Author: Lynch, Stephanie M.

Title: Break-Taking in the Workplace: How Break Activity, Length, Frequency, and Autonomy Influence Post-Break Recovery

The accompanying research report is submitted to the University of Wisconsin-Stout, Graduate School in partial completion of the requirements for the

Graduate Degree/ Major: Master of Science in Applied Psychology

Research Advisor: Alicia Stachowski, Associate Professor

Submission Term/Year: Fall 2019

Number of Pages: 56


☒ I have adhered to the Graduate School Research Guide and have proofread my work.
☒ I understand that this research report must be officially approved by the Graduate School. Additionally, by signing and submitting this form, I (the author(s) or copyright owner) grant the University of Wisconsin-Stout the non-exclusive right to reproduce, translate, and/or distribute this submission (including abstract) worldwide in print and electronic format and in any medium, including but not limited to audio or video. If my research includes proprietary information, an agreement has been made between myself, the company, and the University to submit a thesis that meets course-specific learning outcomes and CAN be published. There will be no exceptions to this permission.
☒ I attest that the research report is my original work (that any copyrightable materials have been used with the permission of the original authors), and as such, it is automatically protected by the laws, rules, and regulations of the U.S. Copyright Office.
☒ My research advisor has approved the content and quality of this paper.

STUDENT:

NAME: Stephanie Lynch
DATE: 12/9/2019

ADVISOR: (Committee Chair if MS Plan A or EdS Thesis or Field Project/Problem):

NAME: Alicia Stachowski
DATE: 12/9/2019

This section for MS Plan A Thesis or EdS Thesis/Field Project papers only

Committee members (other than your advisor who is listed in the section above)

1. CMTE MEMBER’S NAME: Chelsea Lovejoy
DATE: 12/9/2019

2. CMTE MEMBER’S NAME: Marya Wilson
DATE: 12/9/2019

3. CMTE MEMBER’S NAME: 
DATE:

This section to be completed by the Graduate School

This final research report has been approved by the Graduate School.

Director, Office of Graduate Studies: DATE:
Lynch, Stephanie M. *Break–Taking in the Workplace: How Break Activity, Length, Frequency, and Autonomy Influence Post-Break Recovery*

**Abstract**

Many people spend the majority of their day at work. Company-issued laptops and mobile phones make it easy for employees to continue working in the evenings and on weekends as well. According to Hobfoll’s (1989) Conservation of Resources Theory, this can lead to resource loss, which results in strain and a lack of productivity. Rest breaks are often used to remedy this problem. This research investigated the effectiveness of amount of physical activity during breaks, break frequency, break duration, and autonomy (to choose how breaks will be spent and when to take breaks) on recovery. It was hypothesized that a series of frequent shorter breaks was more effective for recovery than fewer long breaks. Additionally, it was posited that physical activity during breaks aided in recovery better than remaining inactive; and that the ability to choose break duration and activity led to better recovery than the inability to choose. This was a descriptive study in which 225 respondents completed a questionnaire on the social media website, Facebook, and Amazon’s Mturk. Results showed that the more active breaks taken, the longer shorter breaks taken, and the interaction between length of long breaks, long break frequency, and autonomy led to better recovery.
Acknowledgments

Thank you to my family and friends for all of your encouragement, love, and support as I completed my thesis. To my parents especially, thank you for providing the motivating words that I needed throughout this journey and for understanding when I missed special family events to work on this. To my aunt Sylvia, thank you for believing that I could accomplish such a task. To my boyfriend, Dusty, thank you for staying up late talking to me, watching Louie, and being there to support me. It was certainly easier to do this with you by my side.

Thank you so much to my advisor, Alicia Stachowski. I appreciate the countless hours you spent reviewing multiple drafts, at all times of the day, and taking time out of your busy schedule to talk to me whenever I had questions. The encouragement and motivation you provided every step of the way was just what I needed to make progress each week. As someone who has been out of school for a few years, I am extremely grateful for all of the extra guidance and help you provided. I always knew that if anyone could help me finish this, it was you.

Thank you to my committee members, Chelsea Lovejoy and Marya Wilson. You provided wonderful feedback on my project for my proposal and defense meetings. It certainly helped to make my final thesis stronger.
# Table of Contents

Abstract ................................................................................................................................. 2

List of Tables ......................................................................................................................... 5

Chapter I: Literature Review ............................................................................................... 6
  Theoretical Basis: Conservation of Resources ................................................................. 7
  Active vs. Inactive Rest-Breaks ....................................................................................... 9
  Rest Break Frequency and Duration .............................................................................. 11
  Autonomy Over Rest-Break Activities .......................................................................... 14

Chapter II: Methodology .................................................................................................... 17
  Participants ....................................................................................................................... 17
  Materials ......................................................................................................................... 17
  Procedure ........................................................................................................................ 20

Chapter III: Results ............................................................................................................. 22
  Hypothesis Testing ......................................................................................................... 25
  Figure 1: Interaction between Long Break Frequency, Long Break Length, and Autonomy .................................................................................................................. 29

