The Relative Effectiveness of Exercise Breaks on Resistance to Surface Acting Demands

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ABSTRACT

Exercise is important to employees' health and well-being. Exercise has been found to increase resources, foster resource replenishment, and increase happiness, which may make it effective in supporting employees against the harmful effects of depletion that arise from emotion regulation. Surface acting is a demanding behavior in which employees must fake their emotions to follow organizational display rules, but we know little about how exercise breaks can prevent harmful effects extending from this common job demand in some organizational settings (e.g., customer service). Fifty participants (N = 50) completed a surface acting task in which they listened to audio-recorded negative restaurant reviews and were instructed to respond to the reviews without conveying negative emotions across a 90-minute in-lab experimental session. Participants were randomly assigned to one of four break conditions (no break, a passive break, an exercise break, or a flaw essay break) which occurred halfway through the experimental session. Participants then completed the surface acting task again for 20 minutes. The surface acting task was effective in inducing emotion regulation. Participants who received a break experienced a decrease in depletion after the break, while participants who did not receive a break experienced an increase in depletion. However, no evidence was obtained to suggest that exercise breaks led to a reduction in depletion relative to other experimental conditions, nor a difference in mastery or positive affect. This thesis contributes to research on emotion regulation and exercise break by creating a new surface acting task that can easily be given in experiments. Also, this thesis suggests that organizations should ensure that employees are receiving breaks during worktime to guarantee employees maintain high productivity.

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GENERAL AUDIENCE ABSTRACT

Work is stressful as individuals may need to enhance, change, fake or suppress emotions through a process known as emotion regulation. One type of emotion regulation is surface acting in which individuals fake emotions to better align with organizational display rules. Surface acting has been found to contribute to emotional exhaustion, work-to-family conflict, feelings of inauthenticity and insomnia. Surface acting is common in customer jobs in which employees need to address customer concerns. Research has demonstrated that breaks can be used to help restore resources and reduce depletion. Specifically, exercise has been found to be beneficial in helping employees combat the harmful effects of emotion regulation and the depletion that comes with it. In this study, fifty participants completed a surface acting task in which they listened to audio-recorded negative restaurant reviews and were instructed to respond to the reviews without conveying negative emotions across a 90-minute in-lab experimental session. Participants were randomly assigned to one of four break conditions (no break, a passive break, an exercise break, or a flaw essay break) which occurred halfway through the experimental session. Participants then completed the surface acting task again for 20 minutes. The surface acting task was found to induce emotion regulation. Participants who received a break experienced a decrease in depletion after the break, while participants who did not receive a break experienced an increase in depletion. There was no evidence to suggest that exercise breaks were better at reducing depletion than the other conditions. This thesis suggests that organizations should ensure that employees are receiving breaks during worktime to guarantee employees maintain high productivity.

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Contents

1 Introduction

Physical activity and exercise are vital to our lives, both at home and in the workplace. Physical activity is defined by the World Health Organization as "any bodily movement produced by skeletal muscles that requires energy expenditure" (World Health Organization, 2018, para. 1). Exercise is a subcategory of physical activity that is goal-directed and structured in order to become physically fit (World Health Organization, 2018). Exercise has been shown to have numerous benefits to individual and organizational outcomes, such as enhanced positive mood (Steinberg et al., 1997), higher job satisfaction (Kirkcaldy et al., 1994), and reduced fatigue (Bergouignan et al., 2016).

A scientist-practitioner gap has arisen, in that organizations are trying to promote exercise in the workplace, but research has not yet validated many of the ideas behind these actions (Calderwood et al., 2016). Within-workday exercise breaks are particularly poorly understood, even though many organizational initiatives emphasize the benefits of increasing physical activity at work (Parks & Steelman, 2008; Aldana et al., 2005; Stave et al., 2003).

In this study, I aim to demonstrate the particular effectiveness of within-workday exercise breaks on supporting emotion regulation. Emotion regulation is when employees need to regulate or change their arousal and cognitions in order to show work-appropriate emotions (Grandey, 2000). Emotion regulation is an important work-related process because it predicts employee well-being and organizational effectiveness (Grandey & Gabriel, 2015).

This project has a strong focus on exercise and emotion regulation in order to make several key contributions to the literature. In particular, this project aims to extend research by providing a comparative analysis of exercise breaks, in comparison to other types of arrangements (e.g., a passive break, a flaw essay break, and no break), in the prediction of

resistance to the depleting effects of emotion regulation. Existing research has focused on the effects of exercise on the regulation of emotions in a clinical context (Goodwin et al., 2012; Bernstein & McNally, 2018), but these findings have not been extended to the context of work-related tasks and to non-clinical populations. I analyze how and why within-workday exercise breaks influence emotion regulation, focusing on a simulated work setting. Analyzing the pathways through which exercise influences emotion regulation will help to deepen our understanding of how to increase resistance to emotion regulation demands. These results will benefit organizations in building interventions that help employees to maintain their well-being in the face of emotion regulation demands, which are common in many organizational settings (Diefendorff et al., 2005).

1.1 Theoretical Background

Self-regulation is the use of willpower to override predominant thoughts, emotions, and behaviors (Inzlicht & Schmeichel, 2012). In modern work organizations there is an increasing emphasis on personal initiative, empowerment, and self-management, thus increasing the necessity of employee self-regulation on the job (Lord et al., 2010). Research has found that self-regulation is a limited resource. Depleted self-regulation, known as ego depletion, leads to impaired task performance on future self-regulation tasks (Baumeister & Heatherton, 1996). Ego depletion has been found to lead to decreased effort as well as increased perceived difficulty, negative affect, and fatigue (Hagger et al., 2010).

Self-regulation is theorized to be particularly important when employees need to enhance, change, fake, or suppress emotions, a process referred to as *emotion regulation* (Grandey, 2000). For example, a customer service employee may be confronted with an angry customer, instead of

returning the anger, they must regulate themselves and assist the customer to perform their job effectively.

The need for positive affective displays in the face of negative emotion inducing events places a high demand on the employee and their self-regulation (Grandey, 2003), which evidence suggests leads to key occupational health outcomes that reflect the depletion of energetic resources, such as emotional exhaustion (Trougakos et al., 2008). Emotion regulation ability has been found to contribute to job satisfaction and happiness (Mérida-López et al., 2019). Furthermore, emotion regulation is vital in the workplace from a performance perspective, as employees often need to regulate their emotions in order to meet their work goals, especially in jobs relating to customer service (Yagil & Medler-Liraz, 2017).

Surface acting is a commonly used strategy to accomplish emotion regulation when interacting with customers. Surface acting involves faking the emotions that one is feeling, in order to better align with emotional display rules of a given organizational situation (Grandey, 2000). In comparison, deep acting involves changing the actual feelings one experiences in order to better align with display rules (Grandey, 2000). Surface acting is not a sustainable way to regulate emotions over time, as this emotion regulation strategy has been linked to high emotional exhaustion, low job satisfaction, greater feelings of inauthenticity (Gabriel et al., 2015), work-to-family conflict, insomnia (Wagner et al., 2014), and customer service sabotage (Chi & Grandey, 2019). In this project, I focused on surface acting rather than deep acting in relation to within-workday exercise breaks because surface acting has been found to be more harmful than deep acting to individual and organizational outcomes (Gabriel et al., 2015; Wagner et al., 2014).

1.2 Literature Review: Exercise and Emotion Regulation

Previous research concerning exercise and emotion regulation has focused on (1) overall or habitual exercise and its impact on emotion regulation, (2) the effects of a single bout of exercise on emotion regulation, (3) exercise interventions, or (4) clinical populations. Previous work connecting exercise and emotion regulation has not yet been brought into the context of workplace processes, such as emotion regulation in customer service settings. Below, I review research on each of the four themes above to give a sense of the existing landscape of exercise and emotion regulation research.

Previous research has shown a positive association between emotion regulation and overall physical activity habits (Isasi et al., 2013), as well as a moderate indirect relationship between aerobic fitness and emotion regulation through heightened executive control (the ability to inhibit automatic responses, direct and shift attention, and monitor neurocognitive processes in order to achieve higher-order goals; Lott & Jensen, 2017). It has also been shown that greater average exercise time is associated with decreased anxiety and that exercise may serve as a buffer to persistent negative affect and benefit emotion regulation ability (Bernstein et al., 2019). Individuals who exercise more frequently also have been found to have fewer difficulties in engaging in goal-directed emotion regulation (Fasciano et al., 2020). Physiological measures have also been used to demonstrate that higher habitual exercise is associated with lower oxygenated hemoglobin in the prefrontal cortex when presented with emotion information (Giles et al., 2017). This lower oxygenated hemoglobin signifies that there is decreased regional cortical activation in response to this information, meaning less attention is being brought to the prefrontal cortex in the service of emotion regulation (Giles et al., 2017). Thus, while unexplored

in studies of work-related processes, broader research literatures suggest that exercise has numerous implications for effective emotion regulation.

Not only have researchers shown that overall exercise habits co-vary with improved emotion regulation, but investigators have also demonstrated the benefits of a single bout of exercise on supporting emotion regulation. For example, a study done by Bernstein and McNally (2017) had participants who initially experienced emotion regulation difficulties either stretch or jog for thirty minutes. The authors found that jogging helped to attenuate negative emotions. Another study by Bernstein and McNally (2018) found that when participants experienced high levels of rumination, and then cycled for thirty minutes, levels of negative affect decreased and levels of positive affect increased, where individuals who stretched for the thirty minutes did not experience these same effects. Hwang and colleagues (2019) also found benefits of walking for twenty minutes on emotion regulation, as measured by neural efficiency when women responded to sad emotion-eliciting cues. In sum, it has been found that even a single bout of exercise has benefits for emotion regulation, although this prediction has not yet been studied in the context of work as it will be in the current study.

Researchers have also studied the impact of exercise interventions on emotion regulation, although not in the context of the work breaks that are the focus of this thesis. For example, Delle Fave et al. (2018) started an intervention for elderly people to increase motor activity that included weekly exercise sessions for four months, each session lasting 45 minutes. Participants experienced significantly more adaptive emotion regulation strategies (e.g., problem focused and positive reappraisal coping) after the training intervention (Delle Fave et al., 2018). Another study highlighted the value of exercise in emotion regulation using a Chinese traditional exercise program, Qigong Yi Jinjing. Investigators found that this training led to increased ability to

emotionally regulate as well as an enhanced ability to express positive affect (Zhang et al., 2016). Thus, exercise programs and interventions have been shown to be effective in benefitting emotion regulation, although we do not yet know if these findings will translate to work breaks or a single, acute break intervention.

