for several hours.¹ Food consumption choices were measured in the evening survey because we are interested in participants' evening eating behaviors after work.

Sleep quality. Sleep quality was measured using an 11-item scale adapted from Buysse, Reynolds, Monk, Berman, and Kupfer (1989). A sample item is "In the past night, I woke up in the middle of the night or early morning." Participants rated their sleep quality on a 5-point Likert scale (from 1 = *strongly disagree* to 5 = *strongly agree*). Because all items in Buysse et al. (1989) were framed to reflect a lack of sleep quality, we reversed coded all items so that the ratings represented participants' sleep quality. Across the 15 surveyed days, the mean Cronbach's alpha was .82 (range = .79–.92).

Job demands. Job demands were measured using a 12-item scale adapted from Schaubroeck and Jones (2000) and Karasek (1979), following K. Y. Ng, Ang, and Chan's (2008) and Schaufeli, Bakker, and van Rhenen's (2009) practices. Participants were instructed to indicate the extent to which they agreed that each item described the job demands they experienced that morning on a 5-point Likert scale (from 1 = *strongly disagree* to 5 = *strongly agree*). A sample item is "I had to do more work than I could do well." Across the 15 surveyed days, the mean Cronbach's alpha was .86 (range = .73–.88).

Healthy and unhealthy food consumption. We used a 14-item checklist adapted from Caan, Coates, and Schaffer (1995) and Section 11 of the Behavioral Risk Factor Surveillance System (Centers for Disease Control and Prevention, 2013) to record participants' daily food consumption after work. Such a checklist-based approach in constructing food consumption measures has several advantages over other methods (e.g., using open-ended questions), such as offering higher acceptability to and lower burden on the participants (especially in daily dietary assessment; Comrie, Masson, & McNeill, 2009; Thompson & Subar, 2008). In addition, overestimation of food consumption quantity is a major drawback if participants are asked to freely recall what they have eaten (Bingham et al., 1994). Thus, using the checklist-based approach can also provide a conservative estimate of food consumption (Kim, Haines, Siega-Riz, & Popkin, 2003).

In creating the adapted checklist, we removed food items uncommon to Chinese dietary habits (e.g., salad dressing and mayonnaise, cheese) and not popular for eating in the evening (e.g., cereal) from the two scales and added food items common in Chinese culture but not covered by the two scales (e.g., whole grain rice, nuts or seeds), based on representative and large-scale research on Chinese dietary structures (Batis et al., 2014; Kim et al., 2003; Stookey, Wang, Ge, Lin, & Popkin, 2000). Each item was carefully reviewed by the authors regarding its health implications and its popularity among the Chinese population. In particular, all of the 14 items in this checklist satisfy the following criteria: (a) having clear health implications (i.e., healthy vs. unhealthy), (b) consistent with Chinese dietary habits, and (c) common for dieting in the evening. Although this checklist is not an exhaustive list of all possible food items, we believe it is exhaustive on food items satisfying the criteria related to the purpose of the current study. This checklist includes eight items for healthy food types and six items for unhealthy food types. Participants were asked if they had eaten particular types of food after work and responded with "Yes" or "No" to each item. Items in the checklist are

included in Appendix A. The number of "Yes" responses to healthy food items and unhealthy food items were counted, respectively, and used to represent how many different types of healthy food and unhealthy food participants consumed during each surveyed evening.

It is important to note that coefficient alpha is not appropriate to provide a reliability estimate for this checklist because it includes distinct types of food that might not be interrelated (Bollen & Lennox, 1991; Frone, 1998; S. Liu, Wang, Zhan, & Shi, 2009). In other words, we cannot assume that all of the healthy food types or unhealthy food types are positively correlated with one another on a given day. For instance, an employee who eats tofu on one day may not be more likely to eat fish on that same day. Validity evidence for this measure can be found in Appendix B.

Analytic strategy. Because data in this study had a nested structure (i.e., daily reports were nested within each participant), multilevel modeling techniques were used to estimate the hypothesized model in Mplus 7 software (Muthén & Muthén, 2012). At Level 1 (i.e., the within-person level), we specified the random effects of morning job demands on evening healthy food and unhealthy food consumption. Because food consumption was measured as the types of healthy or unhealthy food consumed by participants, they were count variables. The distributions of healthy and unhealthy food consumption both followed a Poisson distribution and consequently violated assumptions of the linear regression model (Gardner, Mulvey, & Shaw, 1995). Therefore, we conducted multilevel analyses with a Poisson link function. In addition, we specified the effects of the interaction term (i.e., Job Demands \times Previous Night's Sleep Quality) on evening healthy food and unhealthy food consumption, controlling for the main effects of previous night's sleep quality. Given that the data in the current study were collected from five different companies, standard errors of model parameter estimates were computed using the sandwich estimator to correct for the potential sampling differences (Muthén & Muthén, 2012).² Job demands and sleep quality were both group-mean centered to remove between-person variance (Hofmann & Gavin, 1998). The product of the two group-mean centered variables was used as the interaction term.

Results

Table 1 presents the means, standard deviations, reliabilities, and within-person correlations of the study variables. One-way random-factor ANOVA results showed that the between-person variance was significant for sleep quality, intraclass correlation (ICC) (1) = .68, $F(124, 1150) = 22.45$, $p < .01$, and job

¹ Because Study 1's data were collected as part of a larger project, we did not measure job demands in the afternoon survey again to avoid excessive length of measurement. We realize that this is a limitation, and thus in Study 2 we measured work-related stressors (i.e., customer mistreatment) in both the morning and the afternoon surveys.

² The sandwich estimator is often used for cluster samples in which the clusters (e.g., five companies in our study) are independent but the observations (e.g., multiple participants in the same company) within a cluster are not. This estimator is able to take into account the nonindependence of observations because of cluster sampling and provide an unbiased and robust estimation of standard errors (Rogers, 1993; White, 1980). In the Mplus 7 software, the sandwich estimator can be implemented using the syntax TYPE = COMPLEX.

Table 1
Study 1: Means, Standard Deviations, Reliabilities, and Correlations Among Variables

Variables	<i>M</i>	<i>SD</i>	1	2	3	4
1. Sleep quality of the previous night	1.93	.33	(.82)	.09	-.08	-.06
2. Morning job demands	3.30	.33	-.01	(.86)	-.06	.33**
3. Evening healthy food consumption	3.95	1.20	-.03	-.03	—	.23*
4. Evening unhealthy food consumption	1.37	.82	.00	.03	.19**	—

Note. Correlations below the diagonal are within-person correlations ($n = 1,275$). Correlations above the diagonal are between-person correlations ($n = 125$). Cronbach's alpha coefficients are in parentheses along the diagonal.

* $p < .05$. ** $p < .01$.

demands, $ICC(1) = .73$, $F(124, 1150) = 28.12$, $p < .01$.³ These results indicate that there was substantial variance in the studied variables at the between-person level, which warrants the use of multilevel modeling for analyzing the current data.⁴

Multilevel confirmatory factor analysis (CFA) was conducted to examine the construct validity of sleep quality and job demands (food consumption was not included here because checklist measures do not have latent constructs). When loading all items onto their corresponding latent constructs, the multilevel CFA model failed to converge. This is not surprising, given that this model exceeded the recommended parameter to sample size ratio for estimation at Level 2 (1:5; Bentler & Chou, 1987). Therefore, we used item parceling to estimate the multilevel CFA model of sleep quality and job demands. Specifically, we created three empirically balanced parcels for each latent construct by assigning the item with the highest factor loading to the first parcel, the second highest to the second parcel, and so forth (Landis, Beal, & Tesluk, 2000). Results showed that this two-factor multilevel CFA model fit the data well, $\chi^2(16) = 16.62$, $p = .41$, comparative fit index (CFI) = .99, root mean square error of approximation (RMSEA) = .01, standard root mean square residual (SRMR) = .01 at the within-person level, and .05 at the between-person level. All parcels loaded significantly on their corresponding latent constructs (standardized factor loadings ranged from .47 to .87). The correlation between sleep quality and job demands was .01 and not significant ($p = .95$). Therefore, our measures did capture distinct constructs.

