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Exploring the Energy Link between Emotion Regulation at Work and Health Behaviors

by

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A dissertation submitted in partial fulfillment
of the requirements for the degree of
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ABSTRACT

The present study explores the process through which the regulation of emotions at work, also known as emotional labor, depletes self-regulatory resources, specifically energy, and distally impacts health behaviors in the form of less physical activity and more unhealthy eating. Differences in relationships between two forms of emotional labor, surface acting and deep acting, as well as differences between psychological and physical energy depletion, are explored. Additionally, the roles of trait mindfulness and future temporal focus are examined as between-individual differences moderating the proposed relationships.

Multi-level analysis of daily diary data collected from participants (*N* = 108 participants) over ten work days (*N* = 1,273 total days) demonstrates that surface acting at work, but not deep acting, is negatively related to after work energy levels, such that participants reported less energy on days when they engaged in more surface acting. No significant differences in strength of relationships for physical versus psychological energy depletion were found. After work energy depletion related to less time and intensity spent on physical activity, but no support for an overall mediated effect was found. No significant effects were found for unhealthy eating, or future temporal focus, while trait mindfulness did positively relate to energy levels in several models.

Theoretical and practical implications, as well as future research directions, and methodological recommendations for researchers wishing to conduct similar studies are presented. As one of the first attempts to examine the mechanisms linking emotional labor and

health behaviors, this study highlights the intricate nature of the relationships examined and the resultant need for both broader and more targeted multi-faceted research at multiple-levels of analyses to further explain the complex story of work and health.

CHAPTER ONE:

INTRODUCTION

Understanding the nuanced ways through which occupational characteristics impact employee health is of critical importance. Much research to date has focused on basic relationships between the work domain and health outcomes. For example, many studies have examined links between work characteristics and cardiovascular disease (e.g., Twisk, Snel, Kemper, & van Mechelen, 1999), and there has been much work examining workplace stressors and employee well-being (e.g., Grebner, Semmer, & Elfering, 2005). Thus, there is strong support for the notion that work is linked to health. However, with some notable exceptions in the areas of substance abuse (e.g., Frone, Russell, & Barnes, 1996; Frone, Russell, & Cooper, 1997), eating (Allen & Armstrong, 2006), and physical activity (e.g., Johnson & Allen, 2013), health behaviors have been largely overlooked in the organizational behavior and occupational health psychology literatures. Health behaviors are an important link between aspects of the work environment and health outcomes (Steptoe, 1991), and the current study examines the link between a ubiquitous characteristic of work, the regulation of emotions, and the performance of health behaviors, specifically the primary behavioral predictors of health: physical activity and eating.

The primary purpose of the current study is to elucidate the process through which the regulation of emotions at work depletes self-regulatory resources, specifically energy, and distally impacts health behavior, specifically physical activity and unhealthy eating. In doing so, this study aims to establish a theoretically derived behavioral explanation for existing findings linking work and health (e.g., Twisk et al., 1999) by demonstrating that characteristics of work that deplete self-regulatory resources negatively relate to the performance of health behaviors drawing on the same finite energy source. This approach answers a recent call for more research investigating the assumption that regulating emotions for financial gain has personal costs (Wharton, 2009). In addition to this primary focus, a secondary purpose of the current study is to examine between-individual factors thought to play a role in this process. Specifically, I explore the roles of trait mindfulness and temporal focus as individual differences relevant to the experience of self-regulation at work and health behaviors. Uniquely, research shows that these variables are amenable to change through training interventions (Hall & Fong, 2003; Hülsheger, Alberts, Feinholdt, & Lang, 2012), thus understanding their role is important in that they can inform interventions to ameliorate the hypothesized negative effect of emotional labor on health behaviors. Lastly, I investigate, in an exploratory fashion, the potential for differential relationships among facets of emotional labor (surface vs. deep acting), energy depletion (physical vs. psychological), and health behaviors. To meet these goals, this study integrates extant research from emotion, organizational behavior, and health literatures, employing a within-individual daily diary design to assess between-day variation in emotion regulation at work, energy levels, and health behaviors. A visual representation of the proposed relationships can be found in Figure 1.

Emotion Regulation at Work

Emotion regulation is the process through which individuals influence the emotions they have, when and how they experience them, as well as how they express these emotions (Gross, 1998). The study of emotion regulation can be found in a wide array of scholarly disciplines and historical musings, with origins in contemporary psychology appearing in both the psychoanalytic (Freud, 1926/1959) and stress and coping literatures (Lazarus & Folkman, 1984). As noted by Grandey (2000), the study of emotion in the workplace was largely ignored until the 1980's due to the prevailing view of the workplace as a rational environment, negating the explanatory power of emotions in investigating workplace phenomena (Arvey, Renz, & Watson, 1998; Putnam & Mumby, 1993). Arlie Hochschild's (1983) book *The managed heart: Commercialization of human feelings* eschewed this notion, and instead proposed that a rise in the service sector was causing a new form of labor to develop, coining the term *emotional labor*, wherein workers would manage their feelings and emotions for a wage.

Contemporary scholars now examine emotional labor as a process through which employees attempt to meet organizational expectations regarding the expression or suppression of specific emotions in the workplace (Grandey, 2000). For example, a retail store employee might be expected to express happiness and suppress disgust when dealing with customers, despite whatever emotions the employee may actually feel. Display rules are the job demands or requirements that convey organizational expectations regarding emotion regulation in the work role (Diefendorff & Gregarus, 2009; Diefendorff, Richard, & Croyle, 2006).

Although experienced emotions may match up with emotional display rules in the work role, dissonance often exists resulting in the need to alter one's emotional display to meet organizational requirements (Grandey, 2000). Two primary strategies are surface acting and deep acting. *Surface acting* is the active and conscious effort to display the expected emotion, without changing the underlying felt emotion. For example, a debt collector may be expected to express anger, and do so despite actually being happy. *Deep acting* involves altering one's felt emotion resulting in the experience and display of the expected emotion. For example, a nurse may think of her favorite vacation, inducing the happy emotion that she is expected to express when interacting with a patient. While emotional labor has been predominantly studied in the context of service (e.g., call center operator) and care (e.g., nurse) professions, emotional labor can occur between any actors in the work setting, and there have been recent calls to explore the emotional labor of employees in a broad array of non-solitary occupations (Ashforth & Humphrey, 2013; Ashkanasy & Daus, 2013).

Emotional Labor as Depletion of Self-Regulatory Resources

Altering an expressed emotion to match organizationally defined expectations through surface or deep acting requires effort, and thus resources. Baumeister and colleagues' energy/strength model of self-control describes how effortful self-regulation draws on finite resources and impacts subsequent performance of behavior (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Baumeister, Vohs, & Tice, 2007; Muraven, Tice, & Baumeister, 1998). The central tenets of their model focus on a finite source of self-regulatory energy, and posit that any act of exertion depletes this energy, and is followed by a period of diminished capacity for self-regulation (Muraven, Tice, & Baumeister, 1998). Studies testing these premises typically employ a two-stage experimental design, with participants either performing a depleting or a control task, followed by a second task requiring self-regulation. Resource depletion is evidenced by poorer performance on the second task by participants who also performed an initial depleting task, compared to those who engaged in a control task.

Linking back to the current study's focus on emotional labor, extant work based on the energy/strength model of self-regulation has investigated the depletion of self-regulatory energy using experimental manipulations that parallel features of the emotional labor process. In a study examining self-presentation, participants were challenged to present themselves as likable and competent towards a skeptical audience, and results indicate that the effortful self-regulation of presenting oneself to others negatively impacted performance on a subsequent task requiring self-regulation compared to the control group told to present themselves naturally (Vohs, Baumeister, & Ciarocco, 2005). This manipulation closely resembles interactions many employees encounter at work, where they are expected to portray competence and likability to customers and coworkers. Additional research has focused on the suppression of emotional responses by asking participants to suppress their emotional reactions to emotionally charged video clips. Results indicate that this manipulation depletes self-regulatory resources, as evidenced by subsequent poorer performance on a difficult anagram task (Baumeister, Bratslavsky, Muraven, & Tice, 1998), a test of physical stamina (Muraven, Tice, & Baumeister, 1998), and regulating food intake (Vohs & Heatherton, 2000) compared to control groups. Thus, lab-based studies support the notion that altering the presentation of the self to others and suppressing the expression of felt emotions, two practices directly related to emotional labor, deplete self-regulatory energy.

Prior research has simply assumed the presence and depletion of the ambiguous “energy” or “resources” posited in the energy/strength model of self-regulation by demonstrating strong effects from the aforementioned experimental manipulations. More recently, Gailliot and colleagues undertook a series of studies that sought to establish blood glucose as the limited energy source used for self-regulation (Gailliot et al., 2007). Their findings show that acts of emotion regulation deplete blood glucose levels, and these depleted blood glucose levels impaired performance on a subsequent task requiring self-regulation. Glucose is a primary source of energy for humans, and depletion of glucose is related to exhaustion in studies of physical activity (Coyle, 2004). Demonstrating a similar pattern of relationships, studies have linked emotion regulation to fatigue (Muraven, Tice, & Baumeister, 1998), and emotional labor to reports of exhaustion (Bono & Vey, 2005; Zapf, 2002). Thus regulating one's emotions during the workday is associated with depleted energy – energy that is necessary for self-regulation on other tasks during non-working hours, such as food choice and engaging in physical activity (Vohs & Heatherton, 2000).

Hypothesis 1: Within individuals, daily emotional labor at work will positively predict daily energy depletion.

Disagreement exists in the literature regarding whether surface or deep acting is more strongly related to negative outcomes for employees. One perspective posits that surface acting, involving constant monitoring of expected and actual emotional responses, is more effortful, and thus more draining (Totterdell & Holman, 2003), a notion supported in some studies (e.g., Martínez-Iñigo, Totterdell, Alcover, & Holman, 2007). Alternatively, Liu, Prati, Perrewé, and Ferris (2008) have argued that laboratory based investigations of deep acting, focused on reappraisals of experienced emotions, do not compare to deep acting in real work situations. They note that deep acting likely requires "a great deal of mental energy in the form of motivation, engagement, and role internalization" (p. 2416), making deep acting potentially more demanding than surface acting. Meta-analytic results, however, support the notion that surface acting is more detrimental, showing stronger positive relationships with emotional exhaustion, psychological strain, and psychosomatic complaints, compared to deep acting (Hülsheger & Schewe, 2011).

Hypothesis 2: Within individuals, the relationships between daily surface acting and energy depletion at work will be stronger than the relationships between daily deep acting and energy depletion at work.

While much research has examined the facets of emotional labor, similar attention has not been applied to facets of energy depletion. There is support in the literature that energy depletion, also commonly referred to as acute fatigue, has both physical (e.g., weakened muscles) and psychological (e.g., feeling overwhelmed) components (Shen, Barbera, & Shapiro, 2006). Thus, one can feel out of energy physically, but not experience psychological fatigue, and vice versa, although there is typically a strong relationship between the two (Pietrowsky & Lahl, 2008). Aforementioned research linking emotion regulation and energy has employed general measures of fatigue (e.g., Muraven, Tice, & Baumeister, 1998) or exhaustion (e.g., Seery & Corrigall, 2009), but to date, researchers have not investigated the potential of differential relationships between physical energy depletion, psychological energy depletion, and emotional labor. Based on past research and theory, multiple possible scenarios could be expected. For example, as a primarily cognitive activity, it might be expected that emotional labor be more strongly related to psychological energy depletion. Similarly, given that physical activity is a primarily physical health behavior, it might be expected that physical energy depletion is more strongly related to physical activity than is psychological energy depletion; however, psychological energy depletion likely plays a prominent role in decision making, thus impacting the decision to engage in exercise. As such, in lieu of formal hypotheses, a research question is proposed for exploring these relationships.

Research Question 1: Do physical energy depletion and psychological energy depletion differentially relate to emotional labor?

The Role of Mindfulness

Trait mindfulness is a trainable individual difference defined as "intentionally paying attention to present-moment experience (physical sensations, perceptions, affective states, thoughts, and imagery) in a nonjudgmental way, thereby cultivating a stable and nonreactive awareness" (Carmody, Reed, Kristeller, & Merriam, 2008). Trait mindfulness has been linked to various forms of emotion regulation using a diverse array of research designs.

Basic correlational studies have demonstrated links between trait mindfulness and stronger affect regulatory tendencies, including acceptance of emotions, greater aptitude for repairing unpleasant moods, and general positive affect (Brown & Ryan, 2003; Baer, Smith, & Allen, 2004; Giluk, 2009). Some research suggests that these relationships are a result of mindful states enhancing the brain regions responsible for emotional regulation (Davidson, 2000; Siegel, 2007). Functional magnetic resonance imaging (fMRI) research extends these findings, showing that compared to those low in trait mindfulness, individuals high in trait mindfulness demonstrated less bilateral amygdala response and greater prefrontal cortex activation in response to threatening emotional cues, indicating less reactivity to these threats (Creswell, Way, Eisenberger, & Lieberman, 2007). Broderick (2005) also demonstrated that compared to participants in a rumination condition, mindfulness induction individuals recovered more quickly from an induced sad mood.

As summarized by Brown, Ryan, and Creswell (2007), this body of research suggests that mindfulness is associated with acceptance of emotional states as well as the ability to repair negative emotional states, both of which greatly facilitate the emotional labor process by making it less effortful, and thus less demanding of resources. This increased ability to generate positive emotions, regulate and repair negative emotions, and accept emotional states among individuals with high levels of trait mindfulness is expected to make engaging in emotional labor less draining on self-regulatory resources, thus trait mindfulness is expected to serve as a buffer in the relationship between emotional labor and energy depletion.

Hypothesis 3: Between individual differences in trait mindfulness will moderate the relationships between emotional labor and energy depletion, such that relationships will be weaker for employees with higher levels of trait mindfulness than for employees with lower levels of trait mindfulness.

Emotional Labor, Energy, and Health Behaviors

The aforementioned links between emotional labor and exhaustion (e.g., Bono & Vey, 2005; Zapf, 2002), when considered alongside studies linking exhaustion and burnout to cardiovascular disease (see Melamed, Shirom, Toker, Berliner, & Shapira, 2006), demonstrate that emotional labor may have negative long term health consequences for employees. While a direct link between exhaustion and health outcomes is expected and documented empirically (e.g., Appels, Falger, & Schouten, 1993), emotional labor and the resulting energy depletion may also indirectly influence employee health through health behaviors.

Having energy, and thus the resources necessary for self-regulation, is important in day-to-day life, but is especially critical in maintaining a healthy lifestyle through health behaviors. Qualitative research by Courneya and Hellsten (1998) suggests that this lack of energy is a primary barrier for individuals engaging in health behaviors, such as exercise. The health psychology literature has primarily relied on process models to explain health behaviors such as healthful eating (e.g., Theory of Planned Behavior; Azjen, 1991), while only recently exploring self-regulatory mechanisms that incorporate a wider range of antecedents impacting the self-control required for healthful living (e.g., Allom & Mullan, 2012). In the current study, I focus on two prominent health behaviors: physical activity and unhealthy eating after work. Physical activity is defined as spending time in an activity that requires physical movement, and results in an increase in heart rate and/or breathing. Unhealthy eating is defined as consuming high-fat (e.g., chips), high-sugar (e.g., regular soda), and high-sodium (e.g., processed meats) foods and beverages primarily consisting of “empty calories” as defined by the United States Department of Agriculture (USDA). Although eating healthily and being physically active are intended and objectively beneficial behaviors for many people, many individuals struggle, instead opting for less healthy or maladaptive behaviors. This discrepancy between behavioral intentions and actual behavior is a primary criticism of the traditional theoretical models used to predict health behavior (Hall, Fong, Epp, & Elias, 2008).

In response, Hall and Fong’s (2007) Temporal Self-Regulation Theory (TST) is useful in understanding why seemingly unhealthy behaviors might “win out” when self-regulatory resources are low. These predictions are based on theory and research on intertemporal choice, which explain how expected immediate and long-term outcomes are not equally considered in human decision-making processes (Loewenstein & Elster, 1992). For example, Loewenstein and Thaler (1989) coined the term “time discounting” to refer to the widely replicated empirical finding that preferences for larger, later rewards over small immediate rewards reverse as the larger rewards become further moved into the future.

The benefits of health behaviors are predominantly long-term, and in some instances very distal (e.g., reduced prevalence of degenerative diseases in late life; increased life expectancy). Thus, when decisions are made regarding engaging in these behaviors, these long-term benefits are likely to be discounted compared to short-term benefits of not engaging in the behaviors. Hall and Fong’s (2007) work shows that beneficial health behaviors, while perceived as having long-term benefits, also are perceived to have substantial up-front costs (e.g., inconvenience, discomfort) while unhealthy behaviors with long-term costs have up-front benefits (e.g., convenience, comfort). For example, exercise has many long-term health benefits, but the up-front costs of spending additional time, energy and discomfort on the activity are high. On the flip-side, being sedentary has many long-term health costs (e.g., cardiovascular disease), but the up-front benefits of having free time to relax and do other things are plentiful. Unhealthy foods are very convenient, often requiring little or no preparation, and have ubiquitous availability from fast-food restaurants, vending machines, and gas stations. These short-term benefits contrast with serious long-term consequences of unhealthy eating including, for example, diabetes (Wing et al., 2001). Research on time discounting shows that humans are most influenced by short-term rather than long-term contingencies (Ainslie, 1996; Frederick, Loewenstein & O'Donoghue, 2003), thus making unhealthy, low up-front cost behaviors more appealing, and living a healthy lifestyle more difficult. These choices are thus made even more difficult when self-regulatory energy is depleted by emotional self-regulation at work.