The preceding lines of evidence suggest that exercise can be healthy and beneficial for emotion regulation when implemented correctly, but previous research in clinical populations has shown that it can be overdone. Compulsive exercise has been found to be positively associated with emotion regulation (Goodwin et al., 2012), as well as positively related to dysfunctional emotion regulation in participants who were using overexercising as an unhealthy way of regulating their emotions (Goodwin et al., 2014). Unhealthy exercise in relation to emotion regulation has most often been studied in clinical populations in the context of eating disorders. A study done by Martin (2017) found that in individuals with eating disorders there is actually significantly higher levels of unhealthy exercise and emotion dysregulation. This pattern was observed in both individuals that restricted food intake and individuals that used binge eating. However, not all exercise and emotion regulation studies in clinical populations are cautionary, as an intervention study done with children with Autism Spectrum Disorder used a twelve-week jogging program and found that the children who participated in this intervention group demonstrated significant improvements in emotion regulation (Tse, 2020).

In sum, exercise has been shown to have a positive effect on emotion regulation overall, using a single bout of exercise, using longer term interventions, and in some clinical populations. The reviewed literature is relevant to the concept of exercise work breaks because work breaks can provide a single bout of exercise or can be implemented as a longer-term intervention leading to habitual exercise, both of which appear to have implications for the improvement of

emotion regulation. In the current study, I will focus on a single bout of exercise as a proof-of-concept for this potential relationship in the context of work breaks. The current literature is lacking the impact of exercise on emotion regulation in the context of work breaks. This is an important gap to fill because much of today's jobs use emotion regulation (Troth et al., 2018), and thus improving emotion regulation through exercise breaks may help to bring the positive effects of exercise on emotion regulation into the workplace and into organizations.

1.3 Breaks and Resistance to Surface Acting Demands

Conservation of Resources (COR) theory (Hobfoll, 1989) states that people want to keep and grow their *personal resources*, which include feelings of physical and cognitive energy relevant to the maintenance of employee well-being over time (ten Brummelhuis & Bakker, 2012a). At a broader level, personal resources may include physical (e.g., health), psychological (e.g., attention), affective (e.g., positive emotions), capital (e.g., money), and intellectual (e.g., skills) resources (ten Brummelhuis & Bakker, 2012b). However, in this project, I focused on affective and psychological resources. Emotion regulation involves individuals changing which emotions they express, thus affective resources are relevant to this process (Gross, 1998). Further, emotion regulation has been found to induce negative strain on the individual, thus psychological resources are directly relevant to this process (ten Brummelhuis & Bakker, 2012a).

The central prediction of COR theory is that the actual, or even potential, loss of personal resources is threatening and stressful to an individual. Synthesizing this tenet with the predictions of the Effort – Recovery Model (ERM; Meijman & Mulder, 1998), breaks have been theorized to halt resource loss and allow an individual to recover their personal resources (Bosch et al., 2018), which may underlie perceptions that breaks are rewarding. Applying this theorizing to the context of surface acting and breaks, when employees use surface acting to maintain their

performance during emotion regulation relevant tasks, they should experience resource loss, which would be expected to lead to *depletion*, a state of diminished emotional and cognitive energy that undermines the ability to work efficiently (Wagner et al., 2014). Once an individual becomes depleted, there are subsequent well-being (Binnewies et al., 2009) and performance impairments (Muraven & Baumeister, 2000), and thus depletion may play a key role in the influence of sustained task performance on outcomes extending from surface acting (Walsh et al., 2015).

Taking a break is theorized to halt the loss of affective and psychological resources and facilitate resource recovery, which would be expected to engender lower levels of depletion after a break (Bosch & Sonnentag, 2018). Because breaks facilitate personal resource gain, employees should feel less depleted following a break (Trougakos & Hideg, 2009), which should position them to be more able to be resistant to depletion decrements stemming from subsequent surface acting demands, relative to not taking a break. This aligns with the COR theory prediction that employees with more affective and psychological resources are better equipped to handle future stressful tasks (Hobfoll, 2002). Based on these lines of theorizing relevant to depletion, surface acting, and breaks, I hypothesized that:

Hypothesis 1: Sustained exposure to surface acting demands co-varies with higher pre-break depletion.

Hypothesis 2: Taking a break causes a reduction in depletion.

1.4 The Particular Effectiveness of Exercise Breaks in Resistance to Surface Acting Demands

The recovery potential of breaks has been shown to vary as a function of *recovery experiences,* which are psychological appraisals of non-work experiences that can help an

individual to regain affective and psychological resources (Bosch et al., 2018). Sonnentag and Fritz (2007) have highlighted four main recovery experiences of psychological detachment, relaxation, mastery, and control. Psychological detachment is recovering by physically and mentally disengaging from work. Relaxation is recovering by entering a state of low activation and increased positive affect. Mastery is using challenges and learning opportunities in non-work domains to recover. Control is recovering by experiencing autonomy in how non-work time is spent. Previous research has shown that recovery experiences underlie employee appraisals of their within-workday breaks (Bennett et al., 2020; Bosch et al., 2018).

There are many common types of breaks that may show variability in effectiveness as a function of recovery experiences. As one major comparison of common break types, one can compare the recovery potential of an *exercise break* against a more *passive break* that involves little physical activity, such as sitting quietly watching a video at one's desk (Sonnentag, 2001). An exercise break is likely to include aspects of psychological detachment, relaxation, and mastery (Blasche et al., 2018). In support of the psychological detachment portion of this process, the distraction hypothesis states that exercise allows an escape from stress-related thoughts (Yeung, 1996), with evidence suggesting that such exercise correspondingly allows for psychological detachment from work (Cho & Park, 2017). Furthermore, exercise has been found to induce relaxation when it is not competitive, moderate, and pursued in pleasant surroundings (Shephard, 1997). Exercising more also has the potential to improve an individual's physical and psychomotor skills and thus may facilitate mastery (Cho & Park, 2017). In contrast, a *passive break* has the potential to foster psychological detachment and relaxation, but is unlikely to influence mastery because the employee is not improving their skills or challenging themselves during the break (Sonnentag & Fritz, 2007).

In other words, both exercise and passive breaks have the potential to facilitate psychological detachment and relaxation (Bosch & Sonnentag, 2018), but exercise breaks may be particularly likely to cause personal resource gains relative to passive breaks due to an additional connection to mastery (Sonnentag & Fritz, 2007). This aligns with recovery experience theorizing indicating that mastery is a more active avenue to recovery (i.e., one that proactively leads to personal resource gain) relative to psychological detachment and relaxation, which are passive avenues to recovery (i.e., those that just halt personal resource loss but do not necessarily lead to personal resource gain; Sonnentag & Fritz, 2007). Mastery includes seeking out challenges, broadening horizons, and learning new things in non-work domains (Sonnentag & Fritz, 2007). Engaging in physical activities is likely to be particularly connected to mastery because it allows an individual to challenge themselves and learn about a new activity. In support of this view, mastery perceptions have consistently been found to extend from physical activity engagement (Hovell et al., 1989). Furthermore, previous research has highlighted the importance of mastery perceptions in physical activity interventions (Rovniak et al., 2002; McAuley et al., 1994).

Exercise breaks may also be more effective than passive breaks at facilitating personal resource gains due to the demonstrated connection between physical activity and positive emotions, which in turn are crucial to the acquisition of personal resources. Fredrickson's broaden-and-build theory (2001) states that positive emotions build affective and psychological resources. Previous research has found an association between physical activity and positive emotions, such as happiness (Richards et al., 2015), suggesting that physical activity engagement will yield positive affective states. Extending from broaden-and-build theory, these positive emotions gained from physical activity should accelerate employee personal resource gains

during within-workday breaks. Furthermore, and aligning with the earlier arguments pertaining to the connection of physical activity to mastery, the mastery hypothesis states that completing an effortful task brings about mastery or achievement that subsequently improves mood (Simons et al., 1985). Thus, the mastery appraisals extending from within-workday exercise breaks may further facilitate personal resource gains due to these mood enhancement associations via mechanisms theorized within broaden-and-build theory.

Initial empirical evidence supports the contention that exercise breaks may be particularly effective in helping an individual to be less depleted, which aligns with the theoretically derived argument that exercise breaks are more effective at supporting personal resource gains than a passive break. In particular, exercise breaks have been found to be beneficial in fostering emotional recovery and preventing emotion regulation failures (Bernstein & McNally, 2018). For example, Bernstein and McNally (2017) have shown that moderate aerobic exercise can help weaken the strength of negative emotions when participants are experiencing difficulties with emotion regulation. Physical activity interventions have also been shown to cause a decrease in states such as emotional exhaustion (de Vries et al., 2017), an experience characterized by greater levels of depletion (Ruysseveldt et al., 2011; Trougakos et al., 2015), which suggests that exercising may position individuals to be more resistant to future demands (Hobfoll, 2002). Based on these lines of theoretical and empirical evidence, I hypothesized that:

Hypothesis 3: Exercise breaks are better in (a) reducing post-break depletion and (b) fostering resistance to future depletion following subsequent post-break surface acting demands, relative to no break and a passive break.

Hypothesis 4: Mastery perceptions are higher following an exercise break, relative to a passive break.

Hypothesis 5: Positive affect is higher following an exercise break, relative to a passive break.

2 Method

2.1 Sample

Participants were undergraduate students enrolled in psychology courses at Virginia Tech. Participants were recruited using the extra-credit participant management system, SONA, which is managed by the Department of Psychology. In order to participate, participants were required to be (1) at least eighteen years old and (2) not have any physical limitations that prevent moderate intensity physical activity. Moderate intensity physical activity was defined as physical activity that "requires a moderate amount of effort and noticeably accelerates the heart rate" (World Health Organization, 2019). Participants had to be at least eighteen years old in order to consent to participate in the study without the requirement to obtain parental assent. Furthermore, because the findings will be most directly applied to employees, the experiences of minors were largely beyond the scope of this project. Participants could not have any physical limitations that prevented moderate intensity physical activity because one of the break conditions involved exercise and participants with such physical limitations may not be able to participate in this condition of the experiment. Participants were given the definition of moderate intensity physical activity provided above in the study recruitment advertisement such that they self-selected if they felt that they would not meet this inclusion criteria. This approach was preferable to collecting medical / health information about participants, which could engender privacy concerns.

In order to determine the target sample size for the project, I conducted a statistical power analysis for each hypothesis. In order to test my hypotheses, I used a 4 (no break vs. passive break vs. exercise break vs. flaw essay break[1]) x 4 (survey timepoints) mixed-method analysis of

[1] The flaw essay break was added in order to look at the effect of switching to another effortful and depleting task on depletion.

variance (ANOVA). In order to conduct this ANOVA with a hypothesized medium effect size *f* = 0.25, a Type I error rate of α = .05, a target statistical power of 0.80, and an estimated correlation among repeated measurements of $r = 0.40$[2], a sample size of $N = 36$ is required.