Table 2 summarizes the unstandardized coefficients estimated in our model. As is shown in Table 2, job demands in the morning were negatively related to healthy food consumption ($\gamma = -.30$, $p < .01$), while positively related to unhealthy food consumption in the evening ($\gamma = .52$, $p < .01$), thus providing support for Hypotheses 1a and 1b. These findings suggest that when employees experienced more job demands at work in the morning, they were likely to consume more types of unhealthy food but fewer types of healthy food after work on that day. In other words, a one-unit increase in participants' morning job demands would lead to a decrease of healthy food types consumed in the evening by a factor of .74 ($e^{-.30} = .74$) and an increase of unhealthy food types consumed in the evening by a factor of 1.68 ($e^{.52} = 1.68$).⁵

The interaction effect between job demands and sleep quality on healthy food consumption was not significant ($\gamma = .01$, $p > .05$). Therefore, Hypothesis 2a was not supported. Nevertheless,

the interaction effect between job demands and sleep quality on unhealthy food consumption was significant ($\gamma = -.14$, $p < .05$). Following J. Cohen, Cohen, West, and Aiken's (2003) recommendations, we plotted the interaction at conditional values of sleep quality (1 *SD* above and below the mean). As presented in Figure 2, the positive relationship between morning job demands and evening unhealthy food consumption was weaker when participants had better sleep quality ($\gamma = .48$, $SE = .15$, $p < .01$) compared with poorer sleep quality ($\gamma = .57$, $SE = .13$, $p < .01$) during the previous night. In other words, when participants had better sleep quality the night before, a one-unit increase in participants' morning job demands would lead to an increase of unhealthy food types consumed in the evening by a factor of 1.62 ($e^{.48} = 1.62$), compared with a factor of 1.77 ($e^{.57} = 1.77$) when participants had poorer sleep quality the night before. This represents an increase of 9.3% more consumption of unhealthy food types associated with job demands when participants slept better (vs. worse) during the prior night. These findings support Hypothesis 2b and indicate that better sleep quality the night before

³ ICC and one-way random factor ANOVA analyses cannot be used for count variables. Therefore, ICC and *F* test results for the healthy and unhealthy food consumption variables are not calculable.

⁴ Although not hypothesized in the article, we examined whether gender moderated any of the relationships in the hypothesized model. We did not find any significant moderation effects of gender on the relationships in the model.

⁵ Based on the current model, we attempted to estimate another model by controlling for the effects of the previous day's (i.e., Day T-1) healthy and unhealthy food consumption on the same variables of the current day (i.e., Day T). However, this alternative model failed to converge, and therefore we did not report this model in the text. Given that the within-person correlation between healthy food consumption on Day T-1 and healthy food consumption on Day T ($r = -.01$, $p > .05$) and the within-person correlation between unhealthy food consumption on Day T-1 and unhealthy food consumption on Day T ($r = -.03$, $p > .05$) were both trivial in size and nonsignificant, we believe that including healthy and unhealthy food consumption on Day T-1 would not influence the current findings. Residual variances of the count variables (i.e., healthy and unhealthy food consumption) are not available in Poisson link function-based models (Gardner et al., 1995). Therefore, auto-correlation structure of residuals over time cannot be estimated in the current model.

Table 2
Study 1: Unstandardized Coefficients of the Hypothesized Model

Variables	Evening healthy food consumption		Evening unhealthy food consumption	
	Estimate	SE	Estimate	SE
Intercept	2.39**	.16	-1.72	1.06
Morning job demands (A)	-.30**	.01	.52**	.14
Sleep quality of the previous night (B)	.03	.04	-.03	.35
A × B	.01	.02	-.14*	.06

Note. $N = 1,275$. Variance and residual variance estimations are not available for regressions with a Poisson link function. SE = standard error.

* $p < .05$. ** $p < .01$.

buffered the positive effect of morning job demands on unhealthy food consumption after work.⁶

Discussion

To summarize, in Study 1, we found that on days when employees experienced higher job demands in the morning, they were likely to consume fewer categories of healthy food and more categories of unhealthy food in the evening. These results indicate that job demands may be associated with employee eating behaviors on a day-to-day basis. In addition, if employees slept well during the prior night, the positive relationship between job demands and unhealthy food consumption on the next day became weaker. This suggests that a good night's sleep could serve as a protecting factor that buffers the influence of morning job demands on evening unhealthy food consumption. However, we did not find a moderating effect of sleep quality on the relationship between job demands and healthy food consumption. This might be because the negative effect of job demands on healthy food consumption was particularly strong, overshadowing the potential buffering effect of sleep quality. In other words, it may take a great deal of regulatory resources for employees to choose healthy food when exposed to excessive job demands; even a good night's sleep will not offset the self-regulation impairment from job demands and facilitate healthy food choices. This result is also consistent with previous research demonstrating that sleep buffers the negative consequences associated with resource drain (Barnes, 2012;

Diestel, Rivkin, & Schmidt, 2015). Therefore, it is not surprising that we found better sleep quality only *prevented* employees from opting to eat more unhealthy food in the face of higher levels of job demands, but did not *promote* them to consume more healthy food. In fact, previous research has shown that the consumption of healthy food usually requires more effortful regulation, such as actively creating healthy food consumption goals, keeping those goals activated even with resource drain, and successfully transforming the related intentions into actions (Adriaanse et al., 2011).

Although the majority of hypotheses in Study 1 were supported, some limitations remain, which led us to conduct Study 2 to more comprehensively and directly test our theoretical model. First, we only examined job demands in Study 1, which represent the *overall* extent of work-related stressors experienced by employees (Schaufeli & Bakker, 2004). Interestingly, recent research on work-related stressors suggests that some occupation-specific work-related stressors, albeit having lower frequency and narrower scope than job demands, can lead to particularly significant resource drain for employees of that occupation (e.g., Baethge & Rigotti, 2015; Porath & Erez, 2007; van Jaarsveld, Walker, & Skarlicki, 2010; M. Wang et al., 2011). Therefore, it is also valuable to examine whether a more specific type of work stressor can be linked to unhealthy eating after work. This will help test the robustness of the association between work stressors and unhealthy eating after work. Accordingly, in Study 2, we use a sample of service employees and examine customer mistreatment, an occupation-specific stressor for service employees, as an antecedent of unhealthy eating.

Second, in Study 1, we only examined the content of eating without considering quantity of eating. Thus, in Study 2, we complemented the findings from Study 1 by focusing on the quantity of eating and examining if overeating behaviors are also linked to stressors at work. Third, in Study 1, we did not directly examine the proposed self-regulation failure arguments through

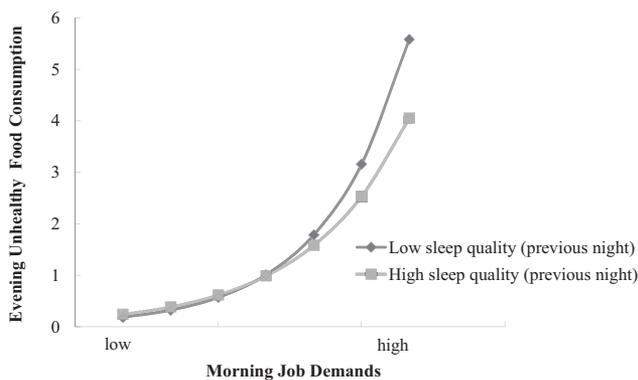


Figure 2. Study 1: Previous night's sleep quality moderates the effect of morning job demands on evening unhealthy food consumption.