Hypothesis 4: Within individuals, daily emotional labor will (a) negatively relate to daily physical activity and (b) positively relate to unhealthy eating.

Hypothesis 5: Within individuals, daily energy depletion will (a) negatively relate to daily physical activity and (b) positively relate to unhealthy eating.

Hypothesis 6: Within individuals, daily energy depletion will mediate the relationships between daily emotional labor and (a) daily physical activity and (b) unhealthy eating.

Temporal Focus and Health Behavior

Temporal focus is an individual difference variable representing the attention individuals devote to thinking about the past, present, and future (Shipp, Edwards, & Lambert, 2009). The extent that individuals think about the future, for example, represents their level of future-oriented temporal focus. Based on Hall and Fong's (2007) TST model, individuals with a stronger future focus are expected to be less likely to discount the distal benefits of health behaviors, and are thus more likely to engage in beneficial health behaviors compared to avoiding them to experience short-term gains (e.g., have free time for other activities).

Several studies have demonstrated support for a link between temporal focus and various health behaviors. Future-oriented temporal focus has been linked to less smoking and more vegetable consumption (Wardle & Steptoe, 2003), and a lower likelihood of dangerous alcohol consumption among college students (Beenstock, Adams, & White, 2011). A meta-analysis by Yarcheski, Mahon, Yarcheski, and Cannella (2004) found future time perspective to be moderately related to general positive health practices among healthy adult participants. In a multi-national study, Luszczynska, Gibbons, Piko, and Tekozel (2004) demonstrated that future orientation positively related to both good nutrition and physical activity. Regarding physical activity in particular, Hall and Fong (2003) developed and administered an intervention designed to increase future orientation, and found an increase in physical activity in participants compared to a control group. In the present study, future temporal focus is expected to serve as a buffer in the relationship between energy depletion and health behaviors. Having a strong future focus is proposed to serve as a resource that predisposes individuals to have their attention drawn away from a state of energy depletion, and instead bring focus to the future long-term benefits of health behaviors and/or consequences of unhealthy behaviors, thus attenuating the relationships between energy depletion and health behaviors.

Hypothesis 7: Between individual differences in temporal focus will moderate the relationship between daily energy depletion and physical activity and unhealthy eating, such that relationships will be weaker for employees with a stronger future focus.

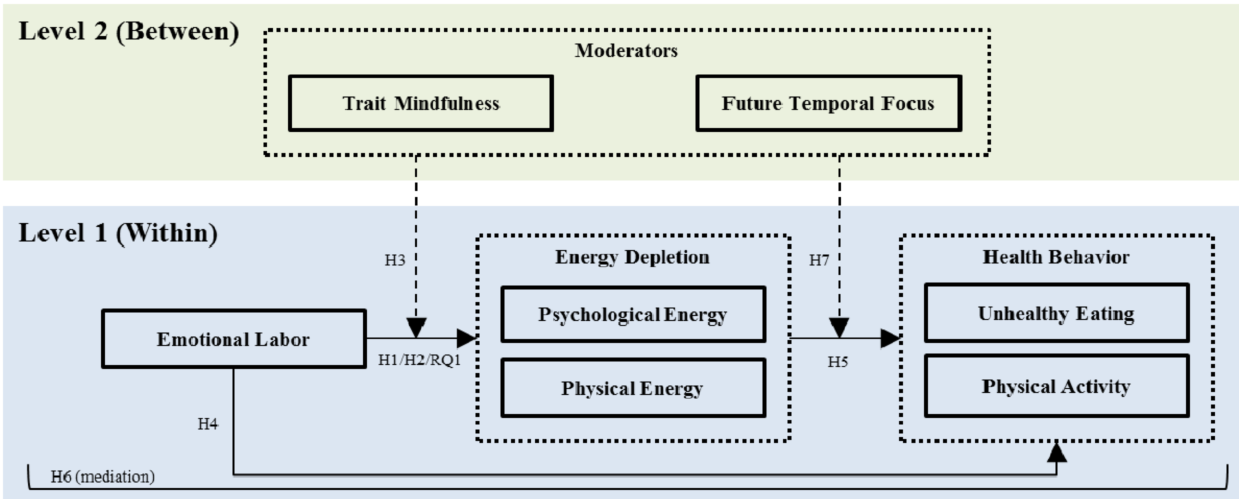

Figure 1. Visual representation of proposed relationships.

CHAPTER TWO:

METHOD

Data for the current study were collected using a daily diary methodology. Participants completed a baseline survey, followed by three daily surveys on each of 10 work days. A visual representation of the data collection timeline can be found in Figure 2.

Participants

Participants for the present study were 121 full-time workers recruited using community and web-based advertisements. Given the complex nature of the proposed multi-level model, a final usable sample size of 100 was desired to detect medium effect sizes. The extant literature was examined for published studies using similar designs (e.g., Ohly, Sonnentag, Niessen, & Zapf, 2010) and a probable attrition rate of up to 20% for daily diary studies was considered. This is a best estimate, given that no common power formula for complex multi-level models with mediation exists (Snijders, 2005).

To participate in the study, participants had to meet the following criteria: be 18+ years of age, work 35+ hours per week in paid employment, work not more than 10 hours per week in a second job (if at all), speak/read English, have engaged in physical activity in the last month, and be free of known physical/psychological disorders that impair daily life or decision making regarding health behaviors (e.g., bulimia, paralysis, broken bone, clinical depression). Of the 121 fully enrolled participants, 13 were excluded from analyses due to non-compliance with the study protocol. Seven of these individuals did not begin participating in the daily portion of the study (described in more detail below), while the remaining six completed three or fewer non-consecutive days of the daily portion of the study and were unresponsive to the researcher's requests for compliance. The final sample of 108 employees was predominantly female (74%), and 67% Caucasian, 17% African American/Black, 12% Hispanic Latino, 3% Native American/Pacific Islander/Alaska Native/Other, 1% Asian, with a mean age of 36 (M = 36.16, SD = 10.95). Most participants were married or living with a partner (61%) and most had no children to care for in the home (72%). Participants were highly educated, with 57% obtaining at least a 4-year college degree, worked an average of 42 hours per week (M = 42.03, SD = 4.86), and had been in their current job for approximately 5 years (M = 5.04, SD = 5.92). Participants worked in a wide variety of industries, with Education/Training/Library (39%), Healthcare Practice/Support (16%), and Office/Administrative Support (12%) being the most prevalent.

Procedure

Recruitment, consent, and training. Participants were recruited using a snowball approach via two initial avenues. A recruitment email was sent to a general university listserv and recruitment posters were placed in various public places in the community. Following successful completion of the study, participants were provided with an email to forward to friends, family, or coworkers who they believed might be eligible. Alternatively, participants were allowed to submit the email addresses of potential other participants for the research team to contact directly. All recruitment methods directed potential participants to a website where they completed a brief questionnaire to ensure they met the aforementioned eligibility criteria. This eligibility questionnaire was accessed a total of 277 times resulting in the identification of 188 eligible potential participants. Eligible potential participants then watched a short online video introducing the study, participant responsibilities, and compensation before providing electronic informed consent. A copy of the consent form can be found in Appendix A. The 135 eligible participants who consented to participate then completed a multi-step web-based training to become familiarized with the study design and use of the on-line survey service. The training consisted of step-by-step screen shots detailing the procedures for logging in to the survey, as well as hands on examples of the various response formats utilized. Lastly, participants took a brief quiz to check their understanding and reinforce the most critical aspects of the training (e.g., survey timing compliance).

Data collection and compensation. This study used a daily diary methodology, with three measurements taken each day over the course of ten workdays. After providing informed consent and completing the online training, participants were provided with a link to the baseline survey. This survey included all demographic information, as well as trait mindfulness, future temporal focus, and pre-existing habits related to physical activity and unhealthy eating. Of the 135 participants who completed training, 14 did not move forward to start or complete the baseline survey. At the end of the baseline survey, participants were guided to select a start date for the daily diary portion of the study based on their unique work and travel schedules. On the selected start date, and on each work day for the following two weeks, participants were instructed to complete three surveys each day: one before starting work (Time 1), one at the end of the workday (Time 2), and one before bed (Time 3). The before work survey (Time 1) assessed energy. The end-of-workday survey (Time 2) assessed emotional labor and energy. The before bed survey (Time 3) assessed physical activity and unhealthy eating.

Participation in the daily diary portion of the study was monitored in real-time to ensure compliance and to identify any potential problems participants might experience. All participants were sent a reminder email the day prior to their scheduled first day of the daily diary portion of the study. A total of 10 participants missed their first day due to the reminder being sent to a work email address that they did not monitor on non-work days. These participants each requested to restart the daily diary portion of the study on their following workday. All participants were sent a status update each weekend detailing any missed surveys and reminding them to continue participating on their next workday. A small number of participants with non-traditional work schedules (e.g., off Monday instead of Saturday) had their status update schedule altered to meet their schedules. To encourage full participation in the daily diary portion of the study, participants were informed during the training that they would be entered into a drawing for one additional $100 Amazon.com gift code if they successfully completed 28 out of 30 daily diary surveys on time. Participants were permitted to complete additional workdays of daily diary surveys to “make-up” for missed days. Upon completion of the daily diary portion of the study, participants were provided with information required to obtain their $75 compensation for participating (in the form of Amazon.com gift codes), an amount commensurate with past research requiring similar demands of participants (e.g., Ilies, Wilson, & Wagner, 2009; Judge, Ilies, & Scott, 2006).

Measures

Complete measures can be found in Appendix B.

Demographics. Demographic information was collected in the baseline survey. Participants reported their gender, age, ethnicity, education level, and family status. Participants also reported their job title, industry, job tenure, and average work hours per week.

Emotional labor. Daily emotional labor, in the form of surface acting and deep acting, was assessed using scales developed by Brotheridge and Lee (2002) and Grandey (2003). A sample from the 3-item surface acting scale is “Hid my true feelings about a situation.” A sample item from the 3-item deep acting scale is "Really tried to feel the emotions that I have to show as part of my job." Participants reported the extent to which they engaged in the behaviors (1 = *not at all*, to 5 = *all the time*), thus higher scores indicate more emotional labor. Surface acting and deep acting were assessed in the daily end-of-workday survey (Time 2). Internal consistency of this scale, and of all other daily scales in the present study, were calculated using methods described by Nezlek and Gable (2001). In these analyses, scale items are nested within days, which are then nested within participants resulting in a three-level measurement model. The item-level reliability of each scale is represented by the reliability of the item-level intercept in an unconditional model accounting for both within- and between-person variability – a multi-level equivalent to Cronbach's alpha (Nezlek, 2012). Using this method, the reliability of the 3-item surface acting scale was .79, and .82 for the 3-item deep acting scale.

Energy/Fatigue. Although consensus dictates that studying energy depletion and acute fatigue are important in a wide variety of contexts, there is little agreement on how best to assess this construct. Over 20 diverse measures can be found in the literature (O'Connor, 2004), however, deficiencies in the existing measures necessitated that a new measure, compiled of revised items from extant scales, be developed. Chalder et al.'s (1993) fatigue scale, with both physical and psychological sub-scales, serves as the structural basis for the current measure, with additional items adapted from the Multidimensional Fatigue Symptom Inventory (MFSI; Stein, Martin, Hann, & Jacobsen, 1998) and other sources. Items from each scale were examined and categorized as primarily assessing psychological or physical energy. Next, items were examined for overlapping content and wording/phrasing appropriate for the daily context. The final scales included seven items assessing physical energy, and seven items assessing psychological energy. Participants indicate the extent they agreed with each statement (1 = *strongly agree*, to 5 =

strongly disagree), thus higher scores indicate greater fatigue (or less energy). The reliability of the 7-item physical energy scale was .74 at Time 1 and .69 at Time 2. The reliability of the 7-item psychological energy scale was .79 at Time 1 and .77 at Time 2. To determine if there was empirical support for investigating physical fatigue and psychological fatigue as distinct constructs, a series of confirmatory factor analyses (CFAs) were conducted using Mplus version 6.12. Time 1 and Time 2 measurement occasions were examined separately, and within each, both single-factor and two-factor models were examined using both single-level and multi-level approaches. A summary of the results can be found in Table 1. In all instances, model fit was not ideal, however, results demonstrate that the two-factor solutions did provide better fit to the data than did single-factor solutions as indicated by improvements in all fit indices for all two-factor models compared to respective models with all fatigue items loading onto a single factor.

Though separate scales for physical and psychological energy depletion are necessary to investigate Research Question 1, tests of the main hypotheses do not require this fine-grained analysis. As such, a validated general measure of energy depletion based on the Profile of Mood States (POMS; McNair, Lorr, & Droppleman, 1992) specifically modified for use in diary studies was also administered and used as the primary measure of energy depletion for hypothesis testing (Cranford et al., 2006). Participants were asked to rate the extent that they are currently feeling or experiencing three mood adjectives representing general fatigue (e.g., worn out; 0 = *not at all*, to 4 = *extremely*), thus higher scores indicate greater fatigue (or less energy). The reliability of the 3-item POMS fatigue scale was .84 at Time 1 and .85 at Time 2. Energy, using both measurement approaches, was assessed in the before work (Time 1) and after work (Time 2) surveys.

Physical activity. Physical activity was assessed by asking participants to describe any physical activity they engaged in since their last physical activity report, always in the before bed (Time 3) survey. This included a short description of the activity, when it occurred, the number of minutes they engaged in the activity, and the level of intensity with which they participated (mild, moderate, or strenuous). These data collection procedures and subsequent scoring are based on the National Health and Nutrition Examination Survey (NHANES) administered by the Centers for Disease Control and Prevention (CDC), and the Godin Leisure-Time Exercise Questionnaire (Godin & Shepherd, 1997).

Daily physical activity was calculated by weighting the time spent in each activity by intensity (Mild = 3, Moderate = 5, Strenuous = 9; Godin & Shepherd, 1997) and summing separate physical activity episodes that occurred between end-of-workday and bed. When counting only physical activity completed between end-of-workday and bed, physical activity was reported on 321 days (26% of total days). To accommodate physical activity completed in the morning prior to work, an additional variable was calculated by summing separate physical activity episodes that occurred between the end-of-workday (Day X) and the beginning of the following workday (Day X+1). For example, if a participant cycled for 30 minutes after work on Day X, and also jogged for 30 minutes before work on Day X+1, both instances of physical activity are associated with Day X for this additional variable. When also including these instances of physical activity completed before work the following morning, 382 days involve a report of physical activity (31% of total days). A pre-existing habit for physical activity was assessed in the baseline survey using the Self-Report Habit Index (SRHI; Verplanken & Orbell, 2003).

Unhealthy eating. Post-work unhealthy eating was assessed with a modified checklist in the before bed daily survey (Time 3). Participants were asked to record the number of servings they consumed of each type of food/beverage since leaving work. The list of foods (e.g., cakes, cookies, pastries, and donuts) and beverages (e.g., non-diet "regular" soda/pop) was developed based on the United States Department of Agriculture's (USDA) MyPlate guideline description of "empty calories" consisting of high-fat, high-sugar, and high-sodium foods and beverages. Across all 1,273 days, participants reported consuming about three servings of unhealthy food and beverages after work per day (M = 2.70, SD = 2.26). Pre-existing habit for healthy eating was assessed in the baseline survey using the Self-Report Habit Index (SRHI; Verplanken & Orbell, 2003).

Trait mindfulness. Trait mindfulness was assessed in the baseline survey with the 15-item Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003). A sample item is "It seems I am 'running on automatic' without much awareness of what I'm doing" (1 = *almost always*, to 5 = *almost never*). Internal consistency reliability of the scale was acceptable (α = .86), and after reverse scoring items, higher scores indicate higher levels of trait mindfulness.

Temporal focus. Future temporal focus was assessed in the baseline survey with 4 items from the Temporal Focus Scale (TFS; Shipp, Edwards, & Lambert, 2009). A sample item is "I imagine what tomorrow will bring for me" (1 = *never*, 3 = *sometimes*, 5 = *frequently*, 7 = *constantly*). Internal consistency reliability of the scale was acceptable (α = .84), and higher scores indicate higher levels of future temporal focus.

Data Analysis

Data structure and quality. For the primary analyses, the final dataset was structured such that daily reported variables were nested within participants, resulting in a 2-level dataset including daily within-person variables (e.g., emotional labor; level-1) and baseline between-person variables (e.g., trait mindfulness; level-2). Essentially, each day is treated as a repeated measure within each person. Conceptually, the data can be structured in other ways, for example, items (level-1) nested within measures (level-2), within days (level-3), within persons (level-4). As mentioned below, some analyses utilized these alternative structures, however, most hypotheses only require the most basic 2-level dataset structure.