Fifty-eight participants consented to join the study by completing an opt-in survey. Four participants ($n = 4$) never completed the in-lab experiment portion of the study. One participant ($n = 1$) was excluded for falling asleep during the in-lab session. Two participants ($n = 2$) were excluded for missing data, which could be a sign of inattentiveness and poor data quality. One participant ($n = 1$) was excluded for being an extreme outlier on state depletion (i.e., greater than 3 *SD* above the mean on post-break depletion). The final sample consisted of 50 participants ($N = 50$). A post-hoc power analysis was conducted in order to estimate the power achieved at a sample size of 50 participants. Using the same estimates as were implemented for the prior power analysis above (i.e., effect size, Type I error rate, and estimated repeated measurements correlation), it is estimated that the power at this sample size is 0.90.

Participants were majority female (76.0%) and 19.42 years old on average ($SD = 1.30$). The majority of participants were White (80.0%), while the remainder were Asian (10.0%), black or African American (8.0%), or more than one race (2.0%). Participants were drawn from twenty-one different majors, the most common being Psychology ($n = 17$). Some of the participants ($n = 19$, 38%) worked in paid employment positions outside of school and the majority (73.7%) of the participants with paid employment positions worked in the service sector. A large majority (86.0%) of participants selected that they regularly engage in physical exercise. Participants' typical workout length ranged between 30 and 150 minutes, with an average participant workout length of 72.56 minutes ($SD = 28.97$ minutes). The distribution of

[2] This repeated measurements correlation was calculated from a 10-day experience sampling study that included 30 total measurements of state depletion (Rost et al., in press).

typical exercise patterns across different days of the week and times of day are displayed in Figure 1.

2.2 Procedure

The study was advertised as a study analyzing customer service performance. Participants signed-up for a timeslot on SONA by choosing the study and selecting the time that works best for them. Once participants signed up for a timeslot on SONA, they were sent a survey via Qualtrics (a secure, online survey platform widely used in social scientific research) that included an informed consent, screening questions, and various demographic and personality questions, which comprised an *opt-in survey* that is described in more detail in the Measures section.

Participants reported to the lab for a 90-minute in-lab session on the day of their chosen timeslot (see Figure 2 for procedure diagram of the in-lab portion of the study). Immediately after reporting to the lab, participants completed a *baseline survey* (Time 1 Survey). Next, participants completed a surface acting task in which they responded to voice recorded negative restaurant reviews on a computer for a duration of 20 minutes, during which they were instructed to respond to the reviews as if they were a customer service representative and to strive to not present or convey any negative emotions in their responses. Previous emotional labor studies have used simulations lasting twenty minutes and demonstrated well-being decrements associated with surface acting in similar simulations (Grandey et al., 2013; Goldberg & Grandey, 2007; Chi et al., 2011).

After participants completed the first wave of the surface acting task, they completed a *pre-break survey* (Time 2 survey). Next, they were instructed to take a break for fifteen minutes. Previous research analyzing the impact of break types after a mentally demanding task has used

a break length of fifteen minutes (Blasche et al., 2018). Furthermore, a break of fifteen minutes is often used as a break length in the workplace, thus also increasing the external validity of this break duration (Rekik et al., 2010).

Participants were randomly assigned to a break condition. Participants were only exposed to one break condition (i.e., a between-subjects manipulation of break condition). The different break conditions were no break, a passive break, an exercise break, and a flaw essay break. The no break condition consisted of not stopping the surface acting task and continuing throughout the 15-minute period (i.e., only stopping to complete the brief Time 2 survey at the same time that participants in the other conditions would be taking a break). These no break condition participants then completed a *post-break survey* (Time 3 Survey) after 15 minutes of additional time on the surface acting task had elapsed, which aligned with the same time point at which participants in the other break conditions took the post-break survey.

The exercise break condition consisted of participants walking one lap around an oval-shaped, grassy stretch of land near the in-person study location. Walking outside was chosen instead of inside on a treadmill to ensure that sessions of more than one person could be conducted. Pilot testing was done with undergraduate research assistants to measure the amount of time it took on average for students to leave the study location, walk around the oval, and return to the study location (M = 14.35 minutes, SD = 1.19 minutes). Research assistants then repeated the walk to practice making it last fifteen minutes and would maintain this pace while leading participants assigned to the exercise break condition on this walk. Participants were instructed to walk at a brisk pace that they could maintain for the fifteen minutes. Previous emotion regulation research has used the same explanation of exercise pace (Edwards et al.,

2018). A research assistant accompanied participants on the walk both to set the pace of the walk and to ensure participants did not socialize during the walk.

The passive break condition consisted of watching a fifteen-minute clip of Blue Planet 2 while remaining seated at a desk. Blue Planet 2 is a nature documentary series about marine life. When choosing a clip, I tried to minimize the likelihood that the clip would change the participant's mood (due to the long-established tradition of using video clips as mood inductions; Marcusson-Clavertz et al., 2019), but would instead act largely as a mild diversion (Bennett et al., 2020). In particular, studies that attempt to change participant mood using video clips often feature a protagonist that participants can identify with (Westermann et al., 1996). The selected clip intentionally does not have a protagonist. The series is available on Netflix and could conceivably serve as something that an employee would actually watch during a break (i.e., a documentary-style clip).

A flaw essay condition was included in order to test the effect of switching to a different task that still included emotion regulation, in comparison to the other experimental conditions (e.g., passive break, exercise break) that were intended not to require emotion regulation. This condition was included in order to analyze if any observed difference in depletion following the breaks was due to switching to a new task, relative to the original task, which has been observed to alter states that correlate with depletion (i.e., fatigue) in past research (Bennett et al., 2020). The flaw essay condition consisted of participants writing an essay about their biggest flaws. Participants were told to spend fifteen minutes preparing and drafting an essay in response to the question "What are my biggest flaws?". Participants were ensured that nobody except study personnel would see their essay. Previous research has used a similar task in which participants

prepared and then gave a speech about their biggest flaws and researchers have demonstrated that this task involves emotion regulation (Lam et al., 2009).

After completion of the Time 3 survey (i.e., after the break), participants repeated the surface acting task again for 20 minutes with a new set of negative reviews. The participants then completed an *end-of-study survey* (Time 4) that was used to evaluate depletion following the second trial of surface acting demands.

Throughout the entire study, all participants wore a research-grade wrist-worn Actigraph device that measures physical activity (Actigraph, 2019), which allowed me to investigate how the intensity of physical activity during the exercise break influenced depletion and recovery experiences for exploratory purposes. Participants in the other conditions also wore this device throughout the study to prevent a confound that would be introduced if only participants in the exercise break condition wore this device, which also allowed me to potentially statistically control for any physical activity that participants in the non-exercise conditions may engage in during the course of the study if necessary.[3]

2.3 Measures

2.3.1 Opt-In Survey. The opt-in survey was sent to participants via e-mail once they signed-up for the study on SONA and was administered online. This survey contained a number of baseline characteristics (i.e., demographics, personality) that were included as potential statistical controls in the unlikely event that random assignment failed to distribute individual differences evenly across conditions. The opt-in survey started out with an informed consent. Participants were then asked questions to determine if they met the inclusion criteria.

[3] There were not statistically significant correlations between the objectively-recorded physical activity indicators and any measured depletion indicators (r = 0.07-0.26, *ns*), thus I did not proceed to conduct these exploratory analyses.

Demographic information, including age, gender, height, weight, and race, were collected within the opt-in survey. These demographics were necessary in order for the Actigraph hardware to correctly measure calorie expenditure and exercise intensity.

Participants were also asked to complete measures of a number of enduring (i.e., trait-level) experiences and behaviors within this opt-in survey. All composite scales included in the opt-in survey have been validated and used in prior research. These measures were included in order to examine if there were mean differences across the four break conditions (i.e., a possible failure of random assignment) and, if there were, for use as possible statistical controls. However, as none of these characteristics differed across break conditions, the psychometric properties of these scales and tests statistics used to evaluate failures of random assignment are described in Appendix A.

2.3.2 Surface Acting Task. In order to induce surface acting, participants were asked to respond to voice recorded restaurant reviews for twenty minutes. Participants were told that they are a customer service representative and were asked to respond to each review, taking their time and answering any concerns that the customer had. Participants were specifically instructed to strive to avoid presenting or conveying any negative emotion when responding, consistent with the conceptualization of this task as entailing surface acting. All reviews were presented in a random order.

Adapting a similar approach to creating situation-based stimulus materials as has previously been implemented (Calderwood et al., 2020), initial drafts of the reviews were created with the target of being roughly 200 words and describing the atmosphere, food quality, value, and service of a restaurant experience in a neutral manner. These four components were chosen to highlight in each review because Yelp, one of the most prolific sources of restaurant reviews,

provides these elements to rate when completing a review. Trained undergraduate research assistants used this core stem of a relatively neutral restaurant review to add specific complaints surrounding each of these elements of the restaurant experience in order to convert these stimulus materials into negative restaurant reviews that can induce surface acting (see Appendix B for sample reviews). Research assistants were specifically instructed not to include any slang within the reviews in order to maximize the likelihood that participants would fully understand the review.

Pilot testing was conducted with a group of 8 undergraduate research assistants to determine how many reviews would be completed in 20 minutes following the prescribed instructions. On average, research assistants were able to respond to 8.13 reviews in twenty minutes (SD = 3.09). Because the maximum duration of time any participant would be working on the review task would be 55 minutes (i.e., participants in the no break condition did the task in blocks of 20, 15, and 20 minutes across the session), I estimated from this pilot data that I will need around 23 reviews on average to fill out the surface acting task during the in-lab session.

Fifty-four reviews were selected to use for the surface acting task. Extra reviews were created to ensure that I have enough reviews in the event that some participants finish the reviews too fast. All reviews were voice recorded by individuals with previous acting experience. Eight different actors were used to record the reviews. Actors were instructed to read the review with an angry tone as if they were talking to a restaurant manager about an experience they had at their restaurant. Recorded reviews were used instead of having participants read the reviews in order to ensure participants understood the negative tone of the review and to create a higher fidelity emotion regulation experience. Participants were told that they were allowed to

relisten to any reviews when completing the surface acting task. Recorded reviews were 51.04 seconds on average (*SD* = 9.47).

2.3.3 Time 1 Survey. The Time 1 survey was administered once the participant arrived at the experiment using a paper-and-pencil survey. All in-lab surveys were kept short in order to not further deplete the participant and to not act as too long of a break for the participants who are randomized to the no break condition.

Depletion. Depletion was measured using a five-item scale adapted by Lanaj, Johnson and Barnes (2014) that was originally developed by Twenge, Muraven, and Tice (2004). A sample item is "My mental energy is running low" ($\alpha = 0.82$). Participants responded to each item on a five-point Likert-type scale ranging from 1 (*not at all*) to 5 (*extremely*). Previous research has used this scale to measure depletion (Barnes et al., 2015). This measure has also been shown to exhibit state-level variability over time[4] (Lanaj et al., 2014).