⁶ Given that eating and sleep are two important health-related behaviors, it is possible that eating and sleeping are interrelated with each other, such that individuals' food consumption at night may impact their sleep quality. However, in Study 1, neither of the within-person correlations between the two types of food consumption and sleep quality on the same day was significant ($r = -.02$ for healthy food and $r = .00$ for unhealthy food, $ps > .05$). Therefore, it is unlikely that healthy and unhealthy food consumption at night influenced sleep quality that same night. We discuss these findings in more detail and in the context of previous research in the General Discussion section.

which work-related stressors might explain the occurrence of unhealthy eating. Therefore, in Study 2, we tested employee afternoon negative mood at work as a mediator to directly operationalize and test the proposed processes of self-regulation failure (i.e., the mood-alteration process and the self-control impairment process) in our theoretical model. Finally, although our theory argues that sleep is a resource-replenishing experience, we did not directly measure participants' levels of resources as a result of sleep in Study 1. Therefore, in Study 2, we included a measure of morning vigor and directly examined the resource-replenishing effect of sleep via morning vigor.

Study 2: Hypotheses Development

Service employees who are required to maintain positive interactions with customers sometimes receive low-quality interpersonal treatment from their customers, such as verbal abuse, unfair demands, and disrespectful behaviors (Skarlicki, van Jaarsveld, & Walker, 2008). Such treatment from customers is usually referred to as *customer mistreatment*, and has been identified as one of the most common work-related stressors for service employees given the customer-interactive nature of their jobs (e.g., Dormann & Zapf, 2004; Dudenhöffer & Dormann, 2013). Previous research has shown robust effects of customer mistreatment in eliciting employee negative mood (e.g., Koopmann, Wang, Liu, & Song, 2015; Zhan, Wang, & Shi, 2016). This is because customer mistreatment is usually appraised to be threatening and interferes with employee service goal pursuit (Beal et al., 2005; Wang et al., 2013). Based on our discussion of the self-regulation perspective earlier, we believe negative mood induced by customer mistreatment could, in turn, result in unhealthy eating, such as overeating behaviors, for two theoretical reasons.

First, negative mood may increase one's desire to engage in maladaptive behaviors for mood-altering reasons. Specifically, maladaptive behaviors can bring temporary comfort to individuals but do not eliminate the source of anxiety and stress (e.g., work-related stressors; Folkman & Lazarus, 1988). Overeating is one maladaptive behavior that can help individuals better their mood: By consuming food excessively, individuals can shift their attention away from negative emotions, and, at the same time, take comfort in the feeling of satiety (Heatherington & Baumeister, 1991; Neese, 1984). Overeating behaviors offer this mood-altering function because, evolutionarily speaking, maximizing caloric intake is an effective approach to ensure survival as doing so prepares individuals for any desolate (e.g., food-poor) environment that they may encounter in the future (Polivy & Herman, 2006). Even though humans today are better able to deal with such harsh environmental conditions, the evolutionary meaning of overeating behaviors remains deeply wired in our brain functioning and can elicit stable activations of the pleasure-related neural circuit (Stice, Yokum, Zald, & Dagher, 2011).

Second, negative mood induced by customer mistreatment may also signify a depleted state of individuals' self-regulatory resources. Previous studies have shown that besides inducing negative mood, customer mistreatment can also tax individuals' regulatory resources and substantially drain one's resource reservoir (e.g., Koopmann et al., 2015; M. Wang et al., 2011). For example, when mistreated, employees may need to expend even more regulatory resources during service interactions to focus their atten-

tion on meeting customer needs. These resource-intensive interactions ultimately lead to greater difficulty regulating the negative mood induced by customer mistreatment. This is especially true given that "altering the expression or experience of an emotion may be the most laborious of self-regulatory efforts" (Beal et al., 2005, p. 1062). As such, after being mistreated by customers at work, employees' experience of negative mood can indicate that their resource reservoir has been drained by mistreatment encounters, which have left them unable to prevent those associated negative feelings from surfacing (for reviews, see Baumeister et al., 1998; Beal et al., 2005; Hagger, Wood, Stiff, & Chatzisarantis, 2010). As a consequence of this resource drain (indicated by negative mood), individuals may also experience difficulties in regulating maladaptive desires and behaviors later that day, such as failing to regulate how much they eat (i.e., overeating behaviors). Taking these two reasons together, we hypothesize the following:

Hypothesis 3: Negative mood will mediate the relationship between daily customer mistreatment and employee overeating behaviors in the evening.

In Study 2, we also directly examine the underlying mechanism of the moderation effect of sleep quality by testing an important indicator of regulatory resources—vigor. After all, a good night's sleep is only a natural driver rather than a direct indicator of replenished regulatory resources (Barnes, 2012). *Vigor* refers to "high levels of energy and mental resilience while working, the willingness to invest effort in one's work, and persistence even in the face of difficulties" (Schaufeli & Bakker, 2004, p. 295). Previous research has examined vigor as an indicator of self-regulatory resources. For example, Schaufeli, Bakker, and Salanova (2006) suggested that vigor is the direct opposite of emotional exhaustion, which is an important marker of resource depletion. Sonnentag and Natter (2004) found that recovery experiences after work were positively associated with flight attendants' vigor before bedtime. Given that sleep is an important process for the restoration of regulatory resources (Barnes, 2012), we believe that a good night's sleep will bring a vigorous state to employees in the morning. We hypothesize the following:

Hypothesis 4: Previous night's sleep quality will be positively related to employees' vigor the next morning at work.

Similar to Study 1, we also expect that a good night of sleep can buffer the negative effect of customer mistreatment. We argue that such a moderation effect is channeled through morning vigor (i.e., the initial levels of resources employees have before starting a day's work). In particular, on days when employees have higher levels of morning vigor, they may appraise customer mistreatment to be more manageable and less threatening because they have more available resources to deal with the negative encounter (Lazarus, 1991; Smith & Kirby, 2001; M. Wang et al., 2010). Consequently, customer mistreatment is less likely to materialize into negative mood. Further, on days when employees have higher levels of morning vigor, they are also more likely to be protected from experiencing resource depletion induced by customer mistreatment. This is because, even in the face of customer mistreatment, a more vigorous state still allows employees to better exercise control over undesirable mental states and behaviors

(Schaufeli et al., 2006; M. Wang et al., 2011). Therefore, we hypothesize the following:

Hypothesis 5: The buffering effect of previous night's sleep quality on the relationship between customer mistreatment and afternoon negative mood will be mediated by morning vigor.