Chapter IV: Discussion ....................................................................................................... 33
  Limitations and Directions for Future Research .......................................................... 35
  Conclusions ...................................................................................................................... 37

References ............................................................................................................................ 39

Appendix: Qualtrics Survey ............................................................................................... 44
List of Tables

Table 1: Short and Long Break Activities ...............................................................23
Table 2: Correlations, Means, and Standard Deviations between Study Variables ..........24
Table 3: Regression for Break Activity, Frequency, Choice, and Autonomy .................26
Table 4: Summary of Hierarchical Regression Analysis for Variables Predicting Break Recovery (N = 127) .......................................................................................................................28
Table 5: Regression for Break Activity, Frequency, Choice, and Autonomy (N = 17) .......31
Table 6: Summary of Hierarchical Regression Analysis for Variables Predicting Break Recovery (N = 67) .......................................................................................................................32
Chapter I: Literature Review

Most people spend between 8 to 12 hours a day at work (Sianoja, Kinnunen, de Bloom, Korpela, & Geurts, 2016), and companies strive to maximize their employees’ productivity while they are there. Cognitive resources, which influence one’s ability to focus, diminish throughout the workday, thereby impacting productivity (Trougakos & Hideg, 2009). To help employees recover these resources, in the United States, most businesses give their full-time employees a 15-minute rest break in the morning, 30-minute rest break for lunch, and another 15-minute rest break during the afternoon (De Vera Barredo & Mahon, 2007). For this reason, it was important to investigate how rest breaks influence resource recovery. Recovery is defined as a “psychophysiological unwinding after effort expenditure at work that restores employees’ energy and mental resources” (Sianoja, et al., 2016, p. 1).

Much of the past research on this subject has provided inconclusive evidence on the most beneficial type of rest break due to the multiple factors influencing recovery (Trougakos & Hideg, 2009). One of the aims of this research is to provide workers information about the most effective rest breaks. For example, it was hypothesized that engaging in physical activity during breaks, and participating in a series of short breaks was associated with better recovery than longer rest breaks. Additionally, it was expected that those who were given the autonomy to choose what they do during their rest breaks would feel more recovered when they resumed working compared to those who were not.

The paper is organized as follows. The theoretical basis for this project, Hobfoll’s (1989) Conservation of Resources Theory, will be discussed first as a foundation for each of the predictions. Next, existing research on inactive versus active rest breaks will be described. Following this consideration, past research about break frequency and duration’s impact on work
outcomes will be discussed. The last independent variable in this project will include the influence of autonomy on break recovery. Specific hypotheses are offered throughout the literature review. The survey methodology and results are described following the literature review. Finally, a discussion of the findings concludes the paper.

**Theoretical Basis: Conservation of Resources**

Break-taking research is grounded in Hobfoll’s (1989) Conservation of Resources Theory. This theory suggests that people strive to obtain and maintain their personal resources. There are four types of resources that are described: object resources (e.g., money, possessions), condition resources (e.g., status), personal characteristics (e.g., skills), and energies to gain additional resources. This theory states that losing any of these resources affects a person more than acquiring resources. Additionally, those who have many resources (e.g., energy) are not as vulnerable to resource loss. For instance, individuals who come to work tired, with low energy, are more likely to feel stressed and lose energy faster when they are assigned work tasks than those who come work fully rested and energized. Moreover, individuals with two hours of intense meetings per day and six hours to complete their work tasks will likely suffer from less fatigue and stress than individuals who have six hours of intense meetings per day with two hours to complete the same work tasks. Those with fewer meetings should feel less fatigued because they have more time to complete their work. It is argued here that breaks help to replenish energy so individuals are better able to deal with workplace stressors. As another example, individuals who take long, relaxing vacations from work accumulate resources while they are away and are, therefore, better able to deal with the demands of work when they get back (Trougakos & Hideg, 2009). Conversely, when individuals with fewer resources lose them,
the loss is more drastic and they have a difficult time acquiring them in the future (Trougakos & Hideg, 2009).

It is necessary to be aware that resource loss (e.g., energy loss) accumulates over time (Meijman & Mulder, 1998). According to Zohar and Dori (2003), resource loss increases with the amount of time spent working. Individuals naturally tend to lose energy throughout the day. This is detrimental because of the long hours that people work during the workday and outside of it. Additionally, resource loss occurs when individuals are given an intense workload and short deadlines for work completion. According to Hobfoll (1989), a helpful remedy for this loss is a rest break, or some form of relaxation, during the workday. It affords individuals the ability to temporarily escape from job demands. Rest-breaks should be long enough to allow individuals to build resources, such as energy, to get them through the entirety of their workday (Sianoja et al., 2016).