From the 108 participants retained for analyses, a total of 1,364 days of data were collected. Participants provided, on average, 12 days of daily data (M = 11.79, SD = 2.07). Although the daily portion of the study was designed to last for only 10 workdays, participants who missed one of the three surveys on any given day were given the option to complete a make-up day if they wished, resulting in many participants having greater than 10 days with some form of valid data.

Of the 1,364 days of data, several were removed for various reasons. Based on email communication with three participants and open-ended comments during data collection, it became apparent that some participants were purposely skipping their before bed (Time 3) surveys. They were under the impression that if they missed a previous survey in the day (in this case, the Time 2 survey), the day could no longer be used for research, and thus they should skip any remaining surveys that day. This behavior leads to the potential for some missing data to be not "missing at random" but instead related to missing a previous survey on the same day. Additionally, some cases of participants not going in to work after filling out a Time 1 survey in the morning were discovered. Because the study is focused on workdays, it was critical that these days also be removed. For these reasons, a total of 73 days with data only at Time 1 were excluded from analyses. To ensure that only full days of work were included in analyses, 15 days in which participants reported working less than five hours were also excluded from analyses. One additional day was excluded based on the participants' report that it was the first day of Ramadan, a holy month characterized by fasting during daylight hours. This was the final day of daily surveys for the participant, and given the obvious links between fasting, energy, and health behaviors, this atypical day was excluded from analyses.

Finally, compliance with the required timing of the daily surveys also resulted in two additional days, and data within days, being excluded from analyses. With the exception of instances mentioned below, all surveys were submitted within the hour before work, after work, and before bed, per instructions. All days were screened for survey completions within 90 minutes of each other (e.g., Time 2 taken at 9:00pm and Time 3 taken at 10:15pm), and 28 total days were identified for further examination. Two days were removed entirely due to Time 1 and Time 2 surveys being taken within minutes of each other, and Time 3 data already being missing. Time 1 and Time 2 data were removed from another day due to surveys being taken within minutes of each other mid-day. Time 2 data were removed from 12 days due to the survey being taken immediately prior to the Time 3 survey (e.g., the participants likely forgot to take the Time 2 survey after work and tried to "make it up"). Thus, based on the removal of 91 days, a total of 1,273 days of level-1 data were retained for analyses, or 93% of collected surveys.

Several irregularities in the level-1 daily data were also identified and remedied. When comparing participant-selected time values (e.g., 9:00 AM, from a drop-down menu in response to "What time did you start work today?") and automatic time tags provided by the survey service, it became evident that many participants were either a) intentionally providing incorrect time-based responses, or b) accidentally making errors when selecting time values from the drop-down menus. By examining each participant's typical schedule, it was evident that in all cases participants were simply incorrectly selecting an AM time rather than a PM time, or vice versa (e.g., reporting starting work at 9:00 PM, in error, and stopping work at 6:00 PM, correctly). To remedy the situation, all 1,273 days of level-1 data were manually checked for valid timing variables related to starting/stopping work and engaging in physical activity. For any suspected errors, the participants' other time responses from that day, time responses from their other diary days, and open ended responses were cross-checked to confirm whether an error was made. In total, 208 time changes (e.g., AM to PM or vice versa) were made within the level-1 dataset.

Analytic approach. Multi-level modeling conducted with the Hierarchical Linear Modeling software program (HLM version 7; Raudenbush & Bryk, 2002) was used to test the within-person hypotheses, and is the standard analysis method for this type of daily diary data. Daily measurements (level-1 variables) are nested within participants (level-2 variables). HLM controls for this nested structure, and also allows the researcher to control for between-subject variables and previous measurements while also accounting for missing data (Beal & Weiss, 2003). In the current study, and in line with recommendations by Nezlek (2012), coefficients were allowed to randomly vary, error terms were entered for each level-1 coefficient in level-2 equations, and random intercepts and slopes models were used. Level-1 variables have been group-mean centered (i.e., within-persons), while level-2 variables have been grand mean centered (i.e., between-persons). Analytic approaches for each hypothesis are described below, and a complete set of model equations is located in Appendix C.

Hypothesis 1 was tested with a basic 2-level model. Energy at Time 2 (after work) is predicted by energy at Time 1 (before work) and an emotional labor predictor from the Time 2 survey. By controlling for energy level before work, this test examines the relationship of emotional labor and energy after work, thus demonstrating energy depletion from emotional labor. In similar 2-level models for Hypotheses 4 and 5, emotional labor predictors (H4) and energy depletion (H5), respectively, are entered as level-1 predictors of physical activity and unhealthy eating outcomes. Participant-level means for the focal predictor in each model are also entered as level-2 predictors of the level-1 intercept to account for the fact that a person's "usual" level (this can even be thought of as a form of "trait" level) of a predictor relates to their baseline or intercept values on the outcomes of interest.

Moderation Hypotheses 3 and 7 include mindfulness (H3) and temporal focus (H7) in the respective level-2 equations for intercepts, and slopes for the focal predictors in the same models used to test Hypotheses 1, 4 and 5. These moderation relationships are explored using the methods described in Preacher, Curran, and Bauer (2006) to probe multi-level interactions and investigate simple slope effects.

Hypothesis 2 was tested by including surface acting and deep acting in a series of tests that involved nested model comparisons. Luo and Azen's (2013) method for dominance analysis in hierarchical models was applied to compare the relative importance of surface versus deep acting in predicting energy depletion. This is accomplished by comparing increases in the pseudo-R^2 (Raudenbush & Bryk, 2002) values, computed as 1 – (within-person level-1 variance of focal model / within-person variance of the null model), for a model with both predictors and nested models with only one of the two emotional labor predictors.

Research Question 1 was explored using a procedure described by Nezlek (2013) in which a 3-level measurement model is specified with dummy-coded indicators for responses to either physical or psychological energy items. By removing the level-1 intercept, mean level estimates of each outcome are "brought up" to level-2, and predictors (in this case, emotional labor) can be added. By constraining the level-3 coefficients of these level-2 predictor equations, the model fit of the constrained model, forcing an identical effect of the emotional labor variable on both forms of fatigue, can be compared to that of the unconstrained model where surface acting is permitted to differentially relate to each outcome. If the unconstrained model demonstrates improved fit over the constrained model, the magnitude of the level-2 coefficients for the emotional labor variable can be directly compared in the unconstrained model. Hypothesis 6 was tested using Bauer, Preacher, and Gil's (2006) method for computing estimates for mediation effects, standard errors, and confidence intervals in multi-level models.

Supplemental analyses. In addition to the primary analyses described above, several alternative approaches were also used to explore the data. In all analyses examining energy depletion, an alternative set of analyses was conducted using a difference score computed by subtracting energy at Time 1 (before work) from energy at Time 2 (after work), representing depletion of energy while at work. Although these analyses are conceptually similar to the aforementioned analyses that control for before work (Time 1) energy levels, results can differ slightly, although these differences are most evident in pretest-postest control group designs (Van Breukelen, 2013).

All analyses involving physical activity were also conducted several different ways. First, analyses were conducted with all valid diary days, once with the original end-of-workday to end-of-day variable, and again with the variable adding Day X+1 before work physical activity instances. Analyses were also conducted after excluding 24 participants who were inactive during the entire daily diary portion of the study. Given the relatively inactive sample (only 25% of diary days included reports of any physical activity) all physical activity analyses were also conducted on a subsample of only days including reports of physical activity. These analyses were also conducted both with the original end-of-workday to end-of-day variable (N = 321 days), and again with the variable adding Day X+1 before work physical activity instances (*N* = 382 days). These analyses essentially investigate Hypotheses 4a, 5a, 6a, and 7 on days when physical activity occurs among participants who were active, thus the outcome of interest is changes in physical activity. For example, because physical activity is assessed by a computed aggregate reflecting duration and intensity, Hypothesis 5a, tested in this sample, proposes that daily energy depletion at work will relate to less prolonged and intense physical activity. Analyses conducted with the full sample of all diary days revealed no significant relationships with any hypothesized study variables, therefore, the results involving physical activity presented below are based only on this reduced sample of days including reports of physical activity.

Analyses involving health behavior outcomes (H4-7) were also tested with prior habits for the behavior entered as a level-2 (between-person) variable to investigate, and potentially control for, their impact in the proposed relationships due to the fact that habits may "override" or buffer the proposed negative influences on health behaviors. As mentioned above, participant-level means for focal predictors were also entered as level-2 predictors of the level-1 intercept. Supplemental analyses without this additional covariate showed no meaningful differences in findings. The few instances in which these alternative analytical approaches do result in meaningfully different results (e.g., changes in magnitude, direction, or significance) are clearly noted alongside the core results presented below and in respective tables.

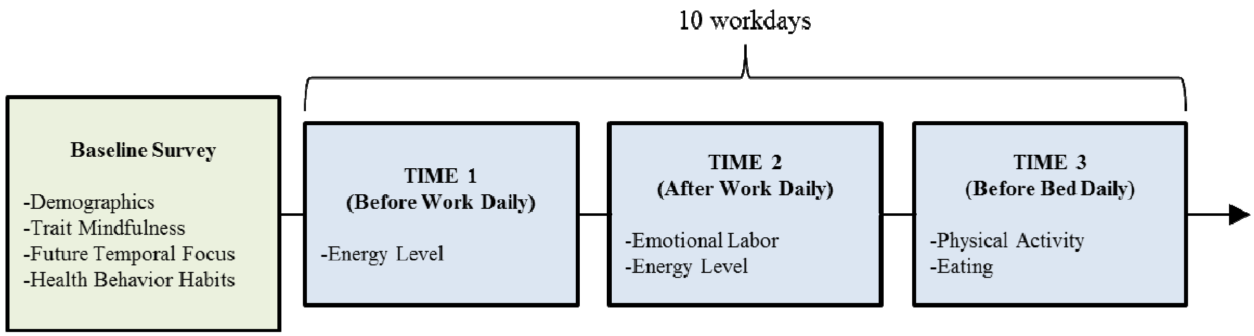

Figure 2. Visual representation of data collection timeline.

Table 1. Summary of factor analysis results for physical and psychological fatigue scales.

Model	χ^2 (*df*)	CFI	RMSEA	SRMR (between)	SRMR (within)	BIC
Time 1 1-level single factor	2568.48 (77)	.81	.16	.07		36294.10
Time 1 1-level 2-factor	1600.09 (76)	.88	.13	.05		35332.83
Time 1 1-level $\Delta\chi^2$	968.39 (1)					
Time 1 2-level single factor	1478.98 (154)	.77	.08	.10	.06	33025.35
Time 1 2-level 2-factor	929.14 (152)	.87	.06	.09	.05	32419.44
Time 1 2-level $\Delta\chi^2$*	417.88 (2)					
Time 2 1-level single factor	2113.52 (77)	.84	.15	.06		38561.56
Time 2 1-level 2-factor	1580.71 (76)	.88	.13	.05		38035.85
Time 2 1-level $\Delta\chi^2$	532.81 (1)					
Time 2 2-level single factor	1240.42 (154)	.80	.08	.06	.06	35533.34
Time 2 2-level 2-factor	929.91 (152)	.86	.07	.06	.05	35108.04
Time 2 2-level $\Delta\chi^2$*	237.11 (2)					

Notes: *N* = 1,230 days (Time 1) and *N* = 1,215 days (Time 2) from *N* = 108 participants; All χ^2s were statistically significant, p < .01; *Scaled Satorra-Bentler chi-square difference test for multi-level models (Satorra, 2000).

CHAPTER THREE:

RESULTS

Descriptive statistics, including means and intra-class correlations (ICCs) for all level-1 variables are provided in Table 2. These mean-level computed level-1 variables represent the mean of the mean scores from all participants across all days of the study at a specific time point, essentially representing the mean value of the variable for all participants across all days. For example, across all participants and days, the mean level for after work (Time 2) physical fatigue (*M* = 2.41, *SD* = .80) was slightly greater than the mean level for psychological fatigue (*M* = 2.03, *SD* = .82). Table 2 also includes descriptive statistics for level-2, between-person variables. Correlations among the level-2 variables and the mean-level computed level-1 variables are reported below the diagonal in Table 3, while correlations among level-1 daily variables are reported above the diagonal.

At these most basic levels of analysis, several findings are worthy of attention. First, the ICCs for the level-1 variables are all above .30. Although there are no strict rules, ICCs greater than .10 are typically viewed as indicative of warranting multi-level analysis of the data. In this case, higher ICCs indicate a greater proportion of variance in the variable residing at the between-person level, which, given the daily diary design and occupational and demographic differences between participants, is not unexpected. Essentially this indicates that there are more similarities between a workday of Person X and another workday of Person X, than between a workday of Person X and a workday of Person Y. Secondly, some correlations between level-2 (between-person) variables, and between level-2 variables and mean-level computed level-1 variables are significant and in the expected direction. Again, these mean-level computed level-1 variables represent the mean of the mean scores from all participants across all days of the study at a specific time point, essentially representing the mean value of the variable for all participants across all days. Mean-levels of surface acting and after work fatigue are positively related (*r*s = .46 to .57, $p < .01$), mean-levels of physical activity and after work fatigue are negatively correlated (*r*s = -.22 to -.27, $p < .05$), and mean-levels of after work POMS fatigue and post-work unhealthy eating are positively correlated ($r = .23$, $p < .05$). Between-person trait mindfulness was negatively related to mean-levels of after work physical ($r = -.26$, $p < .05$) and psychological ($r = -.36$, $p < .05$) fatigue, and negatively related to mean-levels of surface acting ($r = -.31$, $p < .05$). Although perhaps indicative of general trends, these mean-level relationships do not take into account the nested, repeated measures structure of the diary data, thus hypothesis testing was conducted using the hierarchical linear modeling approaches described above.

Moving forward to the results of hypothesis testing, Hypothesis 1 proposed that, within individuals, daily emotional labor at work would positively predict daily energy depletion. Results indicate that surface acting during the workday is positively related to after work fatigue (POMS $\beta = .24$, $p < .01$; Physical $\beta = .13$, $p < .01$; Psychological $\beta = .21$, $p < .01$), after controlling for before work fatigue levels. When analyses were conducted with the computed energy depletion score rather than controlling for before work energy levels, the relationships between surface acting and physical energy depletion became nonsignificant ($\beta = .07$, $p = . 09$), while other relationships did not differ meaningfully in magnitude, direction, or significance. Table 4 details these results. Results indicate that deep acting during the workday is negatively related to after work POMS fatigue ($\beta = -.08$, $p < .05$) when controlling for before work levels of

POMS fatigue, but when analyses were conducted with the computed energy depletion score rather than controlling for before work energy levels, the relationship is no longer significant (β = -.03, *ns*). Deep acting during the workday is not significantly related to physical (β = -.05, *ns*) or psychological (β = -.04, *ns*) fatigue using either analysis approach. Table 5 details these results. In sum, Hypothesis 1 was partially supported.

Hypothesis 2 proposed that, within individuals, the relationships between daily surface acting and energy depletion at work would be stronger than the relationships between daily deep acting and energy depletion at work. For all three fatigue outcomes, the pseudo-R^2 values for surface acting-only models (POMS R^2 = .20; Physical R^2 = .21; Psychological R^2 = .51) were greater than for deep acting-only models (POMS R^2 = .15; Physical R^2 = .18; Psychological R^2 = .47), and the changes in pseudo-R^2 values for adding surface acting over deep acting (POMS ΔR^2 = .07; Physical ΔR^2 = .06; Psychological ΔR^2 = .06) were also larger compared to the changes in pseudo-R^2 values for adding deep acting over surface acting (POMS ΔR^2 = .02; Physical ΔR^2 = .03; Psychological ΔR^2 = .02) in the combined two-predictor models. In sum, these results show that surface acting accounts for more variance in fatigue outcomes compared to deep acting, controlling for morning levels of fatigue, thus demonstrating support for Hypothesis 2. Tables 6-8 include summaries of all model comparisons.

Research Question 1 was posed to explore whether emotional labor differentially relates to physical energy depletion and psychological energy depletion. For surface acting, the unconstrained model did not significantly fit better than the constrained model, $\Delta\chi^2$ (1) = 3.56, p = .06. Although the change in fit over the constrained model was nonsignificant (p = .06), coefficients from the unconstrained model demonstrate a trend toward surface acting being more predictive of psychological fatigue (β = .22, p < .01) compared to physical fatigue (β = .16, p <

.01). For deep acting, the unconstrained model did not significantly fit better than the constrained model ($\Delta\chi^2$ (1) = .00, *ns*), thus deep acting is not differentially predictive of physical versus psychological fatigue. Results are detailed in Tables 9 and 10.