Method

Sample and procedure. We collected data from a call center of a major Chinese telecommunications service company, approved by the institutional review board of the University of Florida (Approval No. IRB201602220). The human resource department assisted us in distributing the study announcement to customer service representatives working in the company. The study announcement was accompanied with a letter assuring employee confidentiality, voluntary participation, and the use of data for research purposes only. A total of 110 employees (response rate = 85.3%) participated in the study, among which 51.8% were female. The participants had an average age of 22.94 years ($SD = 2.90$) and an average organizational tenure of 11.83 months ($SD = 4.49$). These participants' major work responsibilities included answering phone calls from customers and providing service support to customers about telephone, cell phone, and Internet products. Participants completed daily surveys four times every workday for four consecutive weeks. All surveys were distributed and collected by two on-site research assistants who were not affiliated with the company. Specifically, in the morning when participants arrived at work, they submitted the evening survey from the previous night. Then, they received and completed the morning survey (measuring sleep quality of the previous night, vigor, and negative mood) before they started their morning work. The noon survey (measuring customer mistreatment) was distributed and collected after they finished their morning work and before they started their lunch break. Before they left work in the afternoon, they completed and returned an afternoon survey (assessing customer mistreatment and negative mood). After participants completed their afternoon survey, they received the evening survey (assessing overeating behaviors) to bring home and were instructed to fill out the survey before bedtime.

Out of 2,200 potential reporting days (110 participants \times 20 days), participants responded 13.16 days on average (range = 1–16 days, $SD = 3.09$) and submitted a total of 1,448 matched daily reports (compliance rate = 65.8%). At the between-person level, there were no significant correlations between number of response days and any studied variables, suggesting that nonresponse pattern did not affect our results (Goodman & Blum, 1996).

Measures. We translated the measures from English to Chinese following Brislin's (1980) procedure. Similar to Study 1, we measured most variables only once based on the time period during which the variable is most likely to happen logically (Fisher & To, 2012). However, we did measure customer mistreatment in both the noon and afternoon surveys to obtain participants' experiences of customer mistreatment during the whole workday. We also measured negative mood in both morning and afternoon surveys, the former of which was used as a control variable to represent participants' baseline emotional states of the day (e.g., Y. Liu et al., 2015), and the latter of which was examined as a mediator of our model.

Sleep quality. Sleep quality was measured using a single item, "I slept well last night," in the morning survey using a 5-point Likert scale (from 1 = *strongly disagree* to 5 = *strongly agree*). To examine the validity of this measure, we collected daily diary data from an independent sample of 46 Chinese employees (average age = 35.78 years, 47.80% female) on each workday for 5 days. On each workday before participants started their work in the morning, they were asked to rate their sleep quality during the previous night (from 1 = *strongly disagree* to 5 = *strongly agree*) on the 11-item scale we used in Study 1 (mean Cronbach's alpha = .74) and the single-item measure we used in Study 2. Participants' responses on the 11-item scale were significantly and positively correlated with their responses on the single-item scale ($r = .73, p < .01$), supporting the convergent validity of the single-item measure of sleep quality.

Vigor. Vigor was measured using a six-item scale developed by Schaufeli et al. (2006). A sample item is "I feel strong and vigorous now." Participants indicated the extent to which they agreed that each item described how vigorous they felt that morning on a 7-point Likert scale (from 1 = *strongly disagree* to 7 = *strongly agree*). Across the 20 surveyed days, the mean Cronbach's alpha was .93 (range = .85–.96).

Customer mistreatment. Customer mistreatment was measured using an 18-item scale developed by M. Wang et al. (2011). A sample item is "This morning/afternoon my clients vented their bad mood out on me." Participants rated how frequently they experienced customer mistreatment in the morning/afternoon on a 5-point scale (0 = *never*, 1 = *a few times*, 2 = *half of the time*, 3 = *a majority of the time*, and 4 = *all the time*). Across the 20 surveyed days, the mean Cronbach's alpha was .92 in both the morning survey (range = .88–.94) and the afternoon survey (range = .84–.95). We averaged participants' ratings of customer mistreatment in the morning and afternoon surveys of the same day to obtain an overall score of customer mistreatment during the whole workday.⁷

Negative mood. Negative mood was measured using an eight-item scale from Mohr et al. (2005). In particular, participants were asked to indicate the extent to which they agreed that each of the eight words described their current mood states that morning or afternoon (from 1 = *strongly disagree* to 5 = *strongly agree*). Sample items are "jittery" and "hostile." Across the 20 surveyed days, the mean Cronbach's alpha was .85 in the morning survey (range = .79–.91) and .87 in the afternoon survey (range = .83–.90).

Overeating behaviors. Measures of overeating behaviors in the existing literatures were predominantly designed for nutrition and psychosomatic studies among clinical samples (especially among obese patients and restrained dieters; Canetti et al., 2002) and thus are not appropriate for direct adaptation to measure overeating behaviors among normal employee samples. Further,

⁷ Supplemental analysis was conducted using morning customer mistreatment as the predictor in testing the hypothesized model in Study 2. The finding patterns were virtually the same (i.e., maintained same signs and significance levels) as the current results. We decided to report the current results with participants' average score of customer mistreatment in the morning and afternoon surveys of the same day, because the average score better captured participants' complete experiences of customer mistreatment during the entire workday.

items of these measures usually confounded eating motives with eating behaviors (e.g., Arnow et al., 1995; van Strien et al., 1986) and thus are not able to provide a pure measurement of overeating behaviors, which should be independent of any motives for eating. Therefore, we synthesized items from the existing literatures and removed content specific to clinical samples and statements regarding motives for overeating, generating four items to assess our participants' overeating behaviors after work in the evening survey (see Appendix A for the items). Participants rated their agreement with each item on a 5-point Likert scale (from 1 = *strongly disagree* to 5 = *strongly agree*). Across the 20 surveyed days, the mean Cronbach's alpha was .80 (range = .74–.85). Validity evidence for this scale can be found in Appendix B.

Analytic strategy. Similar to Study 1, multilevel modeling techniques were also used in Study 2. To accurately reflect the asymmetric nature of the sampling distribution of the indirect effect, mediation hypotheses were tested using Monte Carlo simulation procedures in the open-source software *R* (Preacher, Zyphur, & Zhang, 2010). At Level 1, we specified the fixed effect of daily customer mistreatment on afternoon negative mood, as well as the fixed effect of these two variables on overeating behaviors after work. To estimate the moderation effects, we specified the fixed effects of the interaction terms (i.e., Daily Customer Mistreatment \times Morning Vigor; Daily Customer Mistreatment \times Sleep Quality of the Previous Night) on afternoon negative mood and evening overeating behaviors. In addition, we specified the effect of previous night's sleep quality on morning vigor. We also controlled for the effects of previous night's sleep quality, morning vigor, and morning negative mood on afternoon negative mood and evening overeating behaviors. The predictor (i.e., daily customer mistreatment) and the moderators (i.e., sleep quality of the previous night and morning vigor) were group-mean centered (Hofmann & Gavin, 1998), the products of which were used as the interaction terms.