The rebuilding of resources during a rest-break leads to other positive consequences as well. For example, Sianoja et al. (2016) conducted a longitudinal study on how lunch break recovery influenced long-term energy levels. They surveyed a sample of 1,192 people at the beginning and end of a 12-month period. During the study, they measured break settings and activities, recovery, emotional exhaustion and control variables. The researchers found that successfully recovering during lunch was related to increased vigor and less exhaustion one year later. According to DeCroon, Sluiter, Blonk, Broersen, and Frings-Dresen (2004), individuals were less likely to suffer from psychological and physical health problems when they were given the opportunity to recover as well.

Although research has heavily supported the benefits of taking breaks, the amount of activity one should engage in for maximum recovery remains unclear (Wendsche, Lohmann-
While researchers have found physical activity to be beneficial during work breaks, they have also found a benefit to remaining sedentary (Sonnentag, 2001). Individuals who do not like physical activity may not find that type of break as enjoyable. This study included workers of different occupations since most previous research includes participants with sedentary jobs (De Vera Barrado & Mahon, 2007).

Rest breaks during the workday have been defined in various ways, but can be separated into active versus inactive breaks. Examples of inactive breaks include changing work assignments, having meetings, and eating lunch. Active breaks include going to the bathroom, taking a smoke break, getting away from a computer, and exercising during the day (Epstein, Avrahami & Biehl, 2016). Since there was disagreement in the amount of physical activity employees should get during a rest break for optimal post-break recovery, the next section explores the existing research on active versus inactive breaks.

**Active vs. Inactive Rest-Breaks**

The results of physical activity benefits during rest-breaks are mixed. While some studies have shown that remaining inactive during rest breaks can be more beneficial than engaging in physical activity (Epstein et al., 2016), others have found physically activity breaks to be more beneficial (Trougakos & Hideg, 2009). Still, other evidence claims that there is no difference between the two conditions (Nakphet, Chaikumarn, & Janwantanakul, 2014). Existing research on both inactive and active breaks is presented below.

**Inactive breaks.** Inactive breaks are those where individuals remain seated. Studies often use the term *respites* to describe restful, low-effort activities such as sitting quietly, sleeping, and relaxing (Trougakos & Hideg, 2009; Trougakos et al., 2008). It is believed that individuals should engage in respite activities during breaks because they require minimal effort,
thereby helping to prevent further depletion of resources (Sonnentag & Natter, 2004). After studying the effects of participating in *respite* versus *chores* (e.g., working with clients, running errands) during breaks, Trougakos and colleagues (2008) found that respite breaks improved performance and recovery, while chores, which are more active, did not.

**Active breaks.** Despite the support for inactive breaks presented above, others have suggested that there are, both physical and cognitive, benefits associated with activity. The Occupational Safety and Health Administration (OSHA) recommends employees engage in physical activity during their workday. More specifically, OSHA recommends that employees stretch their torso, fingers, hands and arms frequently throughout the day; take several rest breaks; stand up and walk around for a few minutes occasionally, and alternate between computer and non-computer tasks. Consistent with this recommendation, other research has found physical activity to be beneficial for employees’ health. In one study, after participants completed four 45-second exercises at the beginning of their 5-minute rest breaks, complaints about musculoskeletal pain in their necks and upper extremities decreased (Van den Heuval, de Looze, Hildebrandt & Thè, 2003).

Physical activity is associated with *cognitive benefits* as well (Fritz, Ellis, Demsky, & Lin, & Guros, 2013; Matic, Ospmani, Popleteev, & Mayora-Ibarra, 2011; Sonnentag & Natter, 2004). Researchers found that rest breaks that include predetermined exercises concentrating on the fingers, forearms, wrist, chest, back, shoulder, and neck, were more effective at improving worker productivity and well-being than inactive rest breaks for Visual Display Unit Operators (Henning, Jacques, Kissel, Sullivan, & Alteras-Webb, 1997). Likewise, Carter and Banister’s (1994) results indicated that exercise during rest breaks was positively related to increased productivity on computer and data entry tasks. Matic et al. (2011) monitored physical activity of
individuals during rest-breaks using a mobile phone sensor. Mood questionnaires were sent to participants three times throughout the workday. They discovered that engaging in physical activity during rest-breaks was positively correlated with changes in reported positive and overall mood, and negatively correlated with negative mood. Relevant to this study, positive mood prevented resource depletion (Tice, Baumeister, Shmueli, & Muraven, 2007). That is particularly important for individuals who work directly with customers on a daily basis and need to exhibit positive affective displays (a positive disposition to deal with customers) in order to succeed at their jobs (Trougakos et al., 2008). Moreover, engaging in a sport or exercise during the evening can predict vigor and well-being before bed as well, which means that it is a good way of replenishing resources before work the next day (Sonnentag & Natter, 2004).

While research has shown both active and inactive breaks to be useful for recovery, the majority of research seems to conclude that active breaks are more beneficial, especially if employees prefer spending their breaks that way. In accord with Hobfoll’s Conservation of Resources Theory (1989), engaging in physical activity is a way of replenishing resources by detaching from work (i.e., moving away from the work station for a break).