Positive and negative affect. Positive and negative affect were measured using the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988). This scale includes twenty emotions and asks the participant to indicate the extent to which they are currently experiencing each emotion using a five-point Likert-type scale ranging from 1 (*not at all*) to 5 (*extremely*). Sample emotions for positive affect include: excited, enthusiastic, inspired, and active ($\alpha = 0.92$). Sample emotions for negative affect include: distressed, upset, irritable and nervous ($\alpha = 0.64$)[5]. Initial validation work demonstrated this scale to be reliable and valid for measuring positive and negative mood using various time frames (e.g., right now, today, etc.; Watson et al., 1988).

[4] Consistent with this view, stability coefficients for the measures of depletion in the current study ranged from r = 0.48-0.69 across the four measured time points.
[5] Due to poor psychometric properties for this scale, I elected to not use this measure in any exploratory analyses that I had originally planned to do.

2.3.4 Time 2 Survey. The Time 2 survey was administered after the first surface acting task using a paper-and-pencil survey. The Time 2 survey repeated the depletion ($\alpha = 0.84$; Lanaj et al., 2014) and PANAS ($\alpha = 0.92$ for positive affect and $\alpha = 0.78$ for negative affect; Watson et al., 1988) measures described in the Time 1 survey section above.

Task difficulty. The Time 2 survey also included a measure of task difficulty (Robinson, 2001). Participants were asked to rate five questions on a 6-point Likert-type scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). The statements assessed how demanding the surface acting task was perceived to be by the participants. A sample item is "I thought this task was hard" ($\alpha = 0.67$)[6]. This measure has been validated by Sanajou, Zohali, and Zabihi (2017).

Emotional regulation. Emotional regulation was measured using three surface acting items adapted from the Emotional Labour Scale (ELS; Brotheridge & Lee, 2003). Participants were asked to rate the extent to which they did three behaviors during the task. A sample item is "Resisted expressing my true feelings" ($\alpha = 0.86$). Participants responded to these items using a five-point Likert-type scale, ranging from 1 (*not at all*) to 5 (*extremely*). This measure is included as a manipulation check that the surface acting task is seen as an emotion regulation task. Brotheridge and Lee (2003) demonstrated convergent and discriminant validity for this measure.

2.3.5 Time 3 Survey. The Time 3 survey was administered after the break occurred for participants in the break conditions and after completion of the additional 15 minutes of the surface acting task for participants in the no break condition. The Time 3 survey again included the depletion ($\alpha = 0.82$; Lanaj et al., 2014), emotional regulation ($\alpha = 0.94$; Brotheridge & Lee,

[6] Due to poor psychometric properties for this scale, I elected to not use this measure in any exploratory analyses that I had originally planned to do.

2003), and PANAS (α = 0.90 for positive affect and α = 0.88 for negative affect; Watson et al., 1988) measures administered in other in-lab study time points.

Recovery experiences. The Time 3 survey also included the Recovery Experience Questionnaire (Sonnentag & Fritz, 2007), adapted for state-level assessment of break experiences (Bennett et al., 2020) for the participants who received a break. This survey includes sixteen items to evaluate how the participant perceived their break from the perspective of psychological detachment, relaxation, mastery, and control. The item "During the break, I did things that challenged me" was removed from the mastery subscale because inclusion of this item in the scale yielded a suboptimal internal consistency estimate (α = .65) and internal consistency was improved (to α = .74) by removing this item. A sample item for psychological detachment is "During the break, I forgot about working on the restaurant reviews" (α = 0.76). A sample item for relaxation is "During the break, I kicked back and relaxed" (α = 0.89). A sample item for mastery is "During the break, I did something to broaden my horizons" (α = 0.74). A sample item for control is "During the break, I felt like I could decide for myself what I did" (α = 0.81). Participants responded to the sixteen statements using a 6-point Likert-type scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). This measure has been extensively validated and used widely in the recovery literature (Sonnentag et al., 2008).

2.3.6 Time 4 Survey. The Time 4 Survey was administered after the second surface acting task using a paper-and-pencil survey. The Time 4 survey included the depletion (α = 0.90; Lanaj et al., 2014), emotional regulation (α = 0.94; Brotheridge & Lee, 2003), and PANAS (α = 0.92 for positive affect and α = 0.79 for negative affect; Watson et al., 1988) measures used in the other in-lab surveys and the task difficulty (α = 0.68; Robinson, 2001) measure used in the Time 2 survey. The Time 4 survey also included a question asking participants if they have any

additional comments about the experiment. Finally, after completing the Time 4 survey, participants were debriefed as to the goal of the study and thanked for their participation.

3 Analytic Approach

I tested my hypotheses using a 4 (no break vs. passive break vs. exercise break vs. flaw essay) x 4 (survey timepoints) mixed-method ANOVA. After evaluating whether an omnibus main effect of time received statistical support, I tested Hypothesis 1 by comparing Time 1 and Time 2 depletion using a paired samples *t*-test. This test was selected in order to account for the non-independence between the depletion measures (Cohen, 2013). I expected to observe mean differences in depletion across the four measured time points and more specifically that participants would report higher mean depletion at Time 2 relative to Time 1. I tested Hypotheses 2 and 3 using simple main effects and compared post-break depletion (i.e., depletion at Time 3) and post-second wave of surface acting task depletion (i.e., depletion at Time 4) across the four conditions. I expected that participants in the two break conditions would report lower depletion at Time 3, relative to participants who did not have a break. Further, I expected that participants in the exercise break condition would report lower depletion at Time 3 and Time 4 than participants who received no break or a passive break.

Hypotheses 4 and 5, which focus only on dependent variables measured in the Time 3 survey (i.e., immediately after the break), were tested via a set of two independent samples *t*-tests. I expected that at Time 3, participants who received an exercise break would have higher perceptions of mastery than participants who received a passive break. I also expected that participants who received an exercise break would have higher positive affect at Time 3 than participants who received a passive break.

4 Results

4.1 Assumption Checking

All of the statistical tests reported above assume normality of criterion variables. Thus, skewness and kurtosis values were calculated for all measured variables (see Table 1 for skewness and kurtosis values). Per the recommendation of Tabachnick and Fidell (2007), variables with a skewness or kurtosis less than -2 or greater than +2 were flagged for further inspection. All variables had skewness and kurtosis values within these bounds except negative affect at Time 2 (skewness = 2.06, kurtosis = 5.89), Time 3 (skewness = 3.06, kurtosis = 9.83), and Time 4 (skewness = 2.31, kurtosis = 6.91). Therefore, I will not conduct analyses concerning negative affect.

All of the statistical tests reported below also assume homogeneity of variance. Thus, Levene's Test for Equality of Error Variances was used to evaluate if estimated error variances differed across the groups being compared in each analysis. None of the error variances were identified as statistically different ($p > 0.05$ for all analyses); thus, I assumed homogeneity of variance for all reported statistical tests.

Multivariate test statistic results were used to avoid requiring the commonly violated sphericity assumption that is inherent in the univariate measures repeated measures ANOVA approach. It has been demonstrated that the Pillai's Trace test statistic provides robust results in cases of both homogenous and heterogenous variances (Ateş et al., 2019). Therefore, Pillai's Trace test statistic was used to determine statistical significance for ANOVA comparisons involving the within-subjects factor.

4.2 Descriptive Statistics

Means, standard deviations, internal consistency estimates, and correlations for all study variables can be found in Table 1. The descriptive statistics broken out by break condition are separately presented in Table 2. Participants spent an average of 13.33 minutes (*SD* = 5.57) on each review. Participants in the no break condition spent a total of 55 minutes on the surface acting task and on average completed 15.63 reviews (*SD* = 10.80). Participants in the three other break conditions spent a total of 40 minutes on the surface acting task and on average completed 8.21 reviews (*SD* = 3.68). I did not have any evidence that there was a difference between the rate (number of reviews completed divided by amount of time given to complete reviews) at which participants completed the reviews between participants who spent 40 minutes (flaw essay participants and the two break condition participants) and participants who spent 55 minutes (participants in the no break condition) on the task ($t_{(48)} = 0.86$, $p = 0.40$, $d = 0.33$).

4.3 Manipulation Check

Prior to testing my hypotheses, I evaluated whether participants viewed the surface acting task as entailing emotion regulation as a manipulation check. The average scores for perceived emotion regulation at Time 2 (i.e., immediately after the first wave of the surface acting task) and Time 4 (i.e., immediately after the second wave of the surface acting task) were 3.25 (*SD* = 1.20) and 3.35 (*SD* = 1.41), respectively, indicating moderate perceived emotion regulation at Time 2 and greater than moderate perceived emotion regulation a Time 4 ($t_{49)} = 1.77$, $p < 0.05$, $d = 0.25$).Therefore, I conclude that the surface acting task was successful in inducing emotion regulation.

As another manipulation check, I evaluated whether participants in the exercise break condition took more steps and burned more calories during the study session than participants in

the other three conditions using data provided by the actigraph devices. Participants in the exercise break condition took more steps (M = 1547.63, SD = 285.28) in comparison to the average of participants in the other three conditions (M = 440.98, SD = 198.95; $t_{(47)}$ = 13.38, p < 0.01, d = 5.17). Participants in the exercise break condition also burned more calories (M = 151.81, SD = 94.53) in comparison to the average of participants in the other three conditions (M = 51.70, SD = 19.38; $t_{(47)}$ = 6.38, p < 0.01, d = 2.46). Therefore, I conclude that the exercise manipulation was successful in inducing exercise.

I also evaluated whether participants in the no break condition experienced greater emotion regulation than participants in the flaw essay condition. The flaw essay is a validated task that is known to require emotion regulation. Participants in the no break condition (M = 3.83, SD = 1.14) experienced higher emotion regulation than participants in the flaw essay condition (M = 1.57, SD = 0.70; $t_{(23)}$ = 6.13, p < 0.01, d = 2.63). Therefore, there is support that the surface acting task is an effective task at inducing emotion regulation.

4.4 Hypothesis Testing

Hypothesis 1, evaluating if sustained exposure to surface acting demands would co-vary with higher pre-break depletion, was tested by conducting a 4 (no break vs. passive break vs. exercise break vs. flaw essay) x 4 (survey timepoints) mixed-method ANOVA. There was support for a multivariate main effect of time on depletion ($F_{(3,44)}$ = 23.64, p < 0.01, η_p^2 = 0.34), which indicates that depletion changed throughout the course of the study. I then conducted a paired samples t-test to specifically compare Time 1 (pre-first round of surface acting task) and Time 2 (post-task, pre-break) depletion. No evidence was obtained to suggest that depletion at Time 1 (M = 1.81, SD = 0.62) differed from depletion at Time 2 (M = 1.84, SD = 0.68) ($t_{(49)}$ = -0.30, p = 0.38, d = 0.04), yielding no support for Hypothesis 1.