Hypothesis 3 proposed that between individual differences in trait mindfulness would moderate the relationships between emotional labor and energy depletion, such that relationships would be weaker for employees with higher levels of trait mindfulness than for employees with lower levels of trait mindfulness. In models with surface acting as the predictor of after work fatigue, trait mindfulness was negatively related to psychological fatigue (β = -.19, p < .05), but not physical fatigue (β = -.09, *ns*) or POMS fatigue (β = .00, *ns*). The interaction terms in all models were nonsignificant (POMS β = .07, *ns*; Physical β = .07, *ns*; Psychological β = .04, *ns*). These results are illustrated in the lower portion of Table 4. In models with deep acting as the predictor of after work fatigue, trait mindfulness was negatively related to psychological (β = -.22, p < .01) and physical (β = -.35, p < .01) fatigue, but not to POMS fatigue (β = -.14, *ns*). The interaction terms in all models were nonsignificant (POMS β = .03, *ns*; Physical β = .02, *ns*; Psychological β = -.02, *ns*). These results are illustrated in the lower portion of Table 5. Simple slope effects were not probed due to nonsignificant interactions between mindfulness and the target predictors. Hypothesis 3 was not supported.

Hypothesis 4a proposed that, within individuals, daily emotional labor would negatively relate to daily physical activity. Neither surface acting (β = 1.43, *ns*) nor deep acting (β = 6.01, *ns*) related to physical activity. Hypothesis 4a was not supported.

Hypothesis 4b proposed that, within individuals, daily emotional labor would positively relate to unhealthy eating. Surface acting was not significantly related to unhealthy eating (β =

.19, p = .08). Deep acting was not related to unhealthy eating (β = -.06, *ns*). Hypothesis 4b was not supported. The results of hypotheses 4a and 4b are detailed in Table 11.

Hypothesis 5a proposed that, within individuals, daily energy depletion would negatively relate to daily physical activity. Controlling for before work POMS fatigue and prior habits for physical activity, after work POMS fatigue was not significantly related to physical activity (β = -16.22, p = .06), an effect that becomes significant (β = -17.49, $p < .05$) when prior physical activity habit is entered as a control. Neither physical (β = -11.00, *ns*) nor psychological (β = -7.70, *ns*) fatigue after work related to physical activity, controlling for before work levels of fatigue. Hypothesis 5a was partially supported, and detailed results are presented in Tables 12-14.

Hypothesis 5b proposed that, within individuals, daily energy depletion would positively relate to unhealthy eating. Controlling for before work levels of fatigue, after work fatigue was not related to unhealthy eating (POMS β = .03, *ns*; Physical β = .04, *ns*; Psychological β = .06, *ns*). Hypothesis 5b was not supported, and detailed results are presented in Tables 15-17.

Hypothesis 6a proposed that, within individuals, daily energy depletion would mediate the relationships between daily emotional labor and daily physical activity, while Hypothesis 6b proposed that, within individuals, daily energy depletion would mediate the relationship between daily emotional labor and unhealthy eating. Mediation models were tested using the computed energy depletion variables (difference scores computed by subtracting before work levels of fatigue from after work levels). In all analyses, the indirect effect of the emotional labor predictor on the health outcomes via energy depletion was not significant. A summary of the indirect effects can be found in Tables 18 and 19. Hypotheses 6a and 6b were not supported.

Hypothesis 7 proposed that between individual differences in future temporal focus would moderate the relationships between daily energy depletion and physical activity and unhealthy eating, such that relationships would be weaker for employees with a stronger future temporal focus. In models predicting physical activity, future temporal focus was not related to physical activity (POMS fatigue predictor β = -2.56, *ns*; physical fatigue predictor β = -5.38, *ns*; psychological fatigue predictor β = -7.35, *ns*), and the interaction terms with after work fatigue were also nonsignificant (POMS fatigue predictor β = 8.50, *ns*; physical fatigue predictor β = 8.18, *ns*; psychological fatigue predictor β = 10.23, *ns*). The lower portions of Tables 11-13 illustrate these results. In models predicting unhealthy eating, future temporal focus was not related to physical activity (POMS fatigue predictor β = -.17, *ns*; physical fatigue predictor β = -.15, *ns*; psychological fatigue predictor β = -.14, *ns*), and the interaction terms with after work fatigue were also nonsignificant (POMS fatigue β = -.01, *ns*; physical fatigue β = -.02, *ns*; psychological fatigue β = .10, *ns*). The lower portions of Tables 15-17 illustrate these results. Simple slope effects were not probed due to nonsignificant interactions between future temporal focus and the target predictors. Hypothesis 7 was not supported.

Table 2. Descriptive statistics, scale reliabilities, and intra-class correlation coefficients.

	Mean (SD)	Min	Max	Skew (SE)	Kurtosis (SE)	Reliability[a]	ICC (2,1)	ICC (2,k)
Time 1								
Physical Fatigue	2.31 (.82)	1.00	4.86	.49(.07)	-.28 (.14)	.74	.47	.91
Psychological Fatigue	1.82 (.70)	1.00	4.86	.97 (.07)	1.25 (.14)	.79	.57	.94
POMS Fatigue	1.80 (.90)	1.00	5.00	1.33 (.07)	1.36 (.14)	.84	.44	.90
Time 2								
Physical Fatigue	2.41 (.80)	1.00	5.00	.39 (.07)	-.23 (.14)	.69	.49	.92
Psychological Fatigue	2.03 (.82)	1.00	5.00	.80 (.07)	.47 (.14)	.77	.61	.95
POMS Fatigue	2.09 (.98)	1.00	5.00	1.08 (.07)	.66 (.07)	.85	.44	.90
Surface Acting	1.81 (.88)	1.00	5.00	1.25 (.07)	1.38 (.14)	.79	.60	.95
Deep Acting	2.50 (1.22)	1.00	5.00	.42 (.07)	-.94 (.14)	.82	.74	.97
Time 3								
Physical Activity	73.29 (163.24)	.00	1200.00	3.07 (.07)	11.28 (.15)	--	.31	.84
Unhealthy Eating	2.70 (2.26)	.00	13.00	.99 (.07)	1.04 (.15)	--	.49	.92
Baseline								
Trait Mindfulness	4.23 (.70)	2.40	5.80	-.07 (.23)	-.20 (.46)	.86	--	--
Future Temporal Focus	4.42 (.85)	2.00	6.00	-.41 (.23)	.41 (.46)	.84	--	--
Physical Activity Habit	2.75 (.91)	1.00	4.92	.15 (.23)	-.68 (.46)	.95	--	--
Healthy Eating Habit	3.09 (.89)	1.08	5.00	.23 (.23)	-.39 (.46)	.96	--	--

Notes: *N* = 1,273 days (Times 1-3) from *N* = 108 participants (Baseline); [a]Reliabilities reported for Baseline variables represent Cronbach's α, and reliabilities reported for daily variables represent day-level scale reliabilities, a form of "pseudo-alpha" for repeated measures diary designs, as described by Nezlek (2012); ICC (2,1) represents the between-person variation in the variable divided by the total combined within- and between-person variation; ICC (2,k) represents the within-person reliability of the measures given *k* = 12 days (on average) of data per person, calculated with the Spearman-Brown formula and the ICC (2,1), [*k*(ICC) / [(*k*-1(ICC)+1].

Table 3. Intercorrelations between variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. T1 Physical Fatigue	--	.74**	.75**	.55**	.48**	.36**	.23**	-.13**	-.09**	.08*	--	--	--
2. T1 Psych Fatigue	.79**	--	.59**	.55**	.67**	.38**	.33**	-.12**	-.09**	.08**	--	--	--
3. T1 POMS Fatigue	.77**	.61**	--	.43**	.38**	.47**	.25**	-.05	-.07*	.08*	--	--	--
4. T2 Physical Fatigue	.78**	.77**	.59**	--	.79**	.74**	.35**	-.10**	-.13**	.07*	--	--	--
5. T2 Psych Fatigue	.66**	.90**	.52**	.87**	--	.66**	.44**	-.09**	-.10**	.06*	--	--	--
6. T2 POMS Fatigue	.52**	.56**	.69**	.78**	.72**	--	.34**	-.04	-.14**	.09**	--	--	--
7. Surface Acting	.36**	.51**	.39**	.53**	.57**	.46**	--	-.01	-.04	.08*	--	--	--
8. Deep Acting	-.14	-.12	-.03	-.10	-.09	-.03	.01	--	.06*	.11**	--	--	--
9. Physical Activity	-.18	-.17	-.11	-.27*	-.22*	-.24*	-.12	.11	--	-.12**	--	--	--
10. Unhealthy Eating	.16	.16	.19*	.15	.13	.21*	.08	.13	-.23*	--	--	--	--
11. Trait Mindfulness	-.27**	-.38**	-.17	-.26**	-.36**	-.15	-.31**	.09	.14	.00	--	--	--
12. Temporal Focus	-.02	-.06	.06	.03	-.04	.13	-.02	.07	-.04	-.06	-.12	--	--
13. Phy. Activity Habit	-.21*	-.11	-.12	-.09	-.10	-.12	.01	.11	.47**	-.16	.01	.17	--
14. Healthy Eating Habit	-.21*	-.22*	-.14	-.21*	-.22*	-.17	-.17	-.03	.15	-.34**	.13	.19*	.27**

Notes: *N* = 1,273 days (Times 1-3) from *N* = 108 participants (Baseline); $p <$ **.01, *.05; Values below the diagonal represent the correlations between person-level means for daily variables (1-10) and between-person variables (11-14) while values above the diagonal represent correlations between variables at the daily level.

Table 4. Surface acting predicting time 2 fatigue variables with trait mindfulness moderating (Hypotheses 1 & 3).

	POMS Fatigue		**Physical Fatigue**		**Psychological Fatigue**	
Fixed Effects	*Coefficient*	*SE*	*Coefficient*	*SE*	*Coefficient*	*SE*
Intercept	2.09**	.06	2.40**	.05	2.04**	.05
Surface Acting (person-level)	.46**	.08	.45**	.07	.56**	.07
T1 Fatigue (matching T2 outcome)	.31**	.04	.27**	.04	.34**	.04
Surface Acting (day-level)	.24**	.05	.13**[a]	.04	.21**	.03
Fixed Effects	*Coefficient*	*SE*	*Coefficient*	*SE*	*Coefficient*	*SE*
Intercept	2.09**	.06	2.40**	.05	2.04**	.05
Surface Acting (person-level)	.45**	.09	.42**	.07	.50**	.08
Mindfulness	.00	.09	-.09	.07	-.19*	.08
T1 Fatigue (matching T2 outcome)	.31**	.04	.27**	.04	.33**	.04
Surface Acting (day-level)	.24**	.05	.13**	.04	.21**	.03
Mindfulness*Surface Acting	.07	.07	.07	.06	.04	.05

Notes: N = 1,273 days from N = 108 participants; p < **.01, *.05, [†].10; [a] when analyses conducted with energy depletion scores, this coefficient is nonsignificant at p = .09.

Table 5. Deep acting predicting time 2 fatigue variables with trait mindfulness moderating (Hypotheses 1 & 3).

	POMS Fatigue		**Physical Fatigue**		**Psychological Fatigue**	
Fixed Effects	*Coefficient*	*SE*	*Coefficient*	*SE*	*Coefficient*	*SE*
Intercept	2.09**	.07	2.41**	.06	2.04**	.06
Deep Acting (person-level)	-.03	.06	-.05	.05	-.06	.06
T1 Fatigue (matching T2 outcome)	.31**	.05	.26**	.04	.33**	.04
Deep Acting (day-level)	-.08*[a]	.04	-.05[b]	.03	-.04	.03
Fixed Effects	*Coefficient*	*SE*	*Coefficient*	*SE*	*Coefficient*	*SE*
Intercept	2.09**	.07	2.41**	.06	2.04**	.06
Deep Acting (person-level)	-.02	.06	-.04	.05	-.04	.06
Mindfulness	-.14	.10	-.22**	.08	-.35**	.09
T1 Fatigue (matching T2 outcome)	.31**	.05	.26**	.04	.33**	.04
Deep Acting (day-level)	-.08*	.04	-.05	.03	-.04	.03
Mindfulness*Deep Acting	.03	.06	.02	.05	-.02	.04

Notes: N = 1,273 days from N = 108 participants; p < **.01, *.05, †.10; [a] when analyses conducted with energy depletion scores, this coefficient is no longer significant; [b] when analyses conducted with energy depletion scores, this coefficient remains nonsignificant, but becomes positive (.01).

Table 6. Relative importance of surface and deep acting in predicting POMS fatigue (Hypothesis 2).

Predictors →	**Null Model**		**Surface Acting**		**Deep Acting**		**Surface & Deep Acting**	
Fixed Effects	*Coeff.*	*SE*	*Coeff.*	*SE*	*Coeff.*	*SE*	*Coeff.*	*SE*
Intercept	2.09**	.07	2.09**	.06	2.09**	.07	2.09**	.06
Surface Acting	--		.24**	.05	--	--	.24**	.05
Deep Acting	--		--	--	-.08*	.04	-.06[†]	.04
Variance Components								
Level-1	.54		.43		.46		.42	
Intercept	.43		.33		.43		.34	
Surface Acting	--		.09		--		.09	
Deep Acting	--		--		.03		.02	
R&B R^2_1	--		.20		.15		.22	
Deviance	2952.76		2692.80		2767.75		2688.36	

Notes: *N* = 1,273 days from *N* = 108 participants; $p <$ **.01, *.05, [†].10; Person-level means for predictors as well as Time 1 fatigue also included in all non-null models; R&B R^2_1 = Raudenbush & Bryk's (2002) "pseudo-R^2" computed as: 1 – (within-person level-1 variance of focal model / within-person variance of the null model).

Table 7. Relative importance of surface and deep acting in predicting physical fatigue (Hypothesis 2).

Predictors →	**Null Model**		**Surface Acting**		**Deep Acting**		**Surface & Deep Acting**	
Fixed Effects	*Coeff.*	*SE*	*Coeff.*	*SE*	*Coeff.*	*SE*	*Coeff.*	*SE*
Intercept	2.40**	.06	2.40**	.05	2.40**	.06	2.40**	.05
Surface Acting	--		.13**	.07	--	--	.12**	.04
Deep Acting	--		--	--	-.05	.03	-.04	.03
Variance Components								
Level-1	.33		.26		.27		.25	
Intercept	.32		.24		.33		.24	
Surface Acting	--		.05		--		.05	
Deep Acting	--		--		.02		.02	
R&B R^2_1	--		.21		.18		.24	
Deviance	2386.60		2133.50		2185.59		2130.53	

Notes: *N* = 1,273 days from *N* = 108 participants; *p* < **.01, *.05, †.10; Person-level means for predictors as well as Time 1 fatigue also included in all non-null models; R&B R^2_1 = Raudenbush & Bryk's (2002) "pseudo-R^2" computed as: 1 – (within-person level-1 variance of focal model / within-person variance of the null model).

Table 8. Relative importance of surface and deep acting in predicting psychological fatigue (Hypothesis 2).

Predictors →	**Null Model**		**Surface Acting**		**Deep Acting**		**Surface & Deep Acting**	
Fixed Effects	*Coeff.*	*SE*	*Coeff.*	*SE*	*Coeff.*	*SE*	*Coeff.*	*SE*
Intercept	2.04**	.06	2.04**	.05	2.04**	.07	2.04**	.05
Surface Acting	--		.21**	.03	--	--	.21**	.04
Deep Acting	--		--	--	-.04	.03	-.03	.03
Variance Components								
Level-1	.43		.21		.23		.20	
Intercept	.27		.29		.44		.29	
Surface Acting	--		.03		--		.04	
Deep Acting	--		--		.01		.01	
R&B R^2_1	--		.51		.47		.53	
Deviance	2185.64		1887.15		2003.60		1885.12	

Notes: *N* = 1,273 days from *N* = 108 participants; *p* < **.01, *.05, †.10; Person-level means for predictors as well as Time 1 fatigue also included in all non-null models; R&B R^2_1 = Raudenbush & Bryk's (2002) "pseudo-R^2" computed as: 1 – (within-person level-1 variance of focal model / within-person variance of the null model).

Table 9. Comparing strength of relationships between surface acting and physical vs. psychological fatigue (Research Question 1).

	Constrained		**Unconstrained**	
Fixed Effects	*Coefficient*	*SE*	*Coefficient*	*SE*
Physical Fatigue				
Intercept	2.38**	.05	2.38**	.05
Surface Acting (person-level)	.47**	.07	.47**	.07
T1 Physical Fatigue	.28**	.04	.30**	.04
Surface Acting (day-level)	.21**	.04	.16**	.05
Psychological Fatigue				
Intercept	2.00**	.06	2.02**	.06
Surface Acting (person-level)	.53**	.08	.54**	.08
T1 Psychological Fatigue	.35**	.04	.35**	.04
Surface Acting (day-level)	.21**	.04	.22**	.04
Deviance	30472.577		30469.018	
# parameters	32		33	
$\Delta\chi^2$ (df = 1)			3.56†	

Notes: N = 1,273 days from N = 108 participants; p < **.01, *.05, †.10; Surface Acting (day-level) coefficients are constrained to be equal in constrained models.