H1: Engaging in physical activity (getting up and moving around) during rest breaks is associated with higher levels of recovery compared to taking inactive rest break.

Rest Break Frequency and Duration

In addition to the question of what kind of break is most valuable, a wealth of research has been conducted to investigate the most beneficial break length (Sonnentag, 2003). Consensus has not yet been achieved. According to Hobfoll’s (1989) Conservation of Resources Theory, individuals need breaks during their workday to build up their cognitive resources. The best way do this is by eliminating or reducing demands during breaks (Trougakos & Hideg, 2009). Being
physically distant from work during non-work time is a way to do this. In fact, some researchers found longer lunch breaks (about 30 minutes) to be more beneficial for recovery than shorter breaks (Sianoja et al., 2016). A longer break affords individuals the time to physically leave the work environment for a bit; shorter breaks may not (Krajewski, Wieland, & Sauerland, 2010). Consistent with the above research, Epstein et al. (2016) found that longer work breaks were associated with feeling more refreshed and relaxed. However, a negative relationship was found between longer work breaks based on time elapsed at the end of a break and readiness to return to work based on a question that directly asked if participants were ready to work. The researchers suggested that while long breaks may leave one less ready to work, those who are less ready to work may also take longer breaks. Inconsistency like this, has led to research on shorter breaks as well.

Short rest breaks, often known as “micro-breaks,” throughout the workday may provide more benefits than longer breaks (Henning et al., 1997; Kuhnel, Zacher, De Bloom, & Bledow, 2017; Wendsche et al., 2016; Zacher, Brailsford, & Parker, 2014). The literature defines micro-breaks as “energy management strategies that are not directly related to doing work” (Zacher et al., 2014, p. 288). Zacher and colleagues (2014) discovered that the most frequent micro-breaks included doing activities such as drinking water, going to the bathroom, and having a snack. They found that micro-break participation was negatively correlated with fatigue and positively correlated with vitality. In one study, shorter rest breaks had more positive effects on performance (Coker, 2013). Henning et al. (1997) found short rest breaks (i.e., 30-seconds to 3-minutes long) that occurred every 15 minutes improved well-being and productivity. However, that finding only occurred at one of the two worksites tested. Additionally, Kuhnel et al. (2017) found that taking short rest breaks had positive effects on work engagement, particularly in the
afternoon. It has been suggested that shorter rest breaks prevent the build-up of strain, thereby preventing negative physical and mental outcomes throughout the day (Wendsche et al., 2016). Although not in a workplace setting, one study of college students found that those with higher academic standing took shorter rest breaks at more frequent intervals than those with lower academic standing (Strongman & Burt, 2000). In that study, participants believed that breaks should be taken sooner and more often for people who engage in primarily mental work, compared to physical work. This body of research may suggest that shorter rest breaks are more effective than longer ones for people working in some occupations more than others.

Hobfoll’s (1989) Conservation of Resources Theory applies to rest-breaks. It mentions that those who have fewer resources (e.g., energy and time) are at a greater risk for resource loss during stressful situations. For instance, those who have less time are more likely to lose energy when they are given work tasks. In terms of break duration, those who take shorter breaks more often should lose fewer resources (e.g., total energy) throughout the day because they continually replenish their resources or energy during breaks. As a result, they will maintain a moderate, functional level of resources throughout the day. Conversely, those who work for longer periods of time likely lose a large amount of resources, making them less likely to restore all of their original resources when they finally take a break. Since the optimal length for a break is still in question, this study will investigate how many breaks participants normally take, and how long their breaks typically last. Previous research defined short breaks differently. In one study, short breaks lasted only 30 seconds, while long breaks lasted 3 minutes (Henning et al., 1997). Wendsche, Lohmann-Haislah, & Wegge (2016) found that the median length of short breaks was 5 minutes ranging from 3 minutes to 10 minutes in length. Also, Kuhnel et al. (2016), defined “short breaks” as “an interruption of your job activity that only took a few minutes.” Since the
literature considers a “short break,” to be 30 seconds to 10 minutes, the current study defined them as breaks lasting five minutes or less. Thus, a break lasting longer than five minutes was considered a “long break.”

Based on the above research, short breaks seem to provide more benefits than longer breaks. Compared to taking few long breaks, frequent short breaks allow individuals to easily replenish the resources they have lost throughout the day. The amount of resources that individuals lose should not be enough to drastically increase fatigue or stress. Since short breaks have been found to prevent the build-up of strain and fatigue, and allow for improved performance, it was hypothesized that those who take short breaks would experience better recovery.

\[ H2: \text{Those who take short breaks throughout the day will experience better recovery than those who take fewer long breaks.} \]

\[ H3: \text{Break frequency is positively associated with recovery.} \]

**Autonomy Over Rest-Break Activities**

There is a significant amount of inconsistency in break-taking research regarding what type of break will provide the most post-break recovery for employees. This inconsistency drove researchers to investigate a common variable that might help explain these discrepant findings: autonomy. Researchers have defined autonomy as the ability to choose when to take breaks, the ability to choose what to do during breaks, or both. Deci and Ryan (2000) explained autonomy like freedom, an important aspect of human functioning. In their study, autonomy was defined as one’s ability to choose when to take a rest break, as well as how the rest break should be spent. Beeftink, van Eerde, and Rutte (2008) found that the ability to decide when to take rest breaks led to more insight and fewer impasses during problem solving activities. Additionally, the
ability to choose when to take a rest break was beneficial because it allowed a time of high productivity to continue without interruption (Bailey & Konstan, 2006).