Results

Table 3 presents the means, standard deviations, reliabilities, and within-person correlations of the study variables. One-way random-factor ANOVA results showed that the between-person variance was significant for the previous night's sleep quality, $ICC(1) = .29$, $F(109, 1338) = 6.47$, $p < .01$, morning vigor, $ICC(1) = .65$, $F(109, 1338) = 26.14$, $p < .01$, daily customer mistreatment, $ICC(1) = .66$, $F(109, 1338) = 25.02$, $p < .01$, afternoon negative mood, $ICC(1) = .58$, $F(109, 1338) = 16.21$, $p < .01$, and evening overeating behaviors, $ICC(1) = .38$, $F(109, 1338) = 8.06$, $p < .01$. These results indicate that there was substantial variance in the studied variables at the between-person level, which warrants the use of multilevel modeling for analyzing the current data.⁸

Multilevel CFA was also conducted to examine the construct validity of all within-person measures (i.e., previous night's sleep quality, morning vigor, daily customer mistreatment, afternoon negative mood, and evening overeating behaviors). Similar to Study 1, the multilevel CFA model failed to converge when all items were loaded onto their corresponding latent constructs, given that this model also exceeded the recommended parameter to sample size ratio for estimation at Level 2 (1:5; Bentler & Chou, 1987). Therefore, to estimate the

multilevel CFA model, item parceling was used for three latent constructs that had more than four items (i.e., morning vigor, daily customer mistreatment, and afternoon negative mood), following the procedure used in Study 1. In particular, two item parcels were created for morning vigor, and three item parcels were created for daily customer mistreatment and afternoon negative mood, respectively. Because sleep quality was measured by a single item, we set its factor loading onto the latent factor to one and its error variance to zero. Results showed that this five-factor multilevel CFA model fit the data well, $\chi^2(112) = 176.83$, $p < .01$, CFI = .99, RMSEA = .02, SRMR = .02 at the within-person level, and .06 at the between-person level). All parcels loaded significantly on their corresponding latent constructs (standardized factor loadings ranged from .48 to .92). Correlations among latent constructs ranged between .05 and .25. Therefore, our measures did capture distinct constructs.

Table 4 summarizes the unstandardized coefficients estimated in our multilevel path analysis model.⁹ Snijders and Bosker's (1999) formulas were used to calculate pseudo R^2 ($\sim R^2$) for the effect sizes in predicting outcomes. Predictors included in the model accounted for 3% of the total variance in morning vigor, 5% in afternoon negative mood, and 3% in evening overeating behaviors at the within-person level. As shown in Table 4, daily customer mistreatment was positively related to negative mood in the afternoon ($\gamma = .32$, $p < .01$) and overeating behaviors in the evening ($\gamma = .33$, $p < .01$). In addition, afternoon negative mood ($\gamma = .14$, $p < .05$) was positively related to evening overeating. With 20,000 Monte Carlo replications, we found that the indirect effects of daily customer mistreatment on evening overeating was .04 via afternoon negative mood with a 95% confidence interval (CI) of [.003, .093]. Because the CI did not include zero, Hypothesis 3 was supported. Thus, when employees experienced more customer mistreatment during the whole workday, they were likely to experience more negative mood in the afternoon before they left work and subsequently engaged in more overeating behaviors in the evening. The effect of previous night's sleep quality on morning vigor was also significant ($\gamma = .20$, $p < .01$), supporting Hypothesis 4.¹⁰

⁸ In Study 2, we also examined whether gender moderated any of the relationships in the hypothesized model but did not find any significant moderation effects.

⁹ Based on the current model, we estimated another model by controlling for the effects of the previous day's (i.e., Day T-1) overeating behaviors on overeating behaviors of the current day (i.e., Day T). The finding pattern was virtually the same as the currently reported results. To keep consistent with Study 1, which did not include baseline control variables of the previous day, we did not report this alternative model in the text. Interested readers can request model coefficients of this alternative model from the corresponding author. In addition, following Wang et al.'s (2013) practices, we reran the model in SAS Proc Mixed with the RE-AR (1) variance-covariance structure (i.e., random effects plus first-order autoregression structure). The finding pattern was virtually the same, suggesting that our results are not likely to be influenced by potential first-order autoregressive effects.

¹⁰ In Study 2, we also examined the within-person correlation between overeating behaviors and sleep quality on the same day, which was small in size and nonsignificant ($r = .01$, $p > .05$). This provides additional evidence that eating behaviors at night were unlikely to influence sleep quality later that night.

Table 3
Study 2: Means, Standard Deviations, Reliabilities, and Correlations Among Variables

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1. Sleep quality of the previous night	3.01	1.16	—	.20*	-.24*	-.15	-.21*	-.03
2. Morning vigor	4.02	1.22	.27**	(.93)	-.13	-.18	.04	.09
3. Morning negative mood	2.13	.61	.00	.02	(.85)	.39**	.94**	.15
4. Daily customer mistreatment	.56	.44	.00	.04	.03	(.92)	.35**	.35**
5. Afternoon negative mood	2.12	.63	-.01	.04	.19**	.22**	(.87)	.18
6. Evening overeating behaviors	2.24	.81	.01	.13**	.05	.17**	.14**	(.80)

Note. Correlations below the diagonal are within-person correlations ($n = 1,448$). Correlations above the diagonal are between-person correlations ($n = 110$). Cronbach's alpha coefficients are in parentheses along the diagonal.

* $p < .05$. ** $p < .01$.

The interaction effect of morning vigor and daily customer mistreatment on afternoon negative mood was significant ($\gamma = -.17, p < .01$). Following J. Cohen et al.'s (2003) recommendations, we plotted the interaction at conditional values of morning vigor (1 *SD* above and below the mean). As presented in Figure 3, when morning vigor was high, daily customer mistreatment did not have a significant association with afternoon negative mood ($\gamma = .15, SE = .09, p > .05$). However, when morning vigor was low, daily customer mistreatment had a significant and positive relationship with afternoon negative mood ($\gamma = .49, SE = .08, p < .01$).¹¹

Given the significant effect of previous night's sleep quality on morning vigor, we tested the moderating effect of sleep quality on the relationships between daily customer mistreatment and afternoon negative mood via the mediating role of morning vigor, following D. Liu, Zhang, and Wang's (2012) approaches.¹² With a 20,000-repetition Monte Carlo simulation, we found that the indirect moderating effect of previous night's sleep quality on the relationship between daily customer mistreatment and afternoon negative mood via morning vigor was $-.03$, with a 95% CI of $[-.064, -.010]$. Because the CI did not contain zero, the indirect moderating effect was significant, supporting Hypothesis 5. This suggests that when employees slept well the prior night, they were more likely to feel vigorous the next morning, which, in turn, buffered the effect of daily customer mistreatment on afternoon negative mood.

Discussion

To summarize, the results of Study 2 extended the findings of Study 1. First, we found that an occupation-specific work-related stressor, customer mistreatment, was associated with employee overeating behaviors in the evening via negative mood in the afternoon. This finding extended Study 1's finding by directly testing and supporting a self-regulation failure mechanism. In addition, we also found that previous night's sleep quality was positively associated with vigor in the next morning, which, in turn, buffered the relation between daily customer mistreatment and afternoon negative mood. These findings extended the results of Study 1 by explicitly demonstrating how resources regained from a good night's sleep could help employees effectively deal with work-related stressors the next day.

An interesting finding is that daily customer mistreatment still had a significant direct effect on evening overeating behaviors

beyond its indirect effect through negative mood in the afternoon. This suggests that other mechanisms, such as physiological ones, exist in explaining the stressor–overeating relationship. For example, physiology research has shown that the hypothalamic–pituitary–adrenal (HPA) axis, which involves the complex influences and interactions among the hypothalamus, the pituitary

¹¹ Although we did not hypothesize the moderating effect of morning vigor on the indirect relationship between daily customer mistreatment and evening overeating behaviors via afternoon negative mood, we estimated the compound coefficient between the interaction effect of morning vigor and daily customer mistreatment on afternoon negative mood and the effect of negative mood on evening overeating behaviors, following Edwards and Lambert's (2007) practices. The compound coefficient was $-.02$ (95% CI $[-.051, -.002]$). In addition, we estimated the indirect effects at low and high values of morning vigor. The indirect effect was $.02$ (95% CI $[-.006, .065]$) when morning vigor was high (1 *SD* above the mean) versus $.07$ (95% CI $[.005, .136]$) when morning vigor was low (1 *SD* below the mean). The difference between the two conditions was $-.05$ (95% CI $[-.105, -.003]$). Because neither the CI of the compound coefficient nor the CI of the difference in conditional indirect effects contain zero, the moderation effect of morning vigor on the indirect relationship between daily customer mistreatment and evening overeating behaviors via afternoon negative mood was significant.