Table 10. Comparing strength of relationships between deep acting and physical vs. psychological fatigue (Research Question 1).

	Constrained		**Unconstrained**	
Fixed Effects	*Coefficient*	*SE*	*Coefficient*	*SE*
Physical Fatigue				
Intercept	2.38**	.06	2.38**	.06
Deep Acting (person-level)	-.04	.06	-.04	.06
T1 Physical Fatigue	.29**	.04	.29**	.04
Deep Acting (day-level)	-.06*	.03	-.06†	.03
Psychological Fatigue				
Intercept	2.03**	.07	2.02**	.07
Deep Acting (person-level)	-.03	.07	-.03	.07
T1 Psychological Fatigue	.35**	.04	.35**	.04
Deep Acting (day-level)	-.06*	.03	-.06*	.03
Deviance	30572.40		30572.40	
# parameters	32		33	
$\Delta\chi^2$ (*df* = 1)			.00	

Notes: *N* = 1,273 days from *N* = 108 participants; *p* < **.01, *.05, †.10; Deep Acting (day-level) coefficients are constrained to be equal in constrained models.

Table 11. Emotional labor predicting physical activity and unhealthy eating (Hypothesis 4).

	Physical Activity		**Unhealthy Eating**	
Fixed Effects	*Coefficient*	*SE*	*Coefficient*	*SE*
Intercept	93.16**	11.46	2.71**	.16
Surface Acting (person-level)	-16.06	16.01	.16	.22
Surface Acting (day-level)	1.43	12.84	.19†	.11
Fixed Effects	*Coefficient*	*SE*	*Coefficient*	*SE*
Intercept	93.17**	11.46	2.71**	.16
Deep Acting (person-level)	10.33	10.86	.21	.15
Deep Acting (day-level)	6.01	9.77	-.06	.09

Notes: N = 321 days from N = 67 participants for Physical Activity outcome and N = 1,273 days from N = 108 participants for Unhealthy Eating outcome; p < **.01, *.05, †.10.

Table 12. Time 2 POMS fatigue predicting physical activity with future temporal focus moderating (Hypothesis 5).

	Physical Activity	
Fixed Effects	*Coefficient*	*SE*
Intercept	93.84**	11.31
POMS Fatigue (person-level)	-35.59†	18.51
T1 POMS Fatigue	-5.60	9.90
T2 POMS Fatigue	-16.22$^{\dagger(*)}$	8.61
Fixed Effects	*Coefficient*	*SE*
Intercept	93.84**	11.38
POMS Fatigue (person-level)	-34.89$^{\dagger(ns)}$	18.68
Temporal Focus	-2.56	13.40
T1 POMS Fatigue	-5.31	9.83
T2 POMS Fatigue	-16.56$^{\dagger(*)}$	8.62
Temporal Focus*T2 POMS Fatigue	8.50	11.32

Notes: N = 321 days from N = 67 participants; p < **.01, *.05, †.10; Superscript in parentheses indicates change in significance when health behavior habit control is entered into the model.

Table 13. Time 2 physical fatigue predicting physical activity with future temporal focus moderating (Hypotheses 5 & 7).

	Physical Activity	
Fixed Effects	*Coefficient*	*SE*
Intercept	93.89**	11.22
Physical Fatigue (person-level)	-50.31*$^{(\dagger)}$	20.55
T1 Physical Fatigue	-1.23	10.25
T2 Physical Fatigue	-11.00	11.59
Fixed Effects	*Coefficient*	*SE*
Intercept	93.86**	11.27
Physical Fatigue (person-level)	-50.05*$^{(ns)}$	20.67
Temporal Focus	-5.38	13.52
T1 Physical Fatigue	-1.34	10.24
T2 Physical Fatigue	-10.77	11.67
Temporal Focus*T2 Physical Fatigue	8.18	14.47

Notes: N = 321 days from N = 67 participants; p < **.01, *.05, †.10; superscript in parentheses indicates change in significance when health behavior habit control is entered into the model.

Table 14. Time 2 psychological fatigue predicting physical activity with future temporal focus moderating (Hypotheses 5 & 7).

	Physical Activity	
Fixed Effects	*Coefficient*	*SE*
Intercept	93.71**	11.34
Psychological Fatigue (person-level)	-40.94*$^{(ns)}$	19.74
T1 Psychological Fatigue	-9.56	14.92
T2 Psychological Fatigue	-7.93	12.27
Fixed Effects	*Coefficient*	*SE*
Intercept	93.67**	11.38
Psychological Fatigue (person-level)	-41.71*$^{(ns)}$	19.91
Temporal Focus	-7.35$^{ns(\dagger)}$	13.70
T1 Psychological Fatigue	-10.20	14.95
T2 Psychological Fatigue	-7.70	12.27
Temporal Focus*T2 Psychological Fatigue	10.23	15.87

Notes: N = 321 days from N = 67 participants; p < **.01, *.05, †.10; superscript in parentheses indicates change in significance when health behavior habit control is entered into the model.

Table 15. Time 2 POMS fatigue predicting unhealthy eating with future temporal focus moderating (Hypotheses 5 & 7).

	Unhealthy Eating	
Fixed Effects	*Coefficient*	*SE*
Intercept	2.72**	.16
POMS Fatigue (person-level)	.60*(†)	.25
T1 POMS Fatigue	.11	.09
T2 POMS Fatigue	.03	.08
Fixed Effects	*Coefficient*	*SE*
Intercept	2.72**	.16
POMS Fatigue (person-level)	.62*(†)	.266
Temporal Focus	-.17	.19
T1 POMS Fatigue	.11	.09
T2 POMS Fatigue	.03	.08
Temporal Focus*T2 POMS Fatigue	-.01	.10

Notes: *N* = 1,273 days from *N* = 108 participants; *p* < **.01, *.05, †.10; superscript in parentheses indicates change in significance when health behavior habit control is entered into the model.

Table 16. Time 2 psychological fatigue predicting unhealthy eating with future temporal focus moderating (Hypotheses 5 & 7).

	Unhealthy Eating	
Fixed Effects	*Coefficient*	*SE*
Intercept	2.72**	.16
Psychological Fatigue (person-level)	.44	.27
T1 Psychological Fatigue	.12	.14
T2 Psychological Fatigue	.06	.11
Fixed Effects	*Coefficient*	*SE*
Intercept	2.72**	.16
Psychological Fatigue (person-level)	.43	.27
Temporal Focus	-.14	.19
T1 Psychological Fatigue	.11	.14
T2 Psychological Fatigue	.06	.11
Temporal Focus*T2 Psychological Fatigue	.10	.15

Notes: N = 1,273 days from N = 108 participants; p < **.01, *.05, †.10; superscript in parentheses indicates change in significance when health behavior habit control is entered into the model.

Table 17. Time 2 physical fatigue predicting unhealthy eating with future temporal focus moderating (Hypotheses 5 & 7).

	Unhealthy Eating	
Fixed Effects	*Coefficient*	*SE*
Intercept	2.72**	.16
Physical Fatigue (person-level)	.48$^{\dagger(ns)}$	.28
T1 Physical Fatigue	.08	.09
T2 Physical Fatigue	.04	.10
Fixed Effects	*Coefficient*	*SE*
Intercept	2.72**	.16
Physical Fatigue (person-level)	.48$^{\dagger(ns)}$	.28
Temporal Focus	-.15	.19
T1 Physical Fatigue	.08	.09
T2 Physical Fatigue	.04	.10
Temporal Focus*T2 Physical Fatigue	-.02	.12

Notes: N = 1,273 days from N = 108 participants; p < **.01, *.05, †.10; superscript in parentheses indicates change in significance when health behavior habit control is entered into the model.

Table 18. Energy depletion mediating emotional labor-physical activity relationship: Summary of indirect effects (Hypotheses 6a).

Predictors →	Surface Acting		Deep Acting	
↓ Mediators	*Coefficient (SE)*	*95% CI*	*Coefficient (SE)*	*95% CI*
POMS Fatigue	-2.41 (3.09)	[-8.46, 3.64]	.12 (2.26)	[-4.31, 4.54]
Physical Fatigue	-.63 (2.97)	[-6.46, 5.20]	.68 (2.14)	[-3.52, 4.88]
Psychological Fatigue	-2.08 (12.98)	[-27.51, 23.51]	-.08 (10.70)	[-21.04, 20.89]

Notes: N = 321 days from N = 67 participants.

Table 19. Energy depletion mediating emotional labor-unhealthy eating relationship: Summary of indirect effects (Hypotheses 6b).

Predictors →	Surface Acting		Deep Acting	
↓ Mediators	*Coefficient (SE)*	*95% CI*	*Coefficient (SE)*	*95% CI*
POMS Fatigue	.00 (.03)	[-.05, .06]	.01 (.02)	[-.03, .05]
Physical Fatigue	-.02 (.02)	[-.06, .03]	.01 (.02)	[-.03, .05]
Psychological Fatigue	.00 (.00)	[-.06, .06]	-.01 (.02)	[-.06, .03]

Notes: N = 1,273 days from N = 108 participants.

CHAPTER FOUR:

DISCUSSION

The purpose of the current study was to explore the process through which the regulation of emotions at work depletes self-regulatory resources, specifically energy, and distally impacts physical activity and unhealthy eating, while also investigating the role of between-individual differences in trait mindfulness and future temporal focus. Overall, the results reveal a somewhat disjointed story about the process linking emotional labor at work, energy, and health behaviors. In general, daily surface acting at work, but not deep acting, was negatively related to after work energy levels, with no significant differences in strength of relationships for physical versus psychological energy depletion. Neither surface acting nor deep acting at work were related to unhealthy eating or physical activity, but when habits for physical activity were included as a control, after work energy level was positively related to physical activity. No effects on unhealthy eating emerged. Several main between-person effects for trait mindfulness emerged, but there was no evidence of the proposed moderating effects, and no main or moderating effects emerged for future temporal focus. Additionally, the overall mediation model was not supported as there were no significant indirect effects linking emotional labor to health behaviors through energy depletion.

Although the majority of the study's hypotheses were not supported, the results do reveal several interesting patterns, potential trends, and new insights. The following sections provide a more comprehensive assessment of the study's findings and a discussion of the associated theoretical and practical implications. Lastly, limitations are addressed and directions for future research offered.

Emotional Labor and Energy

Hypothesis 1 proposed that, within individuals, daily emotional labor at work would positively predict daily energy depletion. Results indicated that surface acting during the workday is positively related to after work energy depletion. Thus, controlling for energy levels before work, on days when employees engaged in more surface acting at work, they reported lower energy levels at the end of the workday. Deep acting was negatively related to after work energy levels when analyses were conducted controlling for morning energy levels, but not when the calculated energy depletion score was used. Furthermore, Hypothesis 2 proposed that surface acting would be more strongly related to energy depletion compared to deep acting, and results fully support this expectation when both emotional labor predictors were entered in a series of models simultaneously. Lastly, Research Question 1 concerned whether surface acting and deep acting were more predictive of physical versus psychological energy depletion. No significant differences in strength of relationships were found, although the near significant change in chi-square for the surface acting models (p = .06) indicates a potential trend towards surface acting being more strongly related to psychological than to physical fatigue.

In general, the aforementioned findings are in line with the existing literature on emotional labor and energy depletion. Although an objective energy depletion assessment was not utilized in the present study, the finding that surface acting, a form of emotional regulation, is related to self-reported energy depletion echoes the findings of Galliot and colleagues' (2007) work testing Baumeister et al.'s energy/strength model of self-control (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Baumeister, Vohs, & Tice, 2007; Muraven, Tice, & Baumeister, 1998).

These results are also in line with previous studies linking emotion regulation to fatigue (Muraven, Tice, & Baumeister, 1998), and emotional labor to reports of exhaustion (Bono & Vey, 2005; Hülsheger & Schewe, 2011; Zapf, 2002).

The relative lack of significant findings for deep acting, overall, and the fact that surface acting is consistently most predictive of energy depletion in the present study also mirror recent meta-analytic results showing stronger positive relationships with emotional exhaustion, psychological strain, and psychosomatic complaints for surface acting, compared to deep acting (Hülsheger & Schewe, 2011). There are several potential explanations for these differences. First and foremost, it is possible that the 3-item measure used to assess deep acting poorly assesses the construct, especially as it applies to the relationships between deep acting and physical and psychological outcomes (Hülsheger & Schewe, 2011). For instance, the item "[I] tried to actually experience the emotions that I needed to display to others" does, on the surface, represent the construct of deep acting, but the item is complex, especially when compared to surface acting items (e.g., "[I] resisted expressing my true feelings"), and potentially confusing to participants. Numerous participants provided open-ended comments mentioning that they did not fully understand one or more of the deep acting items, specifically the notion that they had to "try" rather than automatically experiencing the emotion they needed to display. To this end, researchers have argued that deep acting is more similar to the process of reappraisal described by Gross (1998), taking place relatively quickly at the onset of an emotion, and thus not requiring as much investment of resources compared to surface acting (Totterdell & Holman, 2003). Liu and colleagues argue that deep acting within the work role is fundamentally different than reappraisal and suppression typically studied in the laboratory setting, and the overall consensus in the literature is that less is known about the actual cognitive demands of deep acting, compared to surface acting (Liu, Prati, Perrewé, & Ferris, 2008). It follows that a somewhat complicated 3-item measure of the construct may be insufficient to assess the process.

Another potential explanation for the differential effects on energy depletion for surface versus deep acting focuses on the authenticity of emotional expression. Hochschild (1983) proposed that humans are driven to behave in self-expressive and authentic ways, and surface acting may impede this striving by creating a discrepancy between an employees' felt emotion and their emotional expressions (Brotheridge & Lee, 2002). Research on inauthenticity shows it to be related to stress and depressed mood (Erickson & Wharton, 1997; Sheldon, Ryan, Rawsthorne, & Ilardi, 1997). Deep acting, on the other hand, conceptually involves no discrepancy or inauthenticity because the experienced emotion has been altered to match the expected expressed emotion. The fact that employees may be performing their job in a more authentic manner when deep acting, may explain the present study finding that deep acting was actually positively associated with after work energy levels in some analyses. Similar findings are presented in the Hülsheger and Schewe (2011) meta-analysis where deep acting was negatively related to psychological strain (r = -.01) compared to (r = .35) for surface acting, and the relationship between surface acting and emotional exhaustion (r = .37) was larger than that between deep acting and emotional exhaustion (r = .08).

The finding that surface and deep acting do not differentially relate to physical versus psychological energy depletion (Research Question 1) is also of interest. The near significant change in chi-square for the surface acting models (p = .06) indicates a potential trend towards surface acting being more strongly related to psychological versus physical fatigue. Given that emotional labor is a primarily psychological rather than physical process, a stronger relationship between surface acting and psychological fatigue might be expected. However, meta-analytic findings show similar relationships between surface acting and emotional exhaustion (r = .37), psychological strain (r = .35), and psychosomatic complaints (r = .37) across the literature (Hülsheger & Schewe, 2011). Another consideration in interpreting these findings is that both measures exhibited lower reliability compared to the other daily measures, and while a two-factor model fit the set of items better than did a single factor model, there was room for improvement in fit. As one of the first studies to concurrently investigate both related outcomes, the results of the present study highlight the need for further examination and refined measurement, espoused in more detail below in the section on future directions.

The Role of Mindfulness

Hypothesis 3 proposed that between individual differences in trait mindfulness would moderate the relationships between emotional labor and energy depletion, such that relationships would be weaker for employees with higher levels of trait mindfulness than for employees with lower levels of trait mindfulness. With surface acting as the primary within-person predictor, trait mindfulness was negatively related to psychological fatigue, and with deep acting as the primary within-person predictor, trait mindfulness was negatively related to both psychological and physical fatigue. The interaction terms between trait mindfulness and emotional labor predictors were not significant. Thus, individuals with higher levels of trait mindfulness tended to experience less energy depletion at work, specifically less psychological energy depletion, but between-person differences in trait mindfulness did not interact with daily emotional labor to differentially predict energy depletion for employees who are high versus low in trait mindfulness.

These findings, suggesting that trait mindfulness is related to less energy depletion at work, are in line with research on trait mindfulness as a positive characteristic relating to more optimal moment-to-moment experiences (Brown & Ryan, 2003). Employees in the present study with higher levels of trait mindfulness may experience work as less depleting overall due to their enhanced attentional abilities, which can be beneficial in many work-related experiences other than the regulation of emotions. Trait mindfulness is also associated with greater aptitude for repairing unpleasant moods and less reactivity to threatening emotional cues (Brown & Ryan, 2003; Creswell, Way, Eisenberger, & Lieberman, 2007), and may reduce energy depletion at work via enhanced emotion regulation outside of the interactions with other persons at work characteristic of emotional labor. For example, a mindful person may accidentally step on and kill a spider, but rather than feel sad, be able to calmly see it as an accident or a simple part of life, and move on to their next work task undeterred. These enhanced attentional and emotion regulation abilities are beneficial for employees as well as employers. Employees whose resources are less depleted are better able to perform their jobs, and prior research has demonstrated a positive relationship between trait mindfulness and overall job performance (Dane & Brummel, 2013). The lack of cross-level moderation effects may be due to the fact that mindfulness was measured at the between-person rather than the within-person, or daily, level. Trait mindfulness represents a dispositional tendency, however, mindful states have also been examined in the literature, and it is possible and likely that employees' mindful states varied day to day across the study necessitating future research altering the level of analysis for this construct.