When it comes to the autonomy in relation to break activity, Sianoja (2016) found that female participants with low perceived autonomy, or little choice over how breaks were spent, experienced more emotional exhaustion a year later. High lunch break autonomy, in contrast, was positively related to vigor, which was associated with energy, activation, and mental resilience. Trougakos et al. (2014) found that autonomy during breaks made the relationship between break activities and recovery stronger (Trougakos et al., 2014). However, the authors only used one item to capture perceived autonomy and recommended future studies use multiple items. Therefore, the current study used a scale with multiple autonomy items.

Multiple studies examined the effects of activity choice post break. Hunter and Wu (2016) found that partaking in preferred rest break activities was related to greater resources after the break. One reason for this was that individuals were not engaging in activities that required behavioral regulation, which depletes cognitive resources (Muraven & Baumeister, 2000). It is believed that partaking in activities individuals consider enjoyable helps to energize them in ways that make returning to work easier. Parfitt and Gledhill (2004) suggested that individuals who were able to participate in their preferred exercise experienced lower fatigue and exertion, and greater well-being. As a result, they returned to work better recovered with improved vigor, a better mood, and less physical pain and discomfort. Additionally, Nakphet et al. (2014) conducted a study in which participants were asked during rest breaks to both stand and perform a series of stretching exercises, or to take their hands off of the keyboard and relax in their chairs. No difference was found in productivity, muscle activity, and muscle discomfort between the two conditions; any type of break was beneficial. Both may benefit in a similar manner if they
are able to partake in activity of their choice. It has been suggested that the type of activity one chooses to partake in during their within workday breaks is extremely important since individuals are not able to completely remove themselves from work for long periods of time (i.e., week long vacations; Trougakos & Hideg, 2009). Thus, the activities that serve to restore an individual’s resources the best will likely be the most beneficial for overall recovery.

H4: Those who can choose when to take rest breaks will experience greater recovery than those who cannot choose when to take their breaks.

H5: Those who have a choice of rest break activity will experience greater recovery than those that do not have choice over rest break activity.

While studying each of the above variables, it may be insightful to consider the potential interactions that exist among them. For instance, perhaps frequent short breaks allow for better recovery when individuals have higher autonomy. It may be that duration and frequency of work breaks only matter if an individual is able to choose how they spend their work break. Also, those who are given few work breaks might recover from longer breaks better than short ones. This study investigated which of the variables (frequency, length, and autonomy) was most strongly related to recovery, as well as whether there was an interaction between them.

Research Question 1: Do break type, frequency, and length have an interactive effect on recovery?
Chapter II: Methodology

Research was conducted using a Qualtrics survey posted on Facebook and Amazon’s Mturk. Data collection took place from June 2019 to August of 2019. Participants were full-time workers from a variety of occupations.

Participants

The sample consisted of 225 participants who worked full-time. They were recruited from Facebook and Amazon’s Mturk during the summer of 2019. The majority of the sample, 164 (72.9%) took breaks, 41 (18.2%) did not take breaks, and 20 (8.9%) did not answer the question. There were 144 participants who completed demographic information regarding age, sex, education, and occupation. Participants’ ages ranged from 23 to 72. The mean age was 36.17 (SD = 9.24). The sample was comprised of 78 (54.2%) males and 66 (45.8%) females. Of the 144 participants who answered a question about their level of education, 19 (13.2%) completed high school, 18 (12.5%) had some college, 14 (9.7%) had an Associate’s degree, 68 (47.2%) had a Bachelor’s degree, 22 (15.3%) had a Master’s degree, and 3 (2.1%) had a Doctorate.

Participants held jobs in a variety of occupations. There were 18 (34%) in information technology/software development, programming, 9 (7%) in education, and 9 (7%) in sales/retail, for example.

Materials

Measures for break duration, break type, break frequency, autonomy, recovery and demographics are described in the sections below.

Break duration. Initially, individuals were asked whether or not they took breaks. Those who indicated that they did take breaks were directed to questions about break duration. Short breaks and long breaks were defined for participants. The definition of a “short-break” was
crafted from Kuhnel et al. (2016). It was defined as, “an interruption of your job activity that takes only a few minutes.” In this study a short break was “a break that lasts 5 minutes or less.” A long break was described as a break that “lasts longer than 5 minutes.” They were provided with a list of activities found in past break-taking research regarding short breaks (e.g., using the restroom, making a private phone call, going for a coffee or water, and surfing websites) versus long breaks (e.g., eating lunch, conversing in a breakroom with coworkers, running an errand, or going for a walk). Participants were asked, “On average, how long do your short breaks typically last?” They were given an answer box to fill in the amount of time in minutes. Similarly, they were asked to answer in an open-ended format, “On average, how long do your long breaks typically last?” Moreover, they were questioned about how many short breaks they typically took in the first half of their workday and second half of their work day, as well as how many long breaks they typically took in first half of their work day and second half of their work day. They were given a list from 0 to 20 with an “other” option included so they could fill-in a response if it was not listed.