¹² According to D. Liu et al. (2012), in this type of mediated moderation, the moderating effect of the original moderator (W) on the relationship between the independent variable (X) and the dependent variable (Y) is transmitted through a mediator (M). Mathematically, this mediated moderation can be represented with two equations:

$$M = b_{10} + b_{11}W + b_{12}X \quad (1)$$

$$Y = b_{20} + b_{21}X + b_{22}M + b_{23}W + b_{24}XW + b_{25}XM \quad (2)$$

Replacing M in Equation 2 with Equation 1 provides the following equation:

$$Y = (b_{20} + b_{22}b_{10}) + (b_{21} + b_{22}b_{12})X + (b_{23} + b_{22}b_{11})W + b_{24}XW + b_{25}b_{10}X + b_{25}b_{11}XW + b_{25}b_{12}XX \quad (3)$$

where the compound coefficient $b_{25}b_{11}$ represents the mediated moderation effect of W on the relationship between X and Y via M . In other words, this is the coefficient that should be used to test Hypothesis 5 in our study. In particular, based on our model specification in Study 2, b_{25} represents the moderation effect of morning vigor on the relationship between daily customer mistreatment and afternoon negative mood, and b_{11} represents the effect of the previous night's sleep quality on morning vigor. To test the significance level of the compound coefficient $b_{25}b_{11}$, we used the Monte Carlo simulation procedure to obtain the 95% confidence interval of this coefficient (Preacher et al., 2010).

Table 4
Study 2: Unstandardized Coefficients of the Hypothesized Model

Variables	Morning vigor		Afternoon negative mood		Evening overeating behaviors	
	Estimate	SE	Estimate	SE	Estimate	SE
Intercept	4.01**	.10	2.14**	.05	2.24**	.05
Sleep quality of the previous night (A)	.20**	.04	-.01	.01	-.02	.03
Morning vigor (B)			.02	.02	.11*	.05
Morning negative mood			.20*	.04	.04	.07
Daily customer mistreatment (C)			.32**	.07	.33**	.12
C × A			.07	.06	-.06	.07
C × B			-.17**	.05	-.01	.04
Afternoon negative mood					.14*	.06
Residual variance at Level 1	.48**	.06	.17**	.02	.39**	.04
Residual variance at Level 2	.93**	.14	.24**	.06	.24**	.03

Note. *N* = 1,448. *SE* = standard error.
* *p* < .05. ** *p* < .01.

glands, and the adrenal glands, plays a key role in driving stress-induced eating behaviors among both animals and humans (Adam & Epel, 2007; Tomiyama, Dallman, & Epel, 2011). Specifically, demanding situations in the environment will activate the HPA axis and thus trigger more cortisol release. Cortisol release, in turn, will activate the brain reward pathways located in the limbic system, and the subsequent release of opioids will trigger increased food intake (especially of palatable food). This increase in food intake driven by the brain reward pathways is important because it represents a self-defense mechanism of human beings—humans use the natural reward of food to reduce the stressor-induced HPA axis activation. By ingesting the food reward, humans create a negative feedback loop for HPA axis activation, bringing the limbic system back to homeostasis (when the environment is less demanding). Although the current study focuses on the psychological mechanism of self-regulation and did not examine such a physiological mechanism, future research should simultaneously examine psychological and physiological mechanisms of stressor-induced eating behaviors. It would be especially interesting to examine how these two mechanisms may influence each other.

General Discussion

As noted by Herman and Polivy (2011, p. 533), “eating provides a nice crucible for testing models of self-regulation and self-

regulatory failure.” Therefore, in the current research, we introduce a self-regulation framework to understand the psychological mechanisms that link daily work-related stressors to employees’ eating behaviors. By emphasizing the psychological mechanisms that contribute to eating behaviors, the current research complements existing studies on eating behaviors in the organizational literature. Most of this extant literature has narrowly emphasized job design features (e.g., work scheduling and time allocation) as potential drivers of workers’ eating behaviors.

Taken together, the two studies reported in the paper have different foci when testing our theoretical model (e.g., different aspects of unhealthy eating behaviors served as the criterion of interest). Moreover, Study 2 improves upon Study 1 in two ways. First, by testing a distinct, occupation-specific work-related stressor and a different aspect of unhealthy eating behavior in Study 2, we were able to cross-validate our Study 1 findings on the relationship between work-related stressors and unhealthy eating. Second, by directly operationalizing the self-regulation mechanisms (i.e., the moderating role of vigor and the mediating role of negative mood) implied by the relationships examined in Study 1, we were able to demonstrate the effectiveness of using a self-regulation framework to understand the interrelationships among work-related experiences, sleep quality, and eating behaviors. Findings from our two studies also showed that, on a day-to-day basis, work-related stressors encountered by employees had robust associations with evening eating behaviors after work. These work-related stressors were related to the negative mood of employees at work, which were subsequently linked to evening unhealthy eating behaviors, such as eating more types of unhealthy food and fewer types of healthy food (Study 1) and eating excessively (Study 2). In addition, we found that previous night’s sleep quality buffered the effects of work-related stressors on unhealthy eating in both studies. As shown more directly in Study 2, a good night’s sleep could replenish employees’ regulatory resources and create a vigorous state the following morning. Such vigor, in turn, weakened the impact of customer mistreatment on employees’ negative mood, reducing the likelihood that employees engaged in unhealthy eating later that evening.

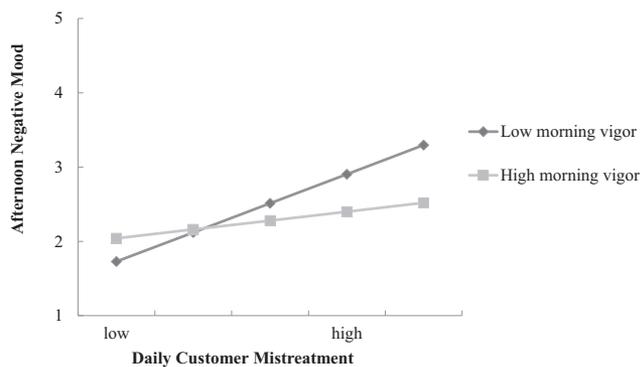


Figure 3. Study 2: Morning vigor moderates the effect of daily customer mistreatment on afternoon negative mood.

Theoretical Implications

First, by adopting the self-regulation perspective to study unhealthy eating, the current research has important implications to the understanding of maladaptive behaviors. In particular, in Study 2, by studying negative mood as both an indicator of undesirable affective appraisal and an indicator of depleted self-regulatory resources, we are able to operationalize and test the underlying self-regulation mechanism through which work-related stressors induce unhealthy eating. In fact, the two proposed roles of negative mood in our study are consistent with early theorizing on the different types of self-regulation failure (Baumeister, Heatherton, & Tice, 1994; Tice & Bratslavsky, 2000; Tice et al., 2001). On the one hand, the proposed mood-alteration process associated with negative mood may reflect the process of *misregulation*, in which individuals prioritize the regulation of ongoing negative mood and sacrifice effective behavioral regulation directed at achieving long-term goals (e.g., healthy eating). On the other hand, the proposed self-control impairment process indicated by negative mood may reflect the process of *underregulation*, in which individuals suffering from impaired self-control capacity are not able to sufficiently inhibit and regulate their undesirable intentions and behaviors. Thus, our research contributes theoretical knowledge of *how* maladaptive behaviors emerge on a day-to-day basis.