Energy and Health Behaviors

Hypothesis 5 proposed that daily energy depletion after working would relate to post-work health behaviors, in the form of more unhealthy eating and less physical activity. No effects on eating behavior emerged, and the lack of findings could be due to several factors.

First, it is possible that participants simply were not responding honestly about their consumption of unhealthy foods, or for those individuals who did tend to increase consumption of unhealthy foods when depleted, actually reporting it brought the behavior to their attention and resulted in reduced consumption (Barta, Tennen, & Litt, 2012). Although the measure is quite comprehensive, there are numerous unhealthy foods that may not be captured, potentially reducing variance in this variable. Fewer than five percent of evening surveys included any written-in food responses, a method provided for participants to report additional foods that they felt were unhealthy but not captured by the measure.

Second, it is possible that day-to-day changes in self-regulatory energy depletion at work do not relate to changes in actual eating behavior. It may be that the relationship between work-related depletion and eating behavior is more long-term. The significant between-person correlation between person-level mean energy levels before and after work and person-level means for unhealthy eating (e.g., participants who tended to have less energy before and after work tended to eat more unhealthy food across all days in the study), lends some support to this explanation. Lastly, it is also possible that participants consumed more unhealthy foods *during* the workday, eating behavior not captured in the present study, rather than after work. This behavior may be most prevalent amongst participants who are keeping track of their eating behaviors throughout the day on their own, outside of the study protocol. If self-regulatory resources are depleted midday, and a very unhealthy lunch is consumed, a participant may try to eat more healthily after work to compensate, thus attenuating the day-to-day relationships between energy depletion and unhealthy eating.

One significant relationship emerged between energy depletion and physical activity. When habits for physical activity and morning energy levels were included as controls, after work energy levels were related to physical activity, such that on days when participants were more depleted after work and engaged in physical activity, they engaged in less physical activity. These findings are in line with research showing that reduced energy is among the top reported barriers to engaging in physical activity (Courneya & Hellsten, 1998). Additionally, although not previously mentioned, these results are representative of resource drain theory (Edwards & Rothbard, 2000) that posits that domains share finite resources (e.g., energy), which when expended in one domain, are unavailable for use in another (Piotrkowski, 1979; Staines, 1980). Although all days in the aforementioned analyses included physical activity, on days with greater energy depletion, less physical activity occurred, perhaps due to the unavailability of that energy to be used for physical activity.

The lack of other findings for physical activity using the various analytic approaches may be due to several factors. First, the lack of findings could be explained by the overall absence of physical activity reported by participants. As previously mentioned, only 25% of diary days had any report of physical activity, meaning that on average, out of the 12 days of data submitted by participants, only 3 days contained any physical activity. The sampling strategy of the present study attempted to screen out inactive participants, and indeed, the "Have you engaged in any physical activity in the past month" eligibility criterion was the most employed screening mechanism after work hours. Despite these efforts, 24 participants were completely inactive during the daily diary portion of the study and a large percentage of participants were active on two or fewer days. In the full daily dataset, this resulted in a positively skewed distribution, although no significant results were found even when using a simple binary yes/no outcome for physical activity each day in supplemental analyses. An unfortunate explanation may be related to measurement reactivity (Barta et al., 2012) in that some participants may have learned that they could move through the survey more quickly by not reporting physical activity, as no filler items were presented in cases when participants said they were inactive.

The design of the study and data collection may also have impacted the variability in physical activity and overall level of activity included in analyses. For example, some participants engaged in physical activity while at work, usually on their lunch breaks. To maintain the temporal precedence of the variables in the study (e.g., work, then non-work), only physical activity taking place outside of working hours was included. This necessitated the exclusion of 101 instances of physical activity from analyses, and thus several participants who only were active during their lunch breaks were completely excluded from some analyses. Additionally, because the focus of the present study was on work days, physical activity engaged in on non-work days was not captured. It is entirely possible that busy participants with demanding jobs may only schedule one workday per week to exercise, or none, but are quite active during their non-work days.

Lastly, although preexisting habits for physical activity (and healthy eating) were included as controls in supplemental analyses, these variables asked only about general habits, with items such as “Physical activity is something I have been doing for a long time” and “Physical activity is something I would find hard not to do.” Thus, although there is one item (of twelve) asking about routines, by and large this variable does not capture scheduling or any aspect of a true structured regimen, but rather assessed the overall prevalence and importance of the health behaviors in participants’ lives. This is an important distinction that is made in research by exercise scholars investigating numerous interventions designed to promote physical activity, and the barriers to doing so. Overall, structure is an important component to continued engagement in physical activity (Marcus et al., 2000). Related to the present study’s findings, it is possible that for some participants, energy depletion due to work was never severe enough for them to skip a pre-scheduled physical activity (or a pre-planned healthy meal). Indeed, numerous participants reported attending group fitness classes such as Zumba, BodyPump, and cycling classes, many of which are pre-paid and/or have other social consequences for lack of attendance. Thus it makes sense that for these instances of physical activity, participation may be protected from the hypothesized negative effects of energy depletion by many other factors, attenuating the expected relationships between energy depletion and physical activity.

Future Temporal Focus

Hypothesis 7 proposed that between-person differences in future temporal focus would moderate the relationships between daily energy depletion and physical activity and unhealthy eating, such that relationships would be weaker for employees with a stronger future temporal focus due to their predisposition to have their attention drawn away from a state of energy depletion, and instead focusing to the future long-term benefits of health behaviors and/or consequences of unhealthy behaviors. No relationships between future temporal focus and health behaviors emerged in the present study, and the proposed cross-level interactions were also not found. Similar to the lack of findings for trait mindfulness, timing and level of analysis issues may be at play. In the present study, future temporal focus was assessed as a between-person trait variable, serving as a proxy for a more in depth analysis of the decision making process that takes place when an individual considers engaging in a healthy or unhealthy behavior. Thus, there may be more nuanced day-to-day differences in how energy depletion influences individuals' decisions to eat healthily and to engage in physical activity beyond those captured by this simple between-person variable.

Lack of Mediation Effects

Hypothesis 6 proposed that, within individuals, daily energy depletion would mediate the relationships between daily emotional labor and daily health behaviors such that emotional labor would relate to health behaviors by depleting self-regulatory energy which in turn would negatively impact healthy behaviors also requiring self-regulation. No evidence of mediation was found, and the possible explanations for the lack of effects largely mirror those previously discussed for the primary relationships within the mediation model. Alternative explanations for the null effects also include the possibility of other mechanisms, including issues of time.

The present study's within-person design permits more confident inferences regarding the causal order of variables compared to cross-sectional designs, however, other daily covariates may still come into play. Regarding the overall model, experiences at work other than emotional labor may influence self-regulatory energy depletion, and after work, factors other than energy depletion may influence health behaviors. To further complicate the matter, these alternative explanations may lie at the between-person level (e.g., personality) or the within-person level (e.g., not having child care on some work days). First and foremost, emotional labor is not the only work-related experience that can be expected to reduce self-regulatory energy. The central tenets of Baumeister and colleagues' energy/strength model of self-control focus on a finite source of self-regulatory energy, and they propose that any act of exertion may deplete this energy and be followed by diminished capacity for self-regulation (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Baumeister, Vohs, & Tice, 2007; Muraven, Tice, & Baumeister, 1998). Many other forms of self-regulation can take place during the workday, all of which have the ability to impact self-regulatory energy. For example, internal emotion regulation, such as trying to move past an unpleasant emotion, requires self-regulation (Gross, 1998), and although perhaps related, would not be captured by the emotional labor variable unless the unpleasant emotion needed to be suppressed for an interaction with another person at work.

Similarly, behaviors at work, especially health behaviors at work, might deplete self-regulatory energy during the workday. For example, trying not to have a cigarette, or deciding between a tempting pizza over a protein-packed chicken and spinach salad for lunch, could have significant impacts on daily self-regulatory energy, and may vary both within- (day-to-day) and between-persons. Moving to health behavior outcomes, research on chronic dieters suggests that emotion regulation may be especially detrimental under conditions of chronic inhibition (Vohs & Heatherton, 2000), and studies of delayed gratification (Metcalfe & Mischel, 1999), especially related to eating behavior, suggest that time may play an important role. The present study examined self-regulatory depletion at the day-level, yet self-regulatory dynamics can occur in any time span, ranging from in the moment, to across a week, a month, or even a year for active attempts of delayed gratification. Thus, a person may purposely delay unhealthy eating (or purposely engage in physical activity) for several days and then intentionally eat unhealthily (or not engage in physical activity) on a predetermined day regardless of any emotional labor or self-regulatory energy depletion they experience on any given day. Thus, while findings of the present study demonstrated links between surface acting and energy depletion, and between energy depletion and physical activity, it is possible that emotional labor is only a small and perhaps unrelated portion of the self-regulatory energy depletion ultimately relating to the complex health behavior decision making process.

Theoretical Implications

Findings of the present study expand the literature in several important ways. The primary purpose of the current study was to establish a theoretically derived behavioral explanation for existing research linking work and health (e.g., Twisk et al., 1999) by demonstrating that characteristics of work that deplete self-regulatory resources negatively relate to the performance of health behaviors drawing on the same finite energy source. Although support for the mediational model was not found, several significant relationships at the within-person level provide support for the central tenets of Baumeister and colleagues' energy/strength model of self-control (Baumeister, Bratslavsky, Muraven, & Tice, 1998). The present study expands on their predominantly experimental lab-based paradigm by applying the theory to a within-person daily-diary design, thus testing these theoretical propositions in a real-world setting and sample. This is the important final step of a "full cycle" approach to theory development described by Mortenson and Cialdini (2010) in which the strict controls of laboratory-developed theories are eschewed. Additionally, the finding that depleted self-regulatory resources are associated with a non-emotionally focused outcome (physical activity) furthers the work by Vohs and Heatherton (2000) demonstrating the potential cross-domain nature of self-regulatory depletion. At a more general level, the results of the present study demonstrate strong support for resource drain theory (Edwards & Rothbard, 2000). Specifically, the emergence of cross-domain relationships in this methodologically rigorous study design highlights the continued importance of holistic cross-domain approaches to the study of work-life issues.

Despite the lack of main or moderating effects of between-person differences in future temporal focus, the significant primary relationships in the study do indicate that self-regulation based theories, such as Hall and Fong's (2007) Temporal Self-Regulation Theory (TST), are useful in conceptualizing and studying the intersection of work and health. Overall, the relative dearth of findings of the present study may serve to highlight the complex nature of decision-making and intertemporal choice involved in health behaviors (e.g., Loewenstein & Elster, 1992), and exist as a cautionary tale to future researchers wishing to examine these complex outcomes in rigorous designs incorporating work domain variables.

Results of the present study also expand the nomological network by extending the scope of emotional labor outcomes to include important behaviors that directly impact health, quality of life, and work role performance. Additionally, this study provides further evidence for the expansion of the work-family conflict construct to also include health behaviors. Health behaviors, such as physical activity and eating, are primary determinants of health, thus exploring relationships between aspects of work and specific health behaviors is important to fully understand links between work and health outcomes. Further emphasizing their importance and relevance to work-family conflict, health behaviors can be role-modeled by employees' children within the family domain, and impact their health as well. Thus for research examining employees' cross-domain, work-related health behavior outcomes, families are important stakeholders in addition to the individual employee and their employer (Johnson & Allen, 2013).

Practical Implications

In addition to building on existing theory, results of the current study also have useful practical implications for employees and their employing organizations. First, these results, along with previous research, suggest that emotional labor at work is detrimental to employees. The present study findings demonstrate that surface acting is related to energy depletion using a rigorous within-person design, and previous meta-analytic work has demonstrated that both surface and deep acting are associated with numerous negative physical and psychological outcomes for employees (Hülsheger & Schewe, 2011). These results, combined with Hülsheger and Schewe's findings that surface acting is negatively related to task performance and customer satisfaction, paint a somewhat troubling picture for organizations concerned with employee well-being and the bottom line. To ameliorate the potentially negative consequences of self-regulatory depletion among employees related to emotional labor, organizations could provide on-the-job training to better equip employees with the skills necessary to meet organizational display rules, or provide information about the benefits and efficacy of health behaviors, which research shows are primary motivators of health behaviors (Jayanti & Burns, 1998). Additionally, frequent job analysis could ensure that emotional display rules are in line with the needs of the job in order to avoid cases in which emotional labor is relatively superfluous.

Finally, the lack of support for the full mediation model, despite significant relationships between surface acting and energy depletion and energy depletion and physical activity, further suggests the need for individuals to think in more holistic ways about how both their work and non-work lives may interact and impact their health and health behaviors. Time-based costs of work are typically at the forefront of individuals' minds as hindrances to healthy behavior (Courneya & Hellsten, 1998), however, employees may be less aware of the impact on health behaviors that other aspects of their jobs may have (Johnson & Allen, 2013). Results of the present study do not support the sound theoretical and somewhat commonsensical notion that self-regulatory depletion due to emotional labor is related to health behaviors. This lack of findings suggests that both employees and employers may be wise to challenge traditional explanations related to health behaviors and explore alternatives when attempting to improve behavioral health.

Limitations

In addition to issues already raised in previous sections, there are several more general limitations inherent to the study related to measures and measurement, sampling, and technical issues that should be considered when interpreting findings.

Measures and measurement. First, data were collected only via self-report, an approach that often draws concerns regarding bias resulting from common methods. Spector (2006) notes that the problem of common method variance is often overstated, and that data should be collected in a manner consistent with the research questions of interest. In the current study, emotional labor and self-regulatory energy are most appropriately assessed via self-report, as no other individual would have the knowledge to accurately describe the expression or suppression of felt emotions nor the experience of physical or psychological fatigue. Similarly, the health behavior variables are appropriately measured by self-report due to the often independent nature of physical activity, and, for the predominantly single sample, eating behavior. Given the time constraints and desire to reduce participation fatigue, self-report was the most appropriate method of data collection. Several alternative data collection strategies, specifically related to health behaviors, are described in the subsequent section on future research directions.

Next, some study measures were shortened or adapted for the daily diary context, and yet other variables were collected only at the between-person level. These decisions were made to reduce the amount of time participants spent completing each survey and thus increase compliance and reduce careless responding or "satisficing", two measurement reactivity problems common with intensive or overly burdensome daily diary studies (Barta et al., 2012). In the present study, only one shortened measure, the Profile of Mood States (POMS; McNair, Lorr, & Droppleman, 1992), specifically modified for use in diary studies (Cranford et al., 2006), was used. Other study-developed measures were designed to reduce the burden on participants (Iida, Shrout, Laurenceau, & Bolger, 2012), resulting in less rich data than would otherwise have been collected without time constraints. For example, the list of unhealthy foods could have been more comprehensive, and ideally, a full food diary for each day would have been captured to permit full exploration of the aforementioned issues related to delayed gratification. Data on decision-making regarding eating behavior, specifically during the workday, to account for this additional potential source of self-regulatory depletion (e.g., wanted unhealthy lunch, but chose health lunch instead) would also have been interesting, but too time consuming for participants to provide. Based on time-stamp data from the survey, the unhealthy eating diary was already the most time-consuming portion of any survey, with some participants spending up to ten minutes each night reflecting and compiling detailed responses. As previously mentioned, the study developed shortened measures for physical and psychological energy depletion used to investigate Research Question 1 exhibited lower reliability compared to the other daily measures. Future scale development initiatives, using a larger pool of items, are warranted to enhance the validity of within-person research assessing self-reported energy levels.

As previously touched upon, trait mindfulness and future temporal focus are two variables measured only in the baseline survey that could have alternatively been collected in some other form at the daily level. These decisions were also made to reduce the time burden of the daily surveys. For example, by assessing mindful states throughout the day, a day-level mean for mindful states could have been computed. It is possible that participants' levels of mindful states may vary day to day (e.g., waking up and doing yoga or meditating before work one day, but not on another), and relate to emotional labor, energy, and decisions to engage in health behaviors.

Lastly, another topic related to measurement that has been discussed in previous sections is the issue of time. While the within-person design used in this study has methodological advantages over a cross-sectional study, there are still limitations associated with time-based analysis decisions which limit the ability to draw causal conclusions. For example, matters regarding timing within and across days have been addressed (e.g., physical activity and unhealthy eating at work), but it is also possible that some relationships explored in the present study actually play out on a much longer timeline. It may be that the impact of self-regulatory depletion on health behaviors is more cumulative, or significantly lagged such that days or even weeks of emotional labor and subsequent self-regulatory energy depletion are required before a significant influence on eating behavior is observed.