**Break type.** In order to measure break type (i.e., inactive vs. physically active), participants were asked about the activities they typically engaged in during their short and long rest breaks. A drop-down list of activities was given. Some of the items in the list included make a to-do list, listen to music, surf the web, go outside for fresh air, stretch, have a snack, send a personal email or text message, and discuss non-work related topics with a friend or co-worker (Zacher et al., 2014). An “other” category was also present, allowing individuals to respond with an answer that was not listed. Participants were able to choose at many as they wanted. Additionally, participants were asked how many active and inactive rest breaks they took throughout the workday. They were given a drop-down list of numbers (0-20) to choose from.
**Break frequency.**  Break frequency was measured using four items. Individuals were asked “How many short breaks do you typically take during the first half of your workday?” They were able to choose from 0 to 20. An “other” category was included for them to write in a response that fell out of that range. Similarly, they were asked, “How many short breaks do you typically take during the second half of your workday?” Again, participants were able to choose responses 0 to 20 and “other” if their answer falls out of the range included. The same questions were asked about long breaks.

**Autonomy.**  In order to measure autonomy, control questions from the Recovery Experience Questionnaire were used (Sonnentag & Fritz, 2007). Although the items on this questionnaire measured recovery experiences during time after work, the items were adapted to apply to recovery after breaks for this study. Items to measure autonomy were given for short and long breaks. For instance, to measure autonomy of short breaks participants were given four items. The first item was, “During short breaks, I determine for myself how I will spend my time.” The second item was, “During short breaks, I decide my own activities.” The third item was, “During short breaks, I feel like I can decide for myself what to do.” The final item was, “During short breaks, I take care of the things the way I want.” Participants indicated responses using a 5-point scale from 1 (*I do not agree at all*) to 5 (*I fully agree*). Cronbach’s alpha for this measure was .85 (Sonnentag & Fritz, 2007). To measure autonomy of long breaks, “During short breaks…” was replaced with “During long breaks…”

**Recovery.**  Recovery was measured using three items, adapted to match break type, from Sonnentag and Niessen (2008). In total there were six items, three for break length (long vs. short) and break activity level (active vs. inactive). All items were measured using a 5-point Likert scale ranging from 1 (*I do not agree at all*) to 5 (*I do fully agree*). Considering equal
amounts of total time between the two break styles, the first item stated, “I feel more recovered after taking a series of short breaks compared to fewer long breaks.” The second was, “I feel more relaxed after taking a series of short breaks compared to fewer long breaks.” The third was, “I am in a good mood after taking a series of short breaks compared to fewer long breaks.” These statements were also asked about the amount of physical activity received during their breaks (i.e., “I feel more recovered after I am mostly active during my rest breaks compared to when I am mostly inactive”). Sonnentag and Niessen (2008) used this to measure recovery after engaging in a series of activities including low effort and physical activities.

Additionally for each type of break (short and long), an item was included to measure how much a person relaxed. Adapted from the Recovery Experience Questionnaire, it read, “During short breaks, I use the time to relax.” They were measured using a 5-point Likert scale, with 1 (Never) and 5 (Always) (Sonnentag & Fritz, 2007).

**Demographics.** Demographic information was collected about the participants including age, gender, education, and occupation.

**Procedure**

A Qualtrics survey was approved by the Institutional Review Board. Then, the survey was posted on the researcher’s Facebook page and Amazon’s Mturk. Participants viewed an implied consent form about the survey prior to clicking on the link to take the survey. When the link had been clicked, consent to complete the survey was assumed. Participants were initially asked whether they had a full-time job. Those who did not were thanked and directed to the end of the survey. The rest of the participants were invited to complete the survey. The researcher monitored the number of responses collected and ended the survey when enough surveys had
been obtained. Facebook participants were incentivized to participate through an opportunity to win one of four $25 Visa gift cards. Mturk participants were paid $1.50 to take the survey.
Chapter III: Results

Results were downloaded from Qualtrics into IBM SPSS for data analysis. Next, data were cleaned. Frequencies and descriptives were run to explore whether there were missing data and enough variability in responses for each question. Reliabilities were then computed. Necessary recoding was done on frequencies as well. Following this step, if 75% of the items for each scale were complete, a mean score was created for each respondent for relevant variables. In addition to these scale scores, new variables were created to analyze the hypotheses. Long break frequency was comprised of number of long breaks taken during the first half of the shift added to the number of long breaks taken in the second half of the shift. Short break frequency was calculated in the same manner. Long break frequency and short break frequency were summed to create total break frequency variable.