However, it is possible that depletion deficits would not be seen after the first twenty minutes of engaging in the task, and that perhaps a greater time on task was necessary to engender this depletion deficit (Ackerman et al., 2012). In line with this view, a paired samples *t*-test demonstrated that Time 4 depletion ($M = 2.49$, $SD = 1.02$) was higher than Time 3 depletion ($M = 1.88$, $SD = 0.69$; $t_{(49)} = 5.28$, $p < 0.01$, $d = 0.75$), Time 2 depletion ($M = 1.84$, $SD = 0.68$; $t_{(49)} = 6.20$, $p < 0.01$, $d = 0.88$), and Time 1 depletion ($M = 1.81$, $SD = 0.62$; $t_{(49)} = 5.27$, $p < 0.01$, $d = 0.75$). Therefore, there appears to be some support for Hypothesis 1, suggesting that exposure to surface acting demands co-varies with higher depletion, although with a greater necessary time on task than anticipated.

Hypotheses 2 and 3 were tested by analyzing simple main effects within the different break conditions. The results of these simple main effect analyses suggested that taking a break caused a reduction in depletion (see Table 3 for mixed method ANOVA results). For those participants in a condition that involved a break (passive break and exercise break), post-break depletion ($M = 1.74$, $SD = 0.62$) was lower than pre-break depletion ($M = 1.93$, $SD = 0.73$; $t_{(24)} = 1.89$, $p = 0.04$, $d = 0.35$). For participants who did not have a break (the no break and flaw essay conditions), post-break depletion ($M = 2.02$, $SD = 0.74$) was higher than pre-break depletion ($M = 1.75$, $SD = 0.62$; $t_{(24)} = 1.82$, $p = 0.04$, $d = 0.36$; see Figure 3 for depletion by time point plot). This provides support for Hypothesis 2.

Hypothesis 3a, comparing post-break depletion for those experiencing exercise breaks relative to not taking a break and taking a passive break, was tested using a series of independent samples *t*-tests. I had no evidence to indicate that depletion after an exercise break ($M = 1.88$, $SD = 0.75$) was different from depletion after not taking a break ($M = 2.28$, $SD = 0.69$; $t_{(15)} = 1.13$, $p = 0.14$, $d = 0.55$). I also did not have evidence to suggest that depletion after an exercise break

was different from depletion after taking a passive break (M = 1.66, SD = 0.54; $t_{(23)}$ = .84, p = 0.21, d = 0.35). Therefore, Hypothesis 3a was not supported.

Hypothesis 3b, comparing resistance to future depletion following exercise breaks relative to not taking a break or taking a passive break, was tested using a series of independent samples *t*-tests comparing end of study (Time 4) depletion across conditions. There was no evidence to demonstrate that Time 4 depletion was different between participants who took an exercise break (M = 2.91, SD = 1.12) and participants who did not take a break (M = 2.93, SD = 0.91; $t_{(15)}$ = 0.03, p = 0.49, d = 0.01). I also had no evidence to indicate that Time 4 depletion was different between participants who took an exercise break and participants who took a passive break (M = 2.30, SD = 1.10; $t_{(23)}$ = 1.32, p = 0.10, d = 0.57). Therefore, Hypothesis 3b was not supported.

Hypothesis 4, comparing post-break mastery perceptions after the exercise break condition in comparison to the passive break condition, was tested using an independent samples *t*-test. There was support for a difference between the break conditions ($t_{(23)}$ = 2.85, p = 0.01, d = 1.25) in relation to post-break mastery. However, this effect was in the opposite direction relative to my expectations. Specifically, individuals in the passive break condition (M = 3.50, SD = 1.33) reported higher mastery perceptions than individuals assigned to the exercise break condition (M = 2.07, SD = 0.91). Therefore, Hypothesis 4 was not supported.

Hypothesis 5, comparing post-break positive affect after the exercise break in comparison to the passive break, was also tested using an independent samples *t*-test. I had no evidence to indicate that positive affect after the break was different between the exercise group (M = 2.22, SD = 0.63) and the passive group (M = 2.74, SD = 0.93; $t_{(23)}$ = 1.47, p = 0.08, d = 0.61). Therefore, Hypothesis 5 was not supported.

4.5 Supplemental Analyses

Further analyses were conducted in order to investigate other possible relationships that may be present based on past theory or empirical research. I conducted a 4 (no break vs. passive break vs. exercise break vs. flaw essay) x 2 (survey time points including measures of task difficulty) mixed-method ANOVA to evaluate if task difficulty perceptions differed based on condition. I did not find support for a time by condition interaction ($F_{(3,46)} = 17.05$, $p = 0.28$, $\eta_p^2 = 0.08$), which does not yield evidence for a difference in end of study depletion between break conditions.

A possible performance metric that could be considered to gauge participants' effectiveness in completing the customer service task is the number of reviews participants completed in the given amount of time. The rate at which employees respond to customer concerns has value to a customer service agency in that the more reviews an employee is able to clear in the time available, the more productive the employee is. In order to analyze the number of reviews employees responded to, I looked at the rate, or number of minutes participants spent on each review per the time allotted. This allowed me to include the no break condition even though they spent an additional fifteen minutes on the task. A one-way ANOVA was used to investigate if the number of minutes participants spent on each review differed based on condition. There was no evidence to suggest that there was a difference in the rate at which participants completed reviews based on break condition ($F_{(46)} = 0.33$, $p = 0.81$, $\eta^2 = 0.02$). Unfortunately, because reviews were completed in a randomly assigned order to minimize order effects, it was not possible to determine how many reviews were completed before and after the break for exploratory purposes.

Another possible performance metric is the total number of sentences a participant wrote during the surface acting task, which could gauge the thoroughness with which participants approached responding to customers concerns. A one-way ANOVA was used to investigate if the number of sentences a participant wrote per minute (i.e., rate of sentences written) differed based on condition. The number of sentences a participant wrote per minute was used in order to include the no break condition even though they spent an additional fifteen minutes on the task. There was no evidence to suggest that there was a difference in the number of sentences a participant wrote per minute differed based on break condition ($F_{(3,46)} = 1.79$, $p = 0.16$, $\eta^2 = 0.10$). In combination, I attained limited evidence to suggest that more quantitatively-oriented performance metrics on the surface acting task differed across break conditions.

5 Discussion

Despite great attention on exercise in the workplace (Parks & Steelman, 2008) and within-workday breaks (Bosch et al., 2018), research has not yet focused on the causal effects of within-workday exercise breaks on responses to emotion regulation demands. I focused on addressing this research gap by studying the effect of four break conditions, including an exercise break, on alleviating depletion induced by a surface acting task. I found that a newly developed surface acting task was effective in inducing emotion regulation. Furthermore, participants who received a break experienced a decrease in depletion after the break, while participants who did not receive a break experienced an increase in depletion. In contrast, I had no evidence to indicate that depletion right after a break or at the end of the study was different between the exercise break and passive break conditions. There was also no evidence to indicate that post-break positive affect was different between the exercise break and the passive break. However, contrary to expectations, I did observe that participants in the passive break condition experienced higher levels of mastery than participants in the exercise break condition.

5.1 Theoretical Implications

In this study, I built on previous research (Bosch & Sonnentag, 2018) demonstrating that breaks are effective at reducing depletion. Participants in the passive and exercise break conditions had lower depletion after the break than before the break, while those who continued being engaged with a task that required emotion regulation experienced increased depletion. This replicates findings from empirical investigations of the Effort – Recovery Model predictions (e.g., Blasche et al., 2018), which state that breaks can allow an individual to recover personal resources (Sianoja et al., 2018). When participants engaged in surface acting, they experienced resource loss, which resulted in depletion. Taking a break then halted the loss of resources,

which led to a decrease in depletion. This suggests that breaks are important in halting resource loss and allowing individuals to regain resources.

Previous research concerning recovery has focused on longer-term recovery, using within-day or lagged next day associations to study weekends and vacations, without consideration of shorter breaks that may occur during the workday (Bennett et al., 2020). Existing research has also focused on micro-breaks (i.e., brief, informal breaks) (e.g., Bennett et al., 2020; Kim et al., 2018). In this thesis, I extend this past research by focusing on more structured, shorter within-workday breaks and their effect on recovery. These structured breaks are more representative of break types that you may see in the service industry. I found that taking a scheduled, fifteen-minute break from an emotion regulation task caused a decrease in depletion. Thus, shorter and structured breaks are still able to provide an individual with recovery, and therefore are theoretically important to our understanding of recovery and personal resource replenishment.

Most studies concerning within-workday breaks have not used random assignment of break conditions, mainly using cross-sectional (e.g., Lee et al. 2018) or daily-diary designs (e.g., Zacher et al., 2014). These designs limit researchers to strictly relational claims. I methodologically improved on this existing research by randomly assigning participants to break conditions, therefore allowing me to analyze the causal effects of break types on depletion, recovery experiences, and affect. This is theoretically essential in expanding what we know about how different break types can directly influence personal resources in a causal fashion, which is important because we can understand the direct impact of break types while accounting for other factors.

I also focused on a non-clinical context when examining the intersection of exercise and emotion regulation. This is theoretically essential in order to demonstrate that processes demonstrated in clinical contexts (Goodwin et al., 2012; Bernstein & McNally, 2018) can be replicated in broader contexts. In this study I used student participants and had them participate in a simulated work setting. The study of exercise and emotion regulation is relevant to student populations and other non-clinical populations as individuals have to hide or fake emotions in order to succeed in the workplace as well as in school. For example, students may have to hide the anger or frustration they have with a particular professor or a class in order to stay professional. Previous research has found that recovery processes are relevant to student contexts even when analyzing short-term changes (Rost et al., in press). This thesis highlights the prevalent relationship between emotion regulation and breaks within a college student sample.

Participants in the passive break condition reported higher levels of mastery than participants in the exercise break condition following the break. Although I did not hypothesize this relationship, it makes sense because the passive break consisted a watching fifteen minutes of a documentary, which would be expected to educate participants on the topic in question. Mastery includes seeking out intellectual challenges, broadening one's horizons, and learning new things. The documentary included facts about nature that could cause the participants to learn about wildlife and induce feelings of mastery. Therefore, it is possible that after watching the documentary, participants felt as if there were intellectual challenges, they broadened their horizons, and learned new things. Future research could experiment with different types of passive and exercise breaks to determine when passive breaks cause greater feelings of mastery in comparison to exercise breaks and vice versa.

5.2 Practical Implications

In this thesis I found that fifteen-minute breaks can be beneficial in causing decreases in depletion. This has practical implications for businesses as prolonged emotion regulation can lead employees to become depleted (Grandey et al., 2004). This study demonstrated that providing participants with a fifteen-minute break after completing an emotionally taxing task restored resources and led to a decrease in depletion. In contrast, participants who did not receive a break experienced increased depletion. Previous work on micro-breaks has focused on informal breaks (Bosch & Sonnentag, 2018). In this thesis I provide evidence that structured breaks can be built-in to one's schedule and formally set and still help to decrease depletion. Organizations should build in short, scheduled breaks, during which employees change what they are doing in order to regain resources. This is important so that the organization can ensure that employees do not become emotionally taxed and get too depleted during the workday. These short, built-in breaks will help employees to continue regulating their emotions successfully after the break. If employees become too depleted, the organization will see decrements in job performance, as employees will not be able to continue surface acting effectively (Yagil & Medler-Liraz, 2017).