Sampling. The combined convenience and snowball sampling approach used in the present study resulted in a diverse and unique sample of employees from a wide range of occupations, life stages, and backgrounds. Via examination of open-ended responses, there were several groups that appeared to be oversampled in the study, for example, members of a local running group, and employees of a specific education institution department. Additionally, casual remarks in open-ended responses and email communication with participants indicated that spouse or partner participation may have occurred. These characteristics of the sample introduce shared variance that is not accounted for in the analyses. Lastly, beyond a visual check of responses for patterns and the removal of cases as described in the Method section above, no additional checks or controls for data integrity (e.g., filler items to “catch” respondents) were included. The wide variety in survey completion times suggests that some participants may have spent more time carefully completing the surveys than others. Given these limitations, the generalizability of the findings is questionable, and future research should replicate this work using alternative samples and sampling methods.

Lastly, some results may have been attenuated by not restricting the sample to occupations traditionally characterized by high emotional labor demands. Emotional labor research has almost exclusively been carried out using samples of specific occupations with a high prevalence of service encounters (e.g., hotel frontline workers) or service relationships (e.g., nurses). To illustrate, in the Hülsheger and Schewe (2011) meta-analysis, of 47 primary studies including a relationship between surface acting and emotional exhaustion and 38 studies including a relationship between deep acting and emotional exhaustion, only 8 (17%) and 10 (26%) studies, respectively, were from general samples or occupations without traditional service orientations. While researchers have predominantly studied within these contexts, emotional labor can occur between any actors in the work setting, and the present study answers recent calls to explore the emotional labor of employees in a broad array of non-solitary and non-service oriented occupations (Ashforth & Humphrey, 2013; Ashkanasy & Daus, 2013). This sampling approach can be viewed as a strength in that it expands the generalizability of emotional labor research. Alternatively, participants with fewer emotional labor demands, or less detrimental or chronic emotional labor, as may be the case in the current sample, may have attenuated effects that perhaps would have been evident in a more traditional service-oriented sample of employees.

Technical issues. Small technical limitations are also worthy of note. A fully mobile data collection was ultimately cost prohibitive, and surveys were instead designed to be accessed via participants' own smartphones, tablets, or traditional computer web browsers, with participants still encouraged to use their mobile devices to increase compliance by reducing the time gap between, for example, the end of their work and completion of the end of workday (Time 2) survey. The ultimate goal of a daily diary design is to reduce retrospective recall of events and behaviors, while also being able to control the temporal order in which data are collected (Reis, 2012). Ultimately only 25% of surveys were submitted from a mobile device, and over 75% of those were before bed (Time 3) surveys. Based on participant feedback, this lack of preference for mobile devices was due to the fact that the mobile versions of the surveys took significantly longer to complete. Although timing compliance in the present study was acceptable and in line with similar studies, a fully mobile and more frequent sampling approach throughout the day would have further ameliorated any retrospective biases by reducing the time gap between the experience of an event and data collection (Connor & Lehman, 2012).

Future Directions

The current study is one of the first attempts to examine the mechanisms linking emotional labor and health behaviors, which are primary predictors of employee health. As such, the results (and lack thereof) provide numerous avenues for future research in addition to those mentioned above. First, future research should further expand the nomological network to examine relationships between emotional labor, self-regulatory energy, and additional behavioral health outcomes that might rely on self-regulatory resources, such as smoking and alcohol consumption. Researchers have investigated links between general psychological strain from work and various negative health behaviors (Aldana, Sutton, Jacobson, & Quirk, 1996; Hellerstedt & Jeffery, 1997; Ng & Jeffery, 2003; Pak, Olsen, & Mahoney, 2000; Steffy & Laker, 1991), and future research should now focus in on more specific characteristics of work that might be especially detrimental, such as emotional labor. Additionally, models could be expanded to include more distal health outcomes such as physical symptoms, illnesses, mortality, and body mass index.

Along with examining a wider array of health behaviors, future research could also examine links between emotional labor and different aspects of health behavior processes. Specifically, the notion that emotional labor and self-regulatory depletion may be more strongly related to individuals' intentions to behave healthily and/or their ability to execute those intentions. Research by Payne, Jones, and Harris (2002, 2005) based on the Theory of Planned Behavior (TPB; Azjen, 1991), on which Hall and Fong's (2007) Temporal Self-Regulation Theory (TST) is based, found that employees in high-strain jobs engaged in less physical activity than those in low-strain jobs, controlling for intentions, and among those who intended to exercise, employees who failed to do so had more demanding jobs and felt less control over executing their intentions. A 2010 daily diary follow-up study demonstrated further support that high-strain jobs disrupt employees' abilities to carry out their intentions to exercise. In the present study, actual physical activity was only reported on 25% of valid diary days. It is likely that among the days without physical activity reported were days on which employees intended to exercise. By focusing on intentions to engage in healthy behaviors, and the execution of these intentions, additional variance in the behavioral outcome is introduced and more enlightening findings may emerge. This type of analysis may also bring to light a lagged effect such that emotional labor and self-regulatory depletion on Day X relate to intentions to engage in health behaviors on Day X+1. Research focused on intentions could also begin exploring the notion that for some employees, physical activity may be used as a coping mechanism to induce positive affect (Arent, Landers, & Etmier, 2000; McDonald & Hodgdon, 1991) after a challenging day at work.

The roles of trait mindfulness and future temporal focus were examined at the between-person level in the present study, and future research should also explore additional moderators in the processes linking emotional labor and health behaviors. Existing research has demonstrated links between personality and both emotional labor (e.g., Liu, Perrewé, Hochwarter, & Kacmar, 2004) and health behaviors (e.g., Booth-Kewley & Vickers, 1994), and it is possible that personality characteristics also play a role in the larger process as a whole. Furthermore, additional attention might be paid to other trainable or knowledge-based moderators including instructions and guides for engaging in health behaviors. Examining these moderators or intervention mechanisms will help clarify results of the present study which did not find an indirect effect of emotional labor on health behaviors through the depletion of self-regulatory energy.

Lastly, future research can expand upon and clarify the present study findings through improved measurement and methodology. First, there are opportunities to develop more psychometrically sound measures for constructs explicitly for use at the daily, or repeated exposure, level. Although psychometric issues related to data collected in daily diary studies have been addressed in the literature (e.g., Cranford et al., 2006), less attention has been paid to the development of scales specifically intended for daily use. Future research would benefit from a more careful assessment of measurement reactivity (Barta et al., 2012) when using measures not originally designed for daily contexts, and from measures and administration methods explicitly designed to reduce measurement reactivity. For health behaviors such as physical activity, future research could employ the use of accelerometers and other mobile health measurement devices to obtain objective data. Similarly, as done in research by Gailliot and colleagues (2007), future studies could better assess self-regulatory energy depletion via blood glucose rather than self-report. Not only would these additional or alternative sources of data enhance the validity of studies of health behaviors, but these methods also have the benefit, in some cases, of reducing the burden on participants.

In a similar vein, future studies examining emotional labor and health behaviors using within-person approaches would be wise to design studies such that barriers to compliant participation are reduced. For example, in mobile data collection scenarios, apps could be designed to encourage more accurate and compliant reporting of data. Recent trends toward self-collected and monitored health data (Lupton, 2013), and “gamification” of fitness (e.g. McCallum, 2012) and other mundane tasks such as employee training, suggest that researchers could potentially improve the quality of all data collected, especially in burdensome and time intensive protocols, by making responding easier and compliance or completion fun. Changes in data collection methods and technologies are constant (e.g., the move from paper and pencil to computerized data collection), however, the current new crop of technologies, including mobile devices, touchscreens, wearables, and personalized feedback (Swan, 2012) provide unique opportunities for researchers studying health behaviors and outcomes to design truly novel studies of complex phenomena.

Conclusion

The present study sought to explore the process through which the regulation of emotions at work depletes self-regulatory resources and distally impacts physical activity and unhealthy eating. Overall, only surface acting was related to after work energy levels, and no differences in strength of relationships were found for study developed measures of psychological and physical energy depletion. After work energy depletion also related to less time and intensity spent on physical activity on physically active days, but no support for an overall mediated effect was found. No effects were found for unhealthy eating, or future temporal focus, while trait mindfulness did exhibit a positive main effect in some models. As one of the first attempts to examine the mechanisms linking emotional labor and health behaviors, this work highlights the complex nature of the relationships examined and the resultant need for both broader and more targeted research at multiple-levels of analyses to further explain the intricate story of work and health.

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APPENDICES

Appendix A: Informed Consent Form

Thank you for your interest in our study titled "Exploring the Energy Link between Emotion Regulation at Work and Health Behaviors" (University of South Florida eIRB#11328). Before you learn more about the study, we would like to share some important information with you about participating.

Please read the information below carefully and decide if you would like to participate:

INFORMED CONSENT TO PARTICIPATE IN RESEARCH
Information to Consider Before Taking Part in this Research Study
eIRB#11328

Researchers at the University of South Florida (USF) study many topics. To do this, we need the help of people who agree to take part in a research study. This form tells you about this online research study.We are asking you to take part in a research study that is called: "Exploring the Energy Link between Emotion Regulation at Work and Health Behaviors."

The person who is in charge of this research study is Ryan C. Johnson, M.A. This person is called the Principal Investigator. However, other research staff may be involved and can act on behalf of the person in charge. He is being guided in this research by Dr. Tammy Allen. The research will be done by collecting your responses online through electronic surveys. This research is being sponsored by the NIOSH funded Sunshine Education and Research Center at the University of South Florida.

PURPOSE OF THE STUDY
The purpose of this study is to investigate the relationship between regulating emotions at work, energy, and health behaviors. This study is being conducting as part of a doctoral student dissertation. You are being asked to participate because you may meet the eligibility requirements for participation.

STUDY PROCEDURES
If you take part in this study, you will be asked to (A) complete a short 20-minute survey today, and complete a 15-minute online training session to receive instructions for the rest of the study, (B) complete short questionnaires three (3) times each day for two (2) work weeks: one before work (2 minutes), one immediately after work (5 minutes), and one just before bed (10 minutes), and (C) complete a 20-minute follow-up survey two weeks after completion of the previous (B) two week daily data collection.

VOLUNTARY PARTICIPATION/WITHDRAWAL
You should only take part in this study if you want to volunteer. You should not feel that there is any pressure to take part in the study. You are free to participate in this research or withdraw at any time. There will be no penalty or loss of benefits you are entitled to receive if you stop taking part in this study. Your decision to participate or not to participate will not affect your student status (course grade) or job status.

ALTERNATIVES
You have the alternative to choose not to participate in this research study.

BENEFITS
We are unsure if you will receive any benefits by taking part in this research study.

RISKS OR DISCOMFORT
This research is considered to be minimal risk. That means that the risks associated with this study are the same as what you face every day. There are no known additional risks to those who take part in this study.

COMPENSATION
You will be paid $75 in the form of Amazon.com gift codes if you complete all the scheduled study sessions. If you withdraw for any reason from the study before completion, you will be paid $15 for participating in any portion of the study today, $45 for also participating in any portion of the daily diary segment of the study, and the remaining $15 for completing the follow-up survey. Participants completing the entire study will be entered into a drawing to win an additional $100 Amazon.com gift code. The Amazon.com gift codes can be used for any purchase or service at Amazon.com.

PRIVACY & CONFIDENTIALITY
We must keep your study records as confidential as possible. It is possible, although unlikely, that unauthorized individuals could gain access to your responses because you are responding online. Your results will be password protected and may be stored for up to 5 years after the Final Report is filed with the IRB. However, certain people may need to see your study records. By law, anyone who looks at your records must keep them completely confidential. The only people who will be allowed to see these records are:

(1) The research team, including the Principal Investigator, the Advising Professor, and all other research staff.
(2) Certain government and university people who need to know more about the study. For example, individuals who provide oversight on this study may need to look at your records. This is done to make sure that we are doing the study in the right way. They also need to make sure that we are protecting your rights and your safety. These include:
(a) The University of South Florida Institutional Review Board (IRB) and the staff that work for the IRB. Other individuals who work for USF that provide other kinds of oversight may also need to look at your records.
(b) The Department of Health and Human Services (DHHS).

We may publish what we learn from this study. If we do, we will not let anyone know your name. We will not publish anything else that would let people know who you are. You can print a copy of this consent form for your records or contact XXXX@gmail.com for a PDF copy.

Appendix B: Complete Measures

A. Demographics

What is your age in years?
What is your gender? *(Male/Female/Prefer not to answer)*
What is your ethnicity? *(White/Asian/Black or African American/Hispanic or Latino/American Indian or Alaska Native/Native Hawaiian or Other Pacific Islander/Other)*
What is your marital status? *(Single/Married/Living with Partner)*
How many children under the age of 18 live with you?
What is the highest level of education you have completed? *(Some Pre-High School/Some High School/High School/Post-Secondary, Trade, or Vocational School/Some College/Bachelor's Degree/Master's Degree/Doctoral or Other Professional Degree)*
Being as specific as possible, what is your job title, and in what industry or type of occupation do you work?
How long have you been in your current occupation in years?

B. Emotional Labor

Instructions: Please indicate the extent that you engaged in the following behaviors *today at work* by circling the appropriate number from 1 to 5 using the scale below.

1	2	3	4	5
Not at all	Sometimes	Often	Most of the time	All the time

Today at work I…

Resisted expressing my true feelings.
Pretended to have emotions that I did not really have.
Hid my true feelings about a situation.
Made an effort to actually feel the emotions that I needed to display to others.
Tried to actually experience the emotions that I needed to display to others.
Really tried to feel the emotions that I have to show as part of my job.

C. Energy

Instructions: Please indicate the extent you agree or disagree with each of the following using the scale below.

1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

*Physical Energy**
My body feels weak. (FS adapted; MFSI adapted)
My head feels heavy. (MFSI)
My body feels heavy all over. (MFSI)
I feel sleepy/drowsy. (FS adapted)
I feel very energetic. (MBI reversed; FS item 'Are you lacking in energy')
I have less strength in my muscles. (FS adapted)
I feel physically drained (from my work). (MBI adapted)

Psychological/Mental Energy
I have difficulty concentrating/thinking clearly. (FS)
I have lost interest in the things I usually enjoy. (FS)
I feel emotionally drained (from my work). (MBI)
I feel like I'm at the end of my rope. (MBI)
I feel burned out (from my work). (MBI)
I feel used up (at the end of the work day). (MBI)
I am not able to concentrate. (MFSI; FS adapted)

*Original item sources noted in parentheses. FS = Fatigue Scale (Chalder et al., 1993); MBI = Maslach Burnout Inventory; MFSI = Multidimensional Fatigue Symptom Inventory (Stein, Martin, Hann, & Jacobsen, 1998).

Profile of Mood States (POMS)
(Adapted for diary studies by Cranford, Shrout, Iida, Rafaeli, Yip & Bolger, 2006)

Instructions: Using the scale below, please indicate the extent to which you are currently feeling or experiencing the following moods.

0	1	2	3	4
Not at all	A little	Moderately	Quite a bit	Extremely

Fatigue
Worn out
Fatigued
Exhausted

D. Physical Activity

Since your last survey response, (end of workday/end of day), have you engaged in any forms of physical activity? (Yes/Maybe/No)

If you answered Yes or Maybe, please describe the activity you engaged in. If you engaged in more than one instance of physical activity, please record each instance separately.

Activity 1:

Describe the physical activity you engaged in, being as specific as you can.
At about what time did you begin the activity?
About how long did the activity last, in minutes?
How intense would you say the activity was for you? (Mild/Moderate/Strenuous)

Activity 2:

Describe the physical activity you engaged in, being as specific as you can.
At about what time did you begin the activity?
About how long did the activity last, in minutes?
How intense would you say the activity was for you? (Mild/Moderate/Strenuous)

(Up to 4 instances of physical activity could be reported in this fashion, followed by an open-ended item allowing details of additional instances to be reported.)

E. Unhealthy Eating

Next, we'd like you to tell us about the foods and beverages you have consumed today since you left work. Not all food you have consumed since leaving work will be on the list, and we do not need to know about everything you ate. If something you ate or drank seems to fit in more than one category, only list it once, making your best guess which category it should be entered into. However, if there are items that you feel might fit into one or more of the categories listed, but are not sure, describe it in the “Other” box at the bottom of the page.

For any food/beverage you did consume, please look at the sample serving size, and then choose the number of those servings that you consumed since leaving work.

For example, if you drank two regular cans of Pepsi since leaving work, you would select “2 servings” for “Non-diet ‘regular’ soda/pop” since the serving size described for that item is “1 can (12 ounces).” If you did not consume any food/beverages from a given category, select “Did not consume.” Remember, if you ate or drank multiple different items from the same category, be sure to add them together when reporting how many servings you consumed in total. For example, in the “Cheese, butter, or cream-based sauces/dips/spreads” category, a serving size is defined as “1/4 cup, or about the size of a golf ball.” If you had a small order of chips with nacho cheese as a snack (1 serving), and a larger portion of pasta with alfredo sauce for dinner (3 servings) you would report a total of 4 servings for that category (1 nacho cheese + 3 alfredo sauce = 4 servings). In this example, you would also report 1 serving in the “Chips and related bagged snack foods” category since the nachos included both chips and cheese sauce.