First, short break length ranged from 0 to 60 minutes ($M = 9.52$ minutes, $SD = 9.64$). Long break length ranged from 0 – 90 minutes ($M = 30.08$ minutes, $SD = 17.19$). Short break frequency ranged from 2 to 16 breaks/day, ($M = 5.26$ minutes, $SD= 2.33$). Long break frequency ranged from 1 to 35 ($M = 2.70$, $SD = 3.94$). Participants were asked about the activities they typically do during short and long breaks. They were able to indicate more than one activity. The most frequent short break activities were getting a drink 100 (44.4%), getting up and walking around 93 (41.3%), and sending a personal email or text 87 (38.7%). The most frequent long break activities were eating lunch 137 (60.9%), sitting somewhere and relaxing 71 (31.6%), and conversing in the breakroom with co-workers 62 (27.6%). See Table 1.
Table 1

*Short and Long Break Activities*

<table>
<thead>
<tr>
<th>Short Break Activities</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get a drink</td>
<td>100</td>
<td>44.4%</td>
</tr>
<tr>
<td>Get up and walk around</td>
<td>93</td>
<td>41.3%</td>
</tr>
<tr>
<td>Send a personal email or text</td>
<td>87</td>
<td>38.7%</td>
</tr>
<tr>
<td>Have a snack</td>
<td>85</td>
<td>37.8%</td>
</tr>
<tr>
<td>Talk to a friend or co-worker</td>
<td>83</td>
<td>36.9%</td>
</tr>
<tr>
<td>Stand up and stretch</td>
<td>81</td>
<td>36.0%</td>
</tr>
<tr>
<td>Browse social media</td>
<td>54</td>
<td>24.0%</td>
</tr>
<tr>
<td>Make a to-do list</td>
<td>14</td>
<td>6.2%</td>
</tr>
<tr>
<td>Go to the restroom</td>
<td>6</td>
<td>2.7%</td>
</tr>
<tr>
<td>Smoke</td>
<td>3</td>
<td>1.3%</td>
</tr>
<tr>
<td>Plan a meeting agenda or email response</td>
<td>1</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Long Break Activities</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eat lunch</td>
<td>137</td>
<td>60.9%</td>
</tr>
<tr>
<td>Sit somewhere and relax</td>
<td>71</td>
<td>31.6%</td>
</tr>
<tr>
<td>Converse in the breakroom with co-workers</td>
<td>62</td>
<td>27.6%</td>
</tr>
<tr>
<td>Go for a walk</td>
<td>52</td>
<td>23.1%</td>
</tr>
<tr>
<td>Read something</td>
<td>47</td>
<td>20.9%</td>
</tr>
<tr>
<td>Run an errand</td>
<td>46</td>
<td>20.4%</td>
</tr>
<tr>
<td>Go home for a bit</td>
<td>20</td>
<td>8.9%</td>
</tr>
<tr>
<td>Watch a TV episode or part of a movie</td>
<td>20</td>
<td>8.9%</td>
</tr>
<tr>
<td>Nap</td>
<td>18</td>
<td>8.0%</td>
</tr>
<tr>
<td>Smoke</td>
<td>17</td>
<td>7.6%</td>
</tr>
<tr>
<td>I typically don’t take long breaks</td>
<td>7</td>
<td>3.1%</td>
</tr>
<tr>
<td>Exercise or workout</td>
<td>2</td>
<td>0.9%</td>
</tr>
<tr>
<td>Browse social media or work on homework</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>Browse websites</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>Meditate</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>Play video games</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>Study</td>
<td>1</td>
<td>0.4%</td>
</tr>
</tbody>
</table>
Table 2 presents the correlations among all of the study variables.

**Table 2**

*Correlations, Means, and Standard Deviations between Study Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Break Frequency</td>
<td>7.14</td>
<td>4.28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Short Break Frequency</td>
<td>5.24</td>
<td>2.33</td>
<td>.73**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Long Break Frequency</td>
<td>1.90</td>
<td>3.04</td>
<td>.85**</td>
<td>.26**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Autonomy</td>
<td>4.39</td>
<td>.68</td>
<td>-.07</td>
<td>-.12</td>
<td>-.03</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Choose Breaks</td>
<td>1.52</td>
<td>.50</td>
<td>-.25</td>
<td>-.19</td>
<td>-.28*</td>
<td></td>
<td></td>
<td></td>
<td>-.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Active Breaks</td>
<td>3.11</td>
<td>1.73</td>
<td>.47**</td>
<td>.56**</td>
<td>.23**</td>
<td>-.09</td>
<td>-.06</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Inactive Breaks</td>
<td>3.38</td>
<td>1.84</td>
<td>.43**</td>
<td>.67**</td>
<td>.09</td>
<td>-.14</td>
<td>.04</td>
<td>-.26**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Short Break Length</td>
<td>9.52</td>
<td>9.64</td>
<td>.14</td>
<td>.04</td>
<td>.16</td>
<td>.02</td>
<td>-.42**</td>
<td>.03</td>
<td>-.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Long Break Length</td>
<td>30.08</td>
<td>17.19</td>
<td>-.13</td>
<td>-.06</td>
<td>-.13</td>
<td>.17</td>
<td>.01</td>
<td>.02</td>
<td>-.16*</td>
<td>-.06</td>
<td></td>
</tr>
<tr>
<td>10. Recovery Scale</td>
<td>3.77</td>
<td>.70</td>
<td>.16</td>
<td>.11</td>
<td>.14</td>
<td>.07</td>
<td>-.35*</td>
<td>.27**</td>
<td>.02</td>
<td>.22*</td>
<td>.08</td>
</tr>
</tbody>
</table>