Second, by demonstrating that sleep quality and vigor moderate the relationship between work-related stressors and unhealthy eating, we show the important role of self-regulatory resources in preventing the occurrence of maladaptive behaviors, such as unhealthy eating. This finding further supports the proposed self-regulatory explanations that underlie the relations between work-related stressors and unhealthy eating. These moderation effects are also consistent with the notion that dynamics in individuals' resources could influence how effectively they regulate behaviors in response to stressful experiences (Baumeister et al., 1998). In sum, our findings contribute to the literature on maladaptive behaviors by providing a more holistic picture of *how* and *when* stimuli from the environment could lead to maladaptive behaviors.

Third, the simultaneous investigation of sleep and eating in both studies offers some insights to the health behavior literature, because we observed a potentially complex association between these two critical health-related activities. For example, in both studies, we did not find significant associations between eating behaviors and sleep quality on the same day, or significant associations between the sleep quality of the night before and eating behaviors the next day. Instead, we found that sleeping and eating were related in a more complex way through a moderation function. These findings contrast the results from nutrition research using clinical samples, such as patients being treated for obesity (e.g., Spiegel, Tasali, Leproult, & Van Cauter, 2009), sleep-related eating disorders (e.g., Morgenthaler & Silber, 2002), and night eating syndromes (e.g., Allison et al., 2008). These studies often show direct associations between sleeping and eating. For example, Spiegel et al. (2009) found a positive association between sleep disorders and risk of obesity. The discrepancy between prior findings and our findings may be attributed to not only sample differences (i.e., clinical vs. nonclinical samples) but also research design differences (i.e., between- vs. within-person design). Given these differences, it is necessary for organizational researchers to

develop unique theories to understand employee eating behaviors, employee sleep, and the interplay between them.

Fourth, the current research also offers insight to the work–nonwork interface literature. Specifically, we found that the spillover effect of self-regulatory resources happened in both directions across work and nonwork domains: Specifically, employees brought resources built up through their sleep at home to work; additionally, employees brought depleted resources because of work stressors to the dinner table after work. These findings demonstrate the importance of considering the complex dynamics between experiences in work and nonwork domains and how these dynamics shape employee behaviors in both domains. Moreover, our findings suggest that the influence of resource fluctuations not only spillover across different life domains on the same day but also spillover across domains on different days. Indeed, resource replenishment (i.e., vigor) brought by a good night's sleep buffered the negative impact of the next day's work experiences. Future research may benefit from examining the work–nonwork interface using a more dynamic methodological approach (e.g., dynamic panel modeling; DeShon, 2012). These future efforts can better reveal how activities in different life domains influence each other in reciprocal ways.

Finally, our focus on negative customer interactions in Study 2 also has implications for the workplace mistreatment literature. For example, the moderating role of sleep quality found in Study 2 suggests that high-quality sleep could be an effective strategy to buffer the negative effects associated with workplace mistreatment. This finding complements existing mistreatment research, which has focused on cognition-based coping strategies that can be deployed by customer service employees (e.g., perspective taking; Rafaeli et al., 2012). Our study identified additional intervention opportunities that are based on healthy behaviors. In addition, although previous research has shown that employees may engage in maladaptive behaviors to cope with workplace mistreatment, the behaviors that have been examined often focus on punishing the transgressors (e.g., sabotage toward customers in response to customer mistreatment; Skarlicki, van Jaarsveld, Shao, Song, & Wang, 2016; M. Wang et al., 2011). Very little attention has been paid to avoidance-based maladaptive behaviors, such as relieving mistreatment-related tension through mood alteration (e.g., alcohol and drug use; Folkman & Lazarus, 1988; Scheibe, Spieler, & Kuba, 2016). Our findings on the association between customer mistreatment and unhealthy eating, therefore, extend the nomological network of maladaptive coping behaviors in reaction to workplace mistreatment.

Practical Implications

Our findings have important practical implications regarding employees' health and well-being. The fact that employees tend to eat unhealthily after experiencing work-related stressors should be highlighted when companies want to establish food-related benefits at work. In particular, although it is desirable nowadays for companies to offer various food-related perks, such as weekly specials and holiday treats, company-sponsored dinners, and all-you-can-eat-style free buffets in workplace cafeterias (Harrison, 2014), our results suggest that more sophisticated consideration regarding this practice is needed. For example, companies should be cognizant that their employees may not always take advantage

of these perks in a healthy manner. When this happens, these food-related benefits may bring negative health consequences to their employees. In addition, companies should also recognize that food-related perks may not be able to meet employees' real needs if their employees are under a great deal of work stress. Food-related perks may only serve as temporary mood-altering remedies for stressed employees, and failure to address the sources of the work stress may have potential long-term detrimental effects on employees' health.

Sleep quality should also be considered when determining employee benefits. Although it is less practical for organizations to closely monitor the employee sleep quantity and quality, some preventive tactics such as sleep awareness training (e.g., insomnia reduction strategies, sleep hygiene counseling) and job redesign (e.g., flexible scheduling) may be helpful (Christian & Ellis, 2011). Some companies have adopted practices, such as providing napping pods and setting up renewal rooms (Stangel, 2013), intended to encourage their employees to gain adequate sleep. In fact, a comprehensive understanding of eating and sleeping in organizational studies supports the movement toward the strategic direction of Total Worker Health initiated by the National Institute for Occupational Safety and Health, which calls for a synthesis of all aspects of health-related company practices to enhance the overall well-being of employees (Schill & Chosewood, 2013). Therefore, sleeping and eating, along with other important health-related behaviors, should all be considered in the implementation of an integrated employee health program that aims to advance employee health and well-being.

Limitations and Future Directions

Several limitations of the current studies should be noted. First, although we examined the content and quantity of eating, other elements of eating behaviors were not covered in the current research. For example, we were not able to record the exact amount of food our participants consumed every day, from which we could have estimated the caloric intake or the overall nutritional content consumed by participants. In addition, we did not consider the context of dietary behaviors, such as eating and drinking alone or eating and drinking with family and friends, the latter of which may be influenced by different mechanisms such as social learning and social influence (e.g., Allen, Shockley, & Poteat, 2008; S. Liu, Wang, Bamberger, Shi, & Bacharach, 2015; Mohr et al., 2001). As one of the first attempts in studying eating behaviors within the organizational context, we hope our study will inspire researchers to develop a more comprehensive measure of eating behaviors with multiple dimensions in the future.

Second, although we developed two theoretical arguments for how work-related stressors induce unhealthy eating, we only included one construct—negative mood—to generally operationalize the two theoretical arguments in Study 2. As such, we were not able to empirically distinguish the two theoretical rationales from each other nor compare their relative strength in channeling the impact of work-related stressors on unhealthy eating. Although we believe that negative mood can adequately capture both unhealthy eating caused by mood-altering desires and unhealthy eating caused by self-control impairment, future research should include and examine parallel mediators, such as state hostility and state

self-control (e.g., Christian & Ellis, 2011), that can tap into the two theoretical rationales separately.