We understand that you may not be able to remember and report exact amounts of the foods and beverages you consumed, but do your best to estimate. Some people find it easiest to use a piece of paper to write down everything they've eaten since leaving work and then filling out this portion of the survey.

Beverages (include any beverages used as mixers in alcoholic and coffee beverages):
Non-diet "regular" soda/pop (e.g., Coca-Cola Classic)
Full calorie energy/sports drinks (e.g., PowerAid, RedBull)
Sugar-sweetened fruit juices/cocktails/mixers (e.g., cranberry juice cocktail, Hi-C, piña colada or margarita mix)
Full-fat (whole) milk, cream (including whipped), or half-and-half

Foods:
Cakes, cookies, pastries, and donuts (e.g., cupcake, coffee cake)
Fried foods (e.g., french fries, fried chicken, mozzarella sticks, fried vegetables)
Chips and related bagged snack foods (e.g., Doritos, Cheetos, Combos)
Cheese, butter, or cream-based sauces/dips/spreads (e.g., nacho cheese, alfredo sauce, garlic butter, margarine)
Pizza (with cheese and/or meat)
Sausages, bacon, regular hot dogs, ribs, regular (less than 85% lean) ground beef
Ice cream, frozen full-fat yogurt, or frozen dairy desserts/novelties (e.g., Klondike bar, popsicle)
Candies and candy bars (e.g., M&Ms, Snickers)

F. Pre-existing Habit for Physical Activity and Unhealthy Eating (based on Verplanken & Orbell, 2003)

Instructions: Please indicate the extent you agree or disagree with each of the following using the scale below.

1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

(Eating healthily/Physical activity) is something…

1. I do frequently.
2. I do automatically.
3. I do without having to consciously remember.
4. that makes me feel weird if I do not do it.
5. I do without thinking.
6. that would require effort not to do it.
7. that belongs to my (daily, weekly, monthly) routine.
8. I start doing before I realize I'm doing it.
9. I would find hard not to do.
10. I have no need to think about doing.
11. that's typically "me."
12. I have been doing for a long time.

G. Trait Mindfulness (Brown & Ryan, 2003)

Instructions: Below is a collection of statements about your everyday experience. Using the 1 to 6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what *really reflects* your experience rather than what you think your experience should be.

1	2	3	4	5	6
Almost Always	Very Frequently	Somewhat Frequently	Somewhat Infrequently	Very Infrequently	Almost Never

I could be experiencing some emotion and not be conscious of it until some time later.
I break or spill things because of carelessness, not paying attention, or thinking of something else.
I find it difficult to stay focused on what is happening in the present.
I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.
I tend not to notice feelings of physical tension or discomfort until they really grab my attention.
I forget a person's name almost as soon as I've been told it for the first time.
It seems I am "running on automatic" without much awareness of what I'm doing.
I rush through activities without being really attentive to them.
I get so focused on the goal I want to achieve that I lose touch with what I am doing right now to get there.
I do jobs or tasks automatically, without being aware of what I'm doing.
I find myself listening to someone with one ear, doing something else at the same time.
I drive places on "automatic pilot" and then wonder why I went there.
I find myself preoccupied with the future or the past.
I find myself doing things without paying attention.
I snack without being aware that I'm eating.

H. Future Temporal Focus (Shipp, Edwards, & Lambert, 2009)

Instructions: Using the 1 to 7 scale below, please indicate how frequently or infrequently you engage in the following behaviors.

1	2	3	4	5	6	7
Never	--	Sometimes	--	Frequently	--	Constantly

I think about what my future has in store
I think about times to come
I focus on my future
I imagine what tomorrow will bring for me

Appendix C: HLM Equations for Hypothesis Testing

Key: Energy_Time1 = daily POMS energy measured at Time 1 (before work)
Energy_Time2 = daily POMS energy measured at Time 2 (after work)
Energy_Diff = daily change in energy from Time 1 (before work) to Time 2 (after work)
Phys_Energy_Time1 = daily physical energy measured at Time 1 (before work)
Psych_Energy_Time1 = daily psychological energy measured at Time 1 (before work)
Phys_Energy_Time2 = daily physical energy measured at Time 2 (after work)
Psych_Energy_Time2 = daily psychological energy measured at Time 2 (after work)
Emo_Labor(_Surface/_Deep) = daily emotional labor measured at Time 2 (after work)
Emo_Labor_MEAN = person-level mean for emotional labor variables
Phys_Activity = daily physical activity
Trait_Mindful = trait mindfulness measured at baseline
Temp_Focus = future temporal focus measured at baseline
PhysAct_Habit = habit for physical activity
β = level-1 coefficients (intercepts and slopes)
r = level-1 error
γ = level-2 coefficients (intercepts and slopes)
u = level-2 error

Note: Equations for H4-7 are presented only for the Physical Activity outcome; however, equations for Unhealthy Eating are identical. All analyses were conducted using all three energy conceptualizations, regardless of the variable used as an example in the equations below.

H1: Within individuals, daily emotional labor at work will positively predict daily energy depletion.

Note: The model below includes the person-level mean for the primary predictor, as described in the section on supplemental analyses. All analyses were conducted with, and without these additional level-2 variable.

<u>Level 1 Model</u>
$\text{Energy\_Time2}_{ij} = \beta_{0j} + \beta_{1j}*(\text{Energy\_Time1}) + \beta_{2j}*(\text{Emo\_Labor}) + r_{ij}$

<u>Level 2 Models</u>
$\beta_{0j} = \gamma_{00} + \gamma_{01}*(\text{Emo\_Labor\_MEAN}) + u_{0j}$
$\beta_{1j} = \gamma_{10} + u_{1j}$
$\beta_{2j} = \gamma_{20} + u_{2j}$

<u>Mixed Model</u>
$\text{Energy\_Time2}_{ij} = \gamma_{00} + \gamma_{01}*(\text{Emo\_Labor\_MEAN}) + \gamma_{10}*(\text{Energy\_Time1}) + \gamma_{20}*(\text{Emo\_Labor}) +$
$+ u_{1j}*(\text{Energy\_Time1}) + u_{2j}*(\text{Emo\_Labor}) + u_{0j} + r_{ij}$

Note: The following model is an example of the supplemental analyses conducted for all hypotheses using the energy depletion variable (difference between Time 2 and Time 1 energy levels) rather than controlling for before work (Time 1) energy levels.

Level 1 Model
Energy_Diff$_{ij}$ = β_{0j} + β_{1j}*(Emo_Labor) + r_{ij}

Level 2 Models
$\beta_{0j} = \gamma_{00} + u_{0j}$
$\beta_{1j} = \gamma_{10} + u_{1j}$

Mixed Model
Energy_Diff$_{ij}$ = γ_{00} + γ_{10}*(Emo_Labor) + u_{1j}*(Emo_Labor) + u_{0j} + r_{ij}

H2: Within individuals, the relationships between surface acting and energy depletion at work will be stronger than the relationships between deep acting and energy depletion at work.

Level 1 Models (analyzed separately in sequence)
Energy_Time2$_{ij}$ = β_{0j} + r_{ij}
Energy_Time2$_{ij}$ = β_{0j} + β_{1j}*(Energy_Time1) + r_{ij}
Energy_Time2$_{ij}$ = β_{0j} + β_{1j}*(Energy_Time1) + β_{2j}*(Emo_Labor_Surface) + r_{ij}
Energy_Time2$_{ij}$ = β_{0j} + β_{1j}*(Energy_Time1) + β_{2j}*(Emo_Labor_Surface) + β_{3j}*(Emo_Labor_Deep) + r_{ij}

Level 2 Models
$\beta_{0j} = \gamma_{00} + u_{0j}$
$\beta_{1j} = \gamma_{10} + u_{1j}$
$\beta_{2j} = \gamma_{20} + u_{2j}$
$\beta_{3j} = \gamma_{30} + u_{3j}$

Full Mixed Model
Energy_Time2$_{ij}$ = γ_{00} + γ_{10}*(Energy_Time1) + γ_{20}*(Emo_Labor_Surface) + γ_{30}*(Emo_Labor_Deep) + u_{1j}*(Energy_Time1) + u_{2j}*(Emo_Labor_Surface) + u_{3j}*(Emo_Labor_Deep) + u_{0j} + r_{ij}

RQ1: Do physical energy depletion and psychological energy depletion differentially relate to emotional labor?

Note: In these models, Level 1 simply serves to create the within-person means for physical and psychological energy depletion based on responses to individual items. These means are then "brought up" to Level 2 due to the removal of the Level 1 intercept. The β_{120} and β_{220} coefficients are constrained to be equal, then allowed to vary, in these analyses. In these models, level-2 is the within-person level, while level-3 becomes the between-person level. ψ = level-1 coefficients, π = level-2 coefficients, β = level-3 coefficients. ε = level-1 error, e = level-2 error, and r = level-3 error.

Level 1 Model
Item_Response$_{mti}$ = ψ_{1ti}*(Phys_Energy_Time2) + ψ_{2ti}*(Psych_Energy_Time1) + ε_{mti}

Level 2 Models
$\psi_{1ti} = \pi_{10i} + \pi_{11i}$*(Phys_Energy_Time1) + π_{12i}*(Emo_Labor) + e_{1ti}
$\psi_{2ti} = \pi_{20i} + \pi_{21i}$*(Psych_Energy_Time1) + π_{22i}*(Emo_Labor) + e_{2ti}

Level 3 Models
$\pi_{10i} = \beta_{100} + r_{10i}$
$\pi_{11i} = \beta_{110} + r_{11i}$
$\pi_{12i} = \beta_{120} + r_{12i}$
$\pi_{20i} = \beta_{200} + r_{20i}$
$\pi_{21i} = \beta_{210} + r_{21i}$
$\pi_{22i} = \beta_{220} + r_{22i}$

H3: Between individual differences in trait mindfulness will moderate the relationships between emotional labor and energy depletion, such that relationships will be weaker for employees with higher levels of trait mindfulness than for employees with lower levels of trait mindfulness.

Level 1 Model
Energy_Time2$_{ij}$ = $\beta_{0j} + \beta_{1j}$*(Energy_Time1) + β_{2j}*(Emo_Labor) + r_{ij}

Level 2 Models
$\beta_{0j} = \gamma_{00} + \gamma_{01}$*(Trait_Mindful) + u_{0j}
$\beta_{1j} = \gamma_{10} + u_{1j}$
$\beta_{2j} = \gamma_{20} + \gamma_{21}$*(Trait_Mindful) + u_{2j}

Mixed Model
Energy_Time2$_{ij}$ = $\gamma_{00} + \gamma_{01}$*(Trait_Mindful) + γ_{10}*(Energy_Time1) + γ_{20}*(Emo_Labor) + γ_{21}*(Emo_Labor*Trait_Mindful) + u_{1j}*(Energy_Time1) + u_{2j}*(Emo_Labor) + $u_{0j} + r_{ij}$

H4: Within individuals, daily emotional labor will negatively relate to daily physical activity and healthy eating.

Level-1 Model
Phys_Activity$_{ij}$ = $\beta_{0j} + \beta_{1j}$*(Emo_Labor) + r_{ij}

Level-2 Models
$\beta_{0j} = \gamma_{00} + u_{0j}$
$\beta_{1j} = \gamma_{10} + u_{1j}$

Mixed Model
$\text{Phys\_Activity}_{ij} = \gamma_{00} + \gamma_{10}*(\text{Emo\_Labor}) + u_{1j}*(\text{Emo\_Labor}) + u_{0j} + r_{ij}$

H5: Within individuals, daily energy depletion will negatively relate to daily physical activity and healthy eating.

Note: The model below is an example of the supplemental analyses conducted for all hypotheses using the energy depletion variable (difference between Time 2 and Time 1 energy levels) rather than controlling for before work (Time 1) energy levels. All analyses predicting health behavior outcomes were also conducted by entering both Time 1 and Time 2 energy level variables as predictors.

Level-1 Model
$\text{Phys\_Activity}_{ij} = \beta_{0j} + \beta_{1j}*(\text{Energy\_Diff}) + r_{ij}$

Level-2 Models
$\beta_{0j} = \gamma_{00} + u_{0j}$
$\beta_{1j} = \gamma_{10} + u_{1j}$

Mixed Model
$\text{Phys\_Activity}_{ij} = \gamma_{00} + \gamma_{10}*(\text{Energy\_Diff}) + u_{1j}*(\text{Energy\_Diff}) + u_{0j} + r_{ij}$

H6: Within individuals, daily energy depletion will mediate the relationship between daily emotional labor and daily physical activity and healthy eating.

Level-1 Models
$\text{Phys\_Activity}_{ij} = \beta_{0j} + \beta_{cj}*(\text{Emo\_Labor}) + r_{ij}$
$\text{Phys\_Activity}_{ij} = \beta_{0j} + \beta_{c'j}*(\text{Emo\_Labor}) + \beta_{bj}*(\text{Energy\_Diff}) + r_{ij}$
$\text{Energy\_Diff}_{ij} = \beta_{0j} + \beta_{aj}*(\text{Emo\_Labor}) + r_{ij}$

Level-2 Models
$\beta_{0j} = \gamma_{00} + u_{0j}$
$\beta_{cj} = \gamma_{c0} + u_{cj}$
$\beta_{c'j} = \gamma_{c'0} + u_{c'j}$
$\beta_{bj} = \gamma_{b0} + u_{bj}$
$\beta_{aj} = \gamma_{a0} + u_{aj}$

Mixed Models
$\text{Phys\_Activity}_{ij} = \gamma_{00} + \gamma_{c0}*(\text{Emo\_Labor}) + u_{cj}*(\text{Emo\_Labor}) + u_{0j} + r_{ij}$
$\text{Phys\_Activity}_{ij} = \gamma_{00} + \gamma_{c'0}*(\text{Emo\_Labor}) + \gamma_{b0}*(\text{Energy\_Diff}) + u_{c'j}*(\text{Emo\_Labor}) +$
$u_{bj}*(\text{Energy\_Diff}) + u_{0j} + r_{ij}$
$\text{Energy\_Diff}_{ij} = \gamma_{00} + \gamma_{a0}*(\text{Emo\_Labor}) + u_{aj}*(\text{Emo\_Labor}) + u_{0j} + r_{ij}$

H7: Between individual differences in temporal focus will moderate the relationship between daily energy depletion and physical activity and healthy eating, such that relationships will be weaker for employees with a stronger future focus.

Note: The model below incorporates pre-existing habits for physical activity as a level-2 covariate, as described in the section on supplemental analyses. All health behavior outcome analyses were conducted with and without these level-2 covariates.

<u>Level-1 Model</u>
$\text{Phys\_Activity}_{ij} = \beta_{0j} + \beta_{1j}*(\text{Energy\_Diff}) + r_{ij}$

<u>Level-2 Model</u>
$\beta_{0j} = \gamma_{00} + \gamma_{01}*(\text{Temp\_Focus}) + \gamma_{02}*(\text{PhysAct\_Habit}) + u_{0j}$
$\beta_{1j} = \gamma_{10} + \gamma_{11}*(\text{Temp\_Focus}) + u_{1j}$

<u>Mixed Model</u>
$\text{Phys\_Activity}_{ij} = \gamma_{00} + \gamma_{01}*(\text{Temp\_Focus}) + \gamma_{02}*(\text{PhysAct\_Habit}) + \gamma_{10}*(\text{Energy\_Diff}) + \gamma_{11}*(\text{Energy\_Diff}*\text{Temp\_Focus}) + u_{1j}*(\text{Energy\_Diff}) + u_{0j} + r_{ij}$

Appendix D: Institutional Review Board Letter of Exemption

UNIVERSITY OF SOUTH FLORIDA

DIVISION OF RESEARCH INTEGRITY AND COMPLIANCE
Institutional Review Boards, FWA No. 0000166
12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 33612-479
(813) 974-5638 • FAX (813) 974-561

February 12, 2013

Ryan Johnson
Psychology Dept.
Tampa, FL 33612

RE: **Exempt Certification** for IRB#: Pro00011328
Title: Exploring the Energy Link between Emotion Regulation at Work and Health Behaviors

Dear Mr. Johnson:

On 2/11/2013, the Institutional Review Board (IRB) determined that your research meets USF requirements and Federal Exemption criteria as outlined in the federal regulations at 45CFR46.101(b):

(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless:
(i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

As the principal investigator for this study, it is your responsibility to ensure that this research is conducted as outlined in your application and consistent with the ethical principles outlined in the Belmont Report and with USF IRB policies and procedures. Please note that changes to this protocol may disqualify it from exempt status. Please note that you are responsible for notifying the IRB prior to implementing any changes to the currently approved protocol.

The Institutional Review Board will maintain your exemption application for a period of five years from the date of this letter or for three years after a Final Progress Report is received, whichever is longer. If you wish to continue this protocol beyond five years, you will need to submit 1) a continuing review with Final Report selected and 2) a new application. Should you complete this study prior to the end of the five-year period, you must submit a request to close the study.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

John A Schinka, Ph.D.

John Schinka, PhD, Chairperson
USF Institutional Review Board