Based on the results of this study, break interventions can be developed in order to ensure that employees are receiving enough breaks to regain resources and be able to productively work during their shift. In this thesis, I found that participants felt higher levels of mastery after watching fifteen minutes of a documentary. Organizations could build in fifteen-minute breaks throughout the day in which employees are allowed to watch videos on their computer, similar to the passive break in this study. Organizations could provide educational and engaging resources that employees could use during these breaks to help experience mastery. These interventions are

particularly applicable to many modern workplaces with computer-based work, where employees might take breaks at the computer.

5.3 Methodological Implications

A methodological implication from this study is the creation of a surface acting task that can be administered in a large group setting. During the task participants responded to recorded restaurant reviews while avoiding conveying negative emotions. All break conditions were also able to be administered in a large group setting. This makes it easier for future researchers to investigate the effects of emotion regulation. Future research could use this task to determine how often breaks should be given when employees are working on tasks that involve emotion regulation. Participants could be randomized to be given a break on a variety of different time intervals. This would be informative in knowing when emotion regulation becomes too much and may start to harm performance. Future research could also investigate how different break types influence performance on this surface acting task. Performance metrics could be created, possibly including the number of reviews a participant completes, if the participant addresses all parts of the review, and how long each written response is. These recommendations would allow the investigation of both quantitative and qualitative inputs to performance, which may differ as a function of surface acting (Brotheridge & Grandey, 2002).

Previous research studying emotion regulation in a workplace-based context has used written emails (Yagil & Medler-Liraz, 2017) in which participants need to respond. In other studies, researchers have used undergraduate research assistants or other non-actors to read a script (e.g., Goldberg & Grandey, 2007; Grandey et al., 2013; Gabriel & Diefendorff, 2015) that participants react to. I used recorded reviews throughout this task, which was beneficial in conveying the negative tone of the reviews. Individuals with previous acting experience read the

reviews in order to improve the realism of reviews. Voice-recorded reviews also may help to ensure that the participant listened to all the review, instead of skimming the review, as what may happen if the reviews had been written. Other emotion regulation tasks may be improved by adding professional actors reading the scripts instead of research assistants without acting experience.

5.4 Limitations and Future Directions

The first concern about this study is the limited sample size (N = 50). The original goal was to recruit 120 participants. Due to the global COVID-19 pandemic and temporary corresponding suspension of human subjects research, only 55 participants completed the experimental session. This may limit the generalizability of the findings from this thesis. Although a power analysis confirmed that I was adequately powered to detect the central time main effect underpinning my arguments, I would have decreased my Type II error rate with a greater sample size. Therefore, null findings observed in this study may be quite tentative and influenced by a smaller sample size. In contrast, the statistically significant findings were still observed despite the lower power, which suggests that I can have more confidence in these findings.

The surface acting task was not observed to induce depletion after the first twenty minutes of the task. However, Time 4 depletion was greater than all other timepoints, signifying that depletion did in fact increase as time on the surface acting task increased. It is possible that twenty minutes was not long enough for the participants to experience depletion. Some previous researchers have found increases in depletion after twenty minutes on a surface acting task (Goldberg & Grandey, 2007; Grandey et al., 2013; Chi et al. 2011), while others have used longer simulations, such as 90-minutes (Gabriel & Diefendorff, 2015). Future research could

explore how increased time on task influences depletion and investigate the nature of the relationship between time on task and levels of depletion. A study varying the time on task could demonstrate if the relationship is linear or curvilinear and if there were any threshold points at which increasing time on task would not induce extra depletion. For example, it is possible that at some point depletion reaches a maximum and participants will no longer become more depleted. At this threshold point, participants may have very low positive affect along with perceptions of high task difficulty, as it would be difficult to continue emotion regulation for a long amount of time without stopping.

Previous literature concerning self-regulation tasks has shown some inconsistency, but the main requirement is effortful suppression of an instinct or overriding a dominant response (Hagger et al., 2010). In the created task there was effortful suppression of negative emotions, which should have induced depletion. Previous studies inducing ego depletion have used shorter times on tasks and still induced depletion. For example, research done by Muraven et al. (1998) had participants suppress their emotional response to a documentary clip for three minutes and induced significant ego depletion, measured by physical endurance with squeezing a handgrip. A similar study done by Baumeister et al. (1998) had participants suppress their emotional response to a humorous video for ten minutes and induced significant ego depletion, measured by performance solving anagrams. Therefore, longer time on the task should not be needed to induce depletion.

Hagger et al. (2010) highlighted the concepts of conservation and motivation, which may provide reasoning as to why the task developed in this study did not effectively induce depletion. Participants completed a Time 1 survey and then completed the surface acting task for twenty minutes and then completed the Time 2 survey. At this point in the study, the participants had

been in the lab for approximately 40 minutes and they signed up to be in the lab for 90 minutes. Conservation states that participants may reserve resources for future tasks. Participants may have not worked their hardest on this task, knowing that they were going to have to work for 90 minutes, leading them to not be depleted. Future research could have participants sign-up for a twenty-minute study session and complete the surface acting task. Participants may engage in more emotion regulation during those twenty minutes instead of having to think about conserving resources for the rest of the study. Participants also may not have been motivated or invested in the task. The participants knew that this was an experiment and the responses to the reviews would not be given to customers. Therefore, the participants may not have been motivated to try as hard on the task, which would limit perceived depletion (Inzlicht & Schmeichel, 2012). Future research could reward participants for the best responses or use a real customer service setting, where employees must be fully involved in their responses in order to do well at their job.

Another limitation of this study is that participants reported a high typical workout length in the opt-in survey, which may engender concerns that participants who joined this study were more interested in exercise than the average member of the population. In turn, the exercise break condition may have been too low of a dose or too low intensity for the average individual in this study. There may have been a greater decrease in depletion, leading to supported differences between the passive break condition and the exercise break condition, if the exercise break was a higher dose or intensity. Mastery perceptions could have also been higher for the exercise break condition if the dose and intensity were higher because students would have felt more challenged. The study description did not state that participants would be partaking in exercise in the study description, meaning that students did not select this study because they

were more interested in exercise. Future research could investigate how different types or lengths of exercise may affect levels of depletion after a surface acting task.

Against my expectations, the passive break participants experienced higher levels of mastery than the exercise break participants. Students often walk around the area that was used for the exercise break condition, meaning that possibly this condition was not novel and did not make participants experience mastery. Having participants walk in an area that they are not used to could have led to changes in mastery perceptions. Future research could investigate how other locations or modes of exercise may affect mastery perceptions.

6 Conclusion

This thesis suggests that within-workday breaks can be scheduled during the workday and help an individual recover from work demands. Organizations can use the results from this thesis by implementing break schedules to help their employees who engage in high levels of emotion regulation throughout their shift. It is important to understand breaks in the organizational context so that employers can know how to structure breaks in order to benefit their employees. This thesis contributes to this idea by demonstrating that short, structured breaks provide individuals with time to reduce their depletion and recover from emotion regulation demands.

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Table 1

Descriptive statistics, internal consistency estimates, and correlations for study variables

Variable	M	SD	Skewness	Kurtosis	1	2	3	4
1. Time 1 Depletion	1.81	.62	.79	.07	(.82)			
2. Time 1 Positive Affect	2.79	.74	.24	-.11	-.06	(.92)		
3. Time 1 Negative Affect	1.29	.30	1.26	1.30	.28	.22	(.64)	
4. Time 2 Depletion	1.84	.68	.81	.41	.57**	-.17	.34*	(.84)
5. Time 2 Positive Affect	2.32	.83	.57	.21	-.10	.76**	.15	-.46**
6. Time 2 Negative Affect	1.33	.39	2.06	5.89	.20	.21	.47**	.32*
7. Time 2 Task Difficulty	3.14	.84	.54	-.03	.34*	-.20	.07	.43**
8. Time 2 Emotion Regulation	3.25	1.20	-.08	-1.15	.35*	-.11	.33*	.31*
9. Time 3 Depletion	1.88	.69	.60	-.01	.57**	-.28*	.41**	.52**
10. Time 3 Positive Affect	2.39	.82	.24	-.76	-.04	.76**	.02	-.21
11. Time 3 Negative Affect	1.33	.52	3.06	9.83	.10	.36*	.41**	.11
12. Time 3 Task Difficulty	3.22	.97	-.06	-.91	.17	-.16	.43*	.002
13. Time 3 Emotion Regulation	1.93	1.17	1.37	.95	.08	-.19	.05	.01
14. Time 3 Psychological Detachment	4.67	1.12	-.66	-.56	-.28	-.24	-.04	-.05
15. Time 3 Relaxation	4.55	1.04	-1.08	1.47	-.39	.10	-.23	-.32
16. Time 3 Mastery	2.77	1.12	-.08	-.93	-.35	.62**	.04	-.44*
17. Time 3 Control	2.53	1.07	.67	-.16	-.14	.09	-.22	-.25
18. Time 4 Depletion	2.49	1.02	.64	-.16	.48**	-.21	.26	.69**
19. Time 4 Positive Affect	1.93	.80	1.01	.01	-.04	.65**	.10	-.39**
20. Time 4 Negative Affect	1.38	.42	2.31	6.91	.24	.14	.37**	.28*
21. Time 4 Emotion Regulation	3.35	1.41	-.35	-1.37	.43**	-.15	.19	.29*
22. Time 4 Task Difficulty	3.53	.88	.21	-.48	.36*	-.19	.03	.45**

Table 1 continued

Variable	5	6	7	8	9	10	11	12	13
1. Time 1 Depletion									
2. Time 1 Positive Affect									
3. Time 1 Negative Affect									
4. Time 2 Depletion									
5. Time 2 Positive Affect	(.92)								
6. Time 2 Negative Affect	.10	(.78)							
7. Time 2 Task Difficulty	-.55**	.17	(.67)						
8. Time 2 Emotion Regulation	-.23	.38**	.53**	(.86)					
9. Time 3 Depletion	-.18	.29*	.04	.32*	(.82)				
10. Time 3 Positive Affect	.67**	.19	-.20	-.20	-.35*	(.90)			
11. Time 3 Negative Affect	.37**	.66**	-.16	.12	.28*	.19	(.88)		
12. Time 3 Task Difficulty	.03	.11	.01	.21	.59**	-.47*	.29	(.67)	
13. Time 3 Emotion Regulation	-.17	.16	.04	.17	.29*	-.32*	.14	.43*	(.94)
14. Time 3 Psychological l Detachment	-.33	-.26	-.08	.06	-.19	-.01	-.26		-.03
15. Time 3 Relaxation	-.05	-.38	.09	-.03	-.51**	.23	-.23		-.28
16. Time 3 Mastery	.57**	.08	-.25	-.16	-.56**	.68**	.30		-.31
17. Time 3 Control	.13	.03	-.01	.04	-.13	.37	-.01		.27
18. Time 4 Depletion	-.40**	.32*	.33*	.39**	.61**	-.21	.14	.33	.32*
19. Time 4 Positive Affect	.85**	.04	-.45**	-.23	-.06	.66**	.35*	.01	-.16
20. Time 4 Negative Affect	.13	.82**	-.06	.22	.48**	.16	.70**	.29	.23
21. Time 4 Emotion Regulation	-.25	.25	.52**	.80**	.39**	-.17	-.03	.23	.22
22. Time 4 Task Difficulty	-.49**	.25	.75**	.54**	.23	-.11	-.13	.05	.16