Third, in explaining the relationship between work-related stressors and unhealthy eating, the current research adopted the self-regulation framework and focused on self-regulation failure as the key mechanism. Additional mechanisms may exist to explain this study's focal relationship. For example, the customer mistreatment literature has often conceptualized customer mistreatment as a type of interactional injustice, which involves interpersonal and informational justice perceptions (Rupp & Spencer, 2006; Skarlicki et al., 2008). Given that the restoration of justice will impose demands on regulatory resources (Thau & Mitchell, 2010), it is possible that justice perceptions could also explain the association between customer mistreatment and unhealthy eating behaviors. As discussed earlier, physiological mechanisms, such as those regulated by the HPA axis (Adam & Epel, 2007), may also play a critical part in linking stressors to eating behaviors. Future studies on eating behaviors should include these potentially important psychological and physiological mechanisms.

Fourth, both of our studies used Chinese samples, which may limit the generalizability of our findings to Western countries (e.g., the United States) because there are differences in eating habits between Eastern and Western cultures. For example, Chinese tend to eat more vegetables, bean products, and whole grains, whereas Americans consume more protein-rich meat and dairy products ("American Cuisine," n.d.; "Chinese Cuisine," 2017). However, previous research has actually found that "surprisingly, the DQI-I [Diet Quality-International, which is an established measure of dietary structure and quality] did not differ greatly between China and the United States" (Kim et al., 2003, p. 3482; explanation added). Kim et al. (2003) also found that the slight difference only existed among some specific aspects of diet; in particular, Americans tended to be better on dietary variety but worse on moderating food intake compared with Chinese. This finding indicates that Chinese may have smaller ranges in both variety and quantity of food consumption. Interestingly, the limited variety and quantity associated with eating behaviors among Chinese suggests that the relationships between work-related stressors and unhealthy eating behaviors found in the current studies are underestimations of what might have been found if a sample of American employees were used (M. Wang et al., 2011).

Fifth, all measures were self-reported in the current studies, rendering our findings prone to common method bias (P. M. Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Particularly in Study 2, the previous night's sleep quality and morning vigor were both measured in the morning survey. However, we used different time frames in instructing our participants to respond to these two measures, such that sleep quality was measured based on participants' experience of the previous night, whereas vigor was measured based on participants' experience that morning. In addition, time separation was thoroughly implemented on all other examined relationships in both studies, which should largely alleviate concerns of common method bias. Although measures of work-related stressors and negative mood should mostly rely on self-reports, when technology allows, future research can attempt to obtain more objective measures of sleeping and eating using wearable trackers of real-time physical activities.

Future research should also examine the influence of employees' unhealthy eating behaviors on both short-term (e.g., job per-

formance) and long-term (e.g., health) employee outcomes. By the same token, outcomes of eating behaviors may be interesting for organizational researchers. For example, future research should explore how eating behaviors at home (e.g., breakfast, dinner) and at work (e.g., lunch) might influence employees' emotions, cognitions, attitudes, and behaviors at work. These future studies may provide great practical implications for companies offering on-site dining. In addition, future research could explore how between-person level variables, such as employees' personality (e.g., core self-evaluation), traits (e.g., trait emotional competencies; Doerwald, Scheibe, Zacher, & Van Yperen, 2016), and other characteristics (e.g., body mass index), as well as organizational policies (e.g., food-related perks), influence the associations between daily work experiences and daily unhealthy eating. Moreover, future research could adopt a more dynamic view in investigating how the relationship between work-related stressors and unhealthy eating fluctuates over time (Y. Liu, Mo, Song, & Wang, 2016).

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(Appendices follow)

Appendix A

Measures of Eating Behaviors in the Two Studies

Study 1

Below are some food items that you might have eaten after work today. Please use the scale provided to indicate whether you have had the following foods since you left work this afternoon

	No	Yes
Healthy food items		
1. Fruits	0	1
2. Green vegetables	0	1
3. Other types of vegetables such as carrots and cauliflower	0	1
4. Whole grain rice	0	1
5. Nuts or seeds	0	1
6. Low-fat dairy products	0	1
7. Tofu or beans	0	1
8. Fish (other than fried)	0	1
Unhealthy food items		
1. Salty snacks such as potato chips	0	1
2. Processed meat products (e.g., ham and sausage)	0	1
3. American-style hamburger	0	1
4. Fried food (e.g., fried chicken, fried fish, and Chinese donuts)	0	1
5. Sweet snacks (e.g., chocolate, candy, ice-cream, and pastry)	0	1
6. Sodas or sugary drinks (e.g., Coke, Pepsi, and iced tea)	0	1

Study 2

Please think about what you have eaten today after work. Indicate your level of agreement or disagreement with each statement by circling one of the five alternatives next to each statement (1 = strongly disagree; 5 = strongly agree)

1. Today I ate too many junk foods after work.
2. Today I had too many unhealthy snacks after work.
3. Today I ate and drank excessively after work.
4. Today I had too many late-night snacks before going to bed.

(Appendices continue)

Appendix B

Validity Evidence for the Two Measures of Eating Behaviors

We recruited a snowball sample of 38 employees from Guangzhou, China (mean age = 31.76 years old, with an *SD* of 10.53; 52.6% male; mean organizational tenure = 6.19 years, with an *SD* of 7.85) to examine the validity of the two measures of eating behaviors used in the two studies. Daily diary data were collected on each workday over two consecutive weeks (i.e., 5 workdays \times 2 weeks). On each workday before participants started their work in the morning, they were asked to rate their eating behaviors from the previous night using the food checklist from Study 1 and the four-item overeating behaviors scale from Study 2. They were also instructed to write down everything they ate and drank during the previous night on a separate page, along with the amount consumed and additional information on the food (e.g., brand, methods of preparation). Participants responded 9.39 days on average (range = 5–10, *SD* = 1.22) and submitted a total of 357 daily reports (compliance rate = 93.9%).

With the information provided in the daily dietary records, we were able to code how many calories participants consumed (i.e., total calorie count) on a daily basis. Specifically, the first two authors of the current manuscript first independently coded the same 10% of the dietary records by transforming the listed food and drink items into total calorie counts using calorie information of Chinese food archived on the website www.booh.com (following the procedure laid out by Song et al., 2014). A high level of interrater reliability ($r = .90, p < .01$) was obtained between the calorie counts transformed by the two authors. Then, each of the two authors coded 45% of the remaining daily dietary records, respectively. On average, our participants consumed 832.01 calories (*SD* = 509.20) during each surveyed night.

In this sample, we found that total calorie count had a positive correlation with participants' unhealthy food consumption ($r =$

.42, $p < .01$), but did not correlate with their healthy food consumption at the daily level ($r = .08, p > .05$). Similarly, we found that overeating behaviors had a positive correlation with participants' unhealthy food consumption ($r = .43, p < .01$), but did not correlate with their healthy food consumption at the daily level ($r = .08, p > .05$). These findings suggest that a larger count score on our unhealthy food consumption scale indicates higher levels of total calorie intake, whereas a larger count score on our healthy food consumption scale does not necessarily indicate more total calorie intake. These findings are reasonable given that total calorie count is more likely to be driven by unhealthy food consumption, which involves more calorie-dense ingredients, such as fat and sugar, instead of healthy food consumption, which is less calorie-dense (Bray & Popkin, 1998; Van Duyn & Pivonka, 2000). As such, among the items in the checklist measure used in Study 1, the unhealthy food items demonstrated convergent validity and the healthy food items demonstrated divergent validity with total calorie intake.

In addition, our participants' responses on the overeating behaviors measure were positively and significantly correlated with the total calorie count at the daily level ($r = .70, p < .01$), suggesting that our measure of overeating behaviors could sufficiently reflect the amount of total calories participants consumed during each surveyed night. Therefore, we believe our measure of overeating behaviors used in Study 2 has desirable construct validity as well.

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