Table 1 continued

Variable	14	15	16	17	18	19	20	21	22
1. Time 1 Depletion									
2. Time 1 Positive Affect									
3. Time 1 Negative Affect									
4. Time 2 Depletion									
5. Time 2 Positive Affect									
6. Time 2 Negative Affect									
7. Time 2 Task Difficulty									
8. Time 2 Emotion Regulation									
9. Time 3 Depletion									
10. Time 3 Positive Affect									
11. Time 3 Negative Affect									
12. Time 3 Task Difficulty									
13. Time 3 Emotion Regulation									
14. Time 3 Psychological Detachment	(.76)								
15. Time 3 Relaxation	.58**	(.89)							
16. Time 3 Mastery	.07	.31	(.74)						
17. Time 3 Control	.14	.18	.25	(.81)					
18. Time 4 Depletion	-.02	-.35	-.46*	.10	(.90)				
19. Time 4 Positive Affect	-.38	-.11	..45*	.08	-.35*	(.92)			
20. Time 4 Negative Affect	-.14	-.24	-.03	.51**	.46**	.10	(.79)		
21. Time 4 Emotion Regulation	-.07	-.18	-.25	.25	.42**	-.24	.14	(.94)	
22. Time 4 Task Difficulty	.04	.13	-.29	.30	.61**	-.47**	.18	.55**	(.68)

Note. Time 3 Task Difficulty, Time 3 Detachment, Time 3 Relaxation, Time 3 Mastery and Time 3 Mastery had a sample size of $N = 25$, while all other measurements had a sample size of $N = 50$. * $p < .05$. ** $p < .01$.

Table 2

Descriptive Statistics by break condition

	No Break		Passive Break		Exercise Break		Essay Break		*F*	*p*
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*		
Time 1 Depletion	1.80	.58	1.80	.61	1.94	.62	1.76	.70	.16	.92
Time 1 Positive Affect	2.45	.64	3.17	.74	2.51	.60	2.74	.75	2.66	.06
Time 1 Negative Affect	1.29	.40	1.24	.25	1.27	.23	1.34	.35	.25	.86
Time 2 Depletion	1.70	.41	1.88	.72	2.02	.80	1.78	.70	.38	.77
Time 2 Positive Affect	2.09	.83	2.47	.94	2.02	.74	2.45	.76	.91	.45
Time 2 Negative Affect	1.40	.44	1.23	.21	1.26	.28	1.42	.53	.84	.48
Time 2 Task Difficulty	3.03	.70	3.23	.68	3.44	.88	2.96	1.01	.74	.54
Time 2 Emotion Regulation	3.63	1.08	2.69	1.09	3.22	1.42	3.63	1.10	2.15	.11
Time 3 Depletion	2.28	.69	1.66	.54	1.88	.75	1.91	.75	1.47	.24
Time 3 Positive Affect	1.93	.90	2.74	.93	2.22	.63	2.28	.67	2.16	.11
Time 3 Negative Affect	1.50	.62	1.30	.63	1.21	.21	1.33	.49	.44	.72
Time 3 Task Difficulty	3.60	.56					3.05	1.08	1.83	.19
Time 3 Emotion Regulation	3.83	1.14	1.42	.69	1.81	.93	1.57	.70	17.47**	.00
Time 3 Psychological Detachment			4.59	1.13	4.81	1.15			.20	.66
Time 3 Relaxation			4.81	.79	4.08	1.31			3.05	.09
Time 3 Mastery			3.50	1.33	2.07	.91			8.15**	.01
Time 3 Control			2.58	1.08	2.44	1.13			.09	.77

Table 2 continued

	No Break		Passive Break		Exercise Break		Essay Break		*F*	*p*
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*		
Time 4 Depletion	2.93	.91	2.30	1.10	2.91	1.12	2.24	.86	1.60	.20
Time 4 Positive Affect	1.80	.84	2.03	.94	1.80	.75	1.96	.71	.24	.87
Time 4 Negative Affect	1.51	.52	1.30	.34	1.27	.1.27	1.45	.52	.81	.49
Time 4 Emotion Regulation	3.79	1.13	3.00	1.31	3.48	1.72	3.41	1.49	.61	.61
Time 4 Task Difficulty	3.78	.35	3.59	.94	3.63	.75	3.34	1.07	.51	.68

Note. Time 3 Task Difficulty, Time 3 Detachment, Time 3 Relaxation, Time 3 Mastery and Time 3 Mastery $N = 25$. For all other measurements $N = 50$. The F ratio represents the mean difference across the four break conditions.
* $p < .05$. ** $p < .01$.

Table 3

Mixed-Method Analysis of Variance of Depletion by Break Conditions

Source	*SS*	*df*	*MS*	*F*	*p*
Time	17.96	3	5.99	23.64	.00
Condition	3.21	3	1.07	.68	.57
Time * Condition	4.34	9	.48	1.90	.06
Error (Time)	34.96	138	0.25		

Note. $N = 50$. A 4 (no break vs. passive break vs. exercise break vs. flaw essay break) x 4 (survey timepoints) mixed-method ANOVA was conducted to analyze the effect of time and condition on depletion.

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
5:00am or earlier	1	1	1	1	1	1	0
5:00am - 6:00am	0	0	0	0	0	0	0
6:00am - 7:00am	0	1	1	1	0	0	0
7:00am - 8:00am	0	1	1	2	0	0	0
8:00am - 9:00am	2	3	1	4	2	0	0
9:00am - 10:00am	3	3	3	4	4	3	2
10:00am - 11:00am	4	1	3	1	1	1	0
11:00am - 12:00pm	6	3	5	2	4	7	2
12:00pm - 1:00pm	8	3	8	3	8	6	4
1:00pm - 2:00pm	2	1	2	2	5	5	2
2:00pm - 3:00pm	3	2	2	2	4	3	3
3:00pm - 4:00pm	3	4	2	4	4	4	3
4:00pm - 5:00pm	4	4	5	5	7	2	2
5:00pm - 6:00pm	1	3	2	3	3	1	2
6:00pm - 7:00pm	2	5	2	1	2	0	1
7:00pm - 8:00pm	3	3	5	3	1	0	1
8:00pm - 9:00pm	3	3	5	1	2	3	3
9:00pm - 10:00pm	2	1	4	2	0	1	0
10:00pm - 11:00pm	2	2	2	3	0	0	2
11:00pm or later	0	0	0	1	0	0	0

Key: The number in each box represents the number of participants who selected that they exercise at that time, this corresponds to the color of the box.

0	1	2	3	4	5	6	7	8

Figure 1. Heatmap of patterns of regular exercise.

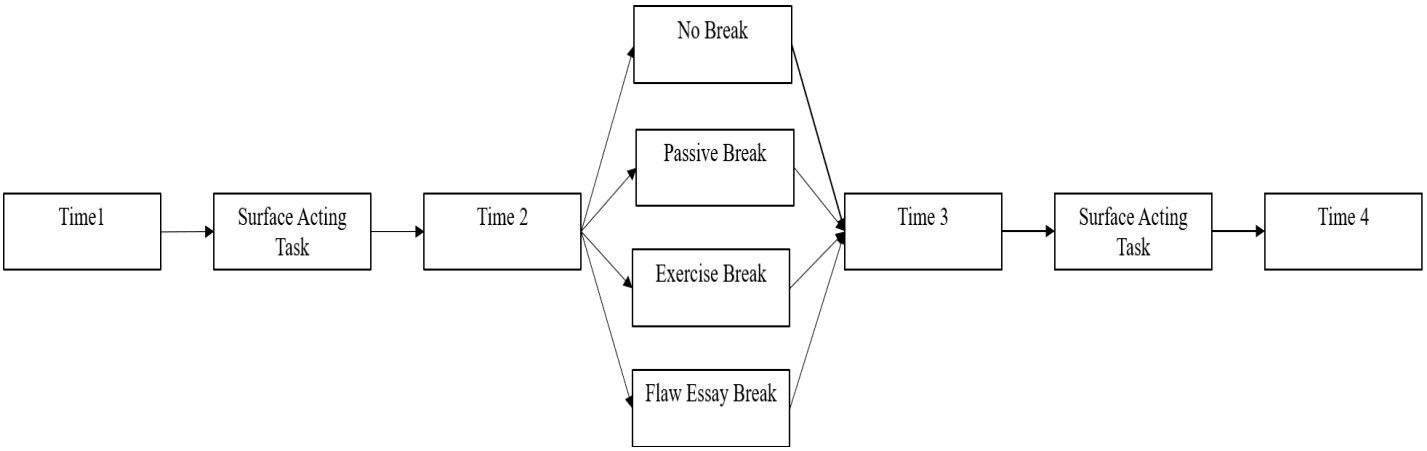

Figure 2. The study procedure.

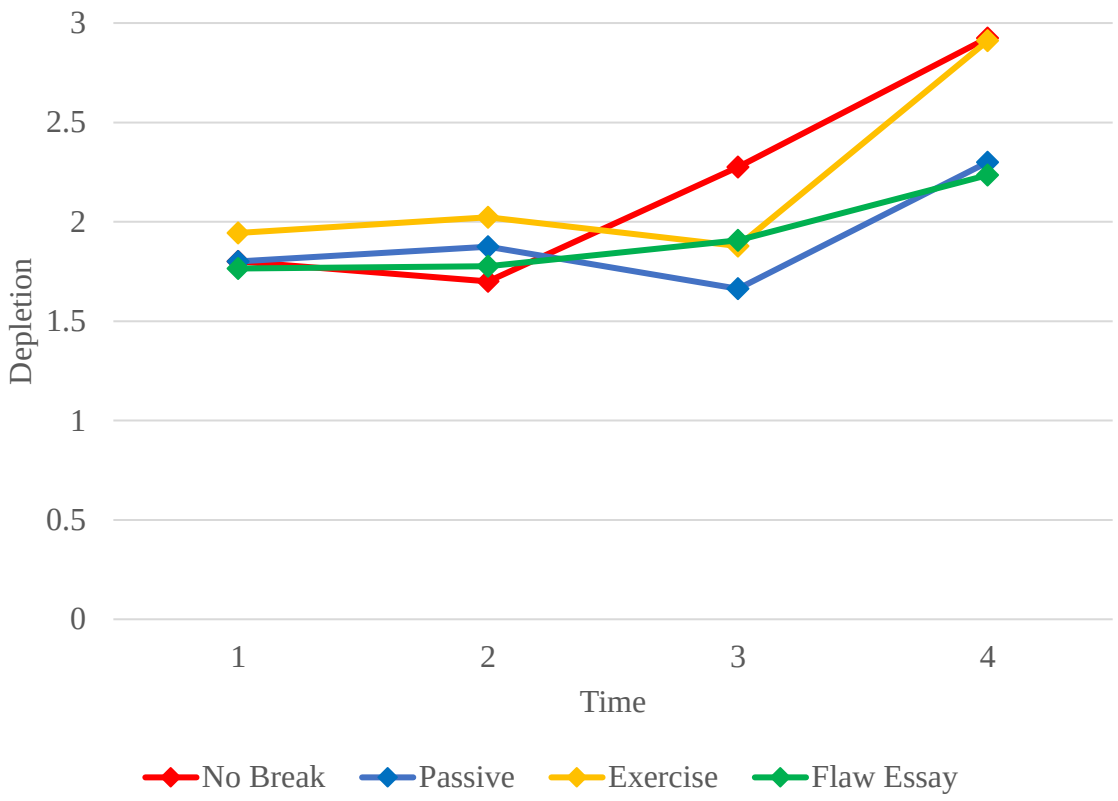

Figure 3. Depletion at each time point across the four break conditions.

Appendix A: Covariate Analysis

A sixteen-item measure of exercise motives was included in order to determine participant's motivation behind participating in physical activities and exercise (Guay et al., 2000; ten Brummelhuis & Trougakos, 2014). The measure included four subscales representing intrinsic motivation, external motivation, identified motivation, and amotivation. Each subscale included four items. Participant responded to each item on a six-point Likert-type scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). Intrinsic motivation for physical activity is engaging in physical activity for itself, to gain the pleasure and satisfaction that an individual feels is inherent in physical activity (Guay et al., 2000). A sample item for intrinsic motivation is "I exercise because I think exercising is interesting" ($\alpha = 0.90$). External motivation for physical activity is engaging in physical activity to obtain a reward or avoid a negative consequence (Guay et al., 2000). A sample item for external motivation is "I exercise because I am supposed to exercise" ($\alpha = 0.62$). The psychometric properties of this measure may be suboptimal to use in analyses. Identified motivation for physical activity is when an individual engages in physical activity because they value the behavior and choose it for themselves (Guay, et al.,2000). A sample item for identified motivation is "I exercise because I am doing it for my own good" ($\alpha = 0.89$). Amotivation for physical activity is when an individual does not experience contingency between participating in physical activity and outcomes (Guay, et al., 2000). A sample item for amotivation is "I exercise but I am not sure if it is worth it" ($\alpha = 0.81$).

Big Five Personality traits were measured using the Mini-Markers scale (Saucier, 1994) in order to capture extraversion, agreeableness, conscientiousness, openness to experience, and neuroticism. Participants indicated the extent to which they agreed or disagreed that various adjectives could be used to describe them in general. Participants responded on a five-point

Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Each of the Big 5 personality traits were captured with eight items. A sample item for extraversion is "Bold" (α = 0.87). A sample item for agreeableness is "Cooperative" (α = 0.78). A sample item for conscientiousness is "Organized" (α = 0.75). A sample item for openness is "Creative" (α = 0.73). A sample item for neuroticism is "Moody" (α = 0.63). The psychometric properties of this measure may be suboptimal to use in analyses.

Self-monitoring is the extent to which an individual observes and controls how they present and express themselves (Snyder, 1974). Self-monitoring was measured using ten statements (Snyder, 1974), in which participants indicated the extent to which the statements described them in general using a five-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). A sample item is "I would make a good actor" (α = 0.83).

Chronic depletion was measured using the Self-Regulatory Fatigue Scale (Nes, Ehler, Whipple, & Vincent, 2013). The scale includes eighteen statements which include cognitive, behavioral, and emotional depletion subscales, but the scale has also been shown to be used as an overall measure, without dividing into subscales (Nes et al., 2013). Participants rated the extent to which they agreed with the statements using a five-point Likert-type scale ranging from 1 (*not at all true*) to 5 (*very true*). The overall scale reliability with all eighteen items was estimated at α = 0.80.

The trait emotion regulation strategies of reappraisal and suppression were measured using the Emotion Regulation Questionnaire developed by Gross and John (2003). Reappraisal occurs when an individual cognitively changes the situation, thus changing the emotional impact of the situation (Lazarus & Alfert, 1964). Suppression is when an individual inhibits or hides the emotion-expressive behavior (Gross, 1998). Participants used a six-point Likert-type scale

ranging from 1 (*strongly disagree*) to 6 (*strongly agree*) to indicate the extent to which they agree with ten statements. Six statements represented reappraisal and four statements represented suppression. A sample item for reappraisal is "I control my emotions by changing the way I think about the situation I'm in" ($\alpha = 0.94$). A sample item for suppression is "When I am feeling negative emotions, I make sure not to express them" ($\alpha = 0.86$).

A set of one-way ANOVAs were conducted to determine if there was a significant difference in the proportion of different demographic group members across the four break conditions, which would be indicative of a failure of random assignment. No evidence was observed that condition assignment was imbalanced as a function of age ($F_{(3,46)} = 1.21$, $p = 0.32$, $\eta^2 = 0.07$), gender ($\varphi = 0.35$, $p = 0.41$), race ($\varphi = 0.30$, $p = 0.88$), height ($F_{(3,46)} = 0.06$, $p = 0.98$, $\eta^2 = 0.004$), or weight ($F_{(3,46)} = 1.16$, $p = 0.34$, $\eta^2 = 0.07$). There was an imbalance in the number of participants that identify as Hispanic or Latinx among break conditions ($\varphi = 0.44$, $p = 0.02$), but this difference may have been spurious due to the fact that there were only five Hispanic or Latinx participants in the sample and they were only represented in two of the four conditions. Therefore, I elected not to statistically control for whether participants were Hispanic or Latinx when testing my hypotheses.

There was also no evidence that condition assignment was imbalanced as a function of if participants had a job ($\varphi = 0.16$, $p = 0.72$) or if this job was in the service sector ($\varphi = 1.03$, $p = 0.52$). No evidence was observed that condition assignment was imbalanced as a function of if participants regularly engaged in physical activity ($\varphi = 0.23$, $p = 0.44$), the number of times per week that they engaged in physical activity ($F_{(3,38)} = 1.96$, $p = 0.14$, $\eta^2 = 0.13$), or the length of a typical workout ($F_{(3,39)} = 0.35$, $p = 0.79$, $\eta^2 = 0.03$). There was also no evidence that condition assignment was imbalanced as a function of intrinsic motivation ($F_{(3,45)} = 0.52$, $p = 0.67$, $\eta^2 =$

0.03), external motivation ($F_{(3,46)} = 1.12$, $p = 0.35$, $\eta^2 = 0.07$), identified motivation ($F_{(3,46)} = 2.48$, $p = 0.07$, $\eta^2 = 0.14$) or amotivation ($F_{(3,46)} = 0.72$, $p = 0.54$, $\eta^2 = 0.04$).

There was no evidence that condition assignment was imbalanced as a function of extraversion ($F_{(3,44)} = 0.94$, $p = 0.43$, $\eta^2 = 0.06$), agreeableness ($F_{(3,46)} = 0.82$, $p = 0.49$, $\eta^2 = 0.05$), conscientiousness ($F_{(3,45)} = 0.03$, $p = 1.00$, $\eta^2 = 0.002$), openness ($F_{(3,46)} = 1.07$, $p = 0.37$, $\eta^2 = 0.07$) or neuroticism ($F_{(3,44)} = 1.23$, $p = 0.31$, $\eta^2 = 0.08$). There was also no evidence that condition assignment was imbalanced as a function of self-monitoring ($F_{(3,46)} = 0.13$, $p = 0.94$, $\eta^2 = 0.01$) or chronic depletion ($F_{(3,46)} = 1.39$, $p = 0.26$, $\eta^2 = 0.08$). Finally, there was no evidence that condition assignment was imbalanced as a function of reappraisal ($F_{(3,46)} = 0.52$, $p = 0.67$, $\eta^2 = 0.03$) or suppression ($F_{(3,46)} = 0.36$, $p = 0.79$, $\eta^2 = 0.02$).

Appendix B: Surface Acting Example

Negative Review #1

My friends and I decided to go to this restaurant for a couple drinks and appetizers after work one day. There was only street parking which was very limited, so we had to park far away. The decor was out there which was obnoxious and distracting. They had benches with pillows instead of chairs, and a lot of string lights hung up around the restaurant which made it seem more like a bedroom than a dining facility. They also had some music playing in the background which was way too loud. We decided to sit at the bar instead of getting a table as there was not a lot of people there compared to the overly packed dining room. The bartender was so slow to get our orders and make our drinks; after a bit of small talk he left us alone for most of the night which was annoying when we wanted to get another drink and he ignored us. The food and drinks were super expensive, and I think that it was an absurd price for the quality that we got. After we finished, the bartender was slow again to get us our tab. Quite the annoying night!

Negative Review #2

Last weekend I went to the city to visit my friend who is still in school. She told me she had a bad day so we decided to go to a cafe to get dessert and coffee. The cafe was grossly colored with no windows that made it so there was no natural light. We sat at a table near the darkest corner and we asked for just the drink and dessert menu. My friend really likes chocolate and sweets so she got a caramel chocolate macchiato while I got a rose infused latte. For dessert she ordered the chocolate molten lava cake and I got the tres leches cake. They brought out desserts and drinks together which was annoying because we wanted to enjoy each separately, additionally drinks were lukewarm by the time it all came out. It also tasted bad and we both had an all-around bad time. The waiter was rude and did not make much of an effort to converse with

us besides the basics. I offered to pick up the check since her day had gone so poorly, and she let me which ended up coming back to bite me because it was overpriced.

Negative Review #3

We went to this sushi restaurant for my son's 15th birthday party because he has been telling me how much he likes sushi. I have always loved sushi so I was so excited to celebrate his special day with this amazing food. When we got there the restaurant was so dark we literally could not see anything, maybe it would be good for a romantic date which is obviously not what this was. We ordered 5 different rolls and ended up ordering two more because they weren't big enough for my family of six. Really the waiter should have warned us in the beginning that we should order more. The sushi was bad and the fish seemed old. I wish each roll had a little more sauce on it. My son whose birthday it was didn't end up liking the sushi we got too. I think he lied about liking it in the first place but even us sushi lovers were not pleased. I would not recommend going here if you have any intentions of eating even semi decent sushi. Additionally, it was way too expensive for the small amount of food we got.