*Note:* *p < .05, **p < .01, two-tailed.

Of note, active breaks were most strongly positively correlated with short break frequency (*r* = .56, *p* < .001). Inactive breaks were positively correlated to short break frequency
(r = .67, p < .01), but no significant correlation was found between inactive breaks and long break frequency (r = .08, p = .279).

**Hypothesis Testing**

A simultaneous multiple regression was used to test if break physical activity, break length, break frequency, the ability to choose when to take breaks, and autonomy in break activity influenced post break recovery (H1-H5). All of the independent variables were mean centered before being run in the regressions. The model explained 32.5% of the variance, \( R = .57, F(6, 39) = 3.21, p = .001 \). Exploring the individual coefficients next, the number of active breaks taken during a workday significantly predicted recovery, \( \beta = .49, p < .001 \), which supports H1. The number of inactive breaks taken during the workday did not significantly predict recovery, \( \beta = -.18, p = .341 \). Number of short breaks did not significantly predict recovery, \( \beta = -.02, p = .922 \). Long break frequency also did not significantly predict recovery, \( \beta = .05, p = .793 \). Interactions between break length and frequency were also explored. They were not significant (See Table 3; H2 was not supported). Total break frequency was eliminated from the regression due to multicollinearity with the other variables in the model (H3 was not supported). Those who could choose when to take their rest breaks did not experience greater recovery than those who could not choose when to take their breaks, \( \beta = -.23, p = .130 \). H4 was not supported. Similarly, autonomy to do what one wants during breaks was unrelated to recovery, \( \beta = -.08, p = .584 \) (H5). See Table 3.
Table 3

Regression for Break Activity, Frequency, Choice, and Autonomy

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Breaks</td>
<td>0.21</td>
<td>0.07</td>
<td>0.49**</td>
</tr>
<tr>
<td>Inactive Breaks</td>
<td>-0.07</td>
<td>0.08</td>
<td>-0.18</td>
</tr>
<tr>
<td>Short Frequency</td>
<td>-0.01</td>
<td>0.07</td>
<td>-0.02</td>
</tr>
<tr>
<td>Long Break Frequency</td>
<td>0.02</td>
<td>0.07</td>
<td>0.05</td>
</tr>
<tr>
<td>Choose Breaks</td>
<td>-0.31</td>
<td>0.20</td>
<td>-0.23</td>
</tr>
<tr>
<td>Autonomy</td>
<td>-0.06</td>
<td>0.12</td>
<td>-0.08</td>
</tr>
</tbody>
</table>

\[ R^2 = 0.33 \]

F for change in \( R^2 \) \( 3.21 \)

Note: **\( p < .01 \).

In addition to the formal hypotheses, a research question regarding whether potential interactions among break type, frequency, and length have an interactive effect on recovery was addressed. Another multiple regression was used to explore the IVs of break type, break frequency, break length, and autonomy on recovery, as well as the interactions among them, first entering the individual variables in step 1, followed by the two-way interactions in a second step, and last, the three-way interaction in a third step. Results of the regression showed two variables significantly predicted post-break recovery: length of short breaks and the interaction between long break frequency, length, and autonomy. The third model, with the interaction terms, predicted 13.4% of the variance (\( R = .366, F(9, 117) = 2.01, p = .050 \)). It was found that the length of short breaks significantly predicted recovery (\( \beta = .19, p = .029 \)), as well as the interaction between length of long breaks, long break frequency, and autonomy (\( \beta = .41, p = .
The interaction shows that high break frequency seems to have the biggest impact on recovery when level of break length and autonomy match (high length, high autonomy or low length, low autonomy). The highest level of recovery is experienced by those with high long break length, high autonomy, and high break frequency. This is followed by those with low long break length, low autonomy, and low frequency. When there is low break frequency, the opposite is true: better recovery is experienced when length and autonomy differ (high break length, low break autonomy or low break length, high break autonomy). See Table 4 and Figure 1.
Table 4

*Summary of Hierarchical Regression Analysis for Variables Predicting Break Recovery (N = 127)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>SE B</td>
<td>β</td>
</tr>
<tr>
<td>Short Frequency</td>
<td>0.03</td>
<td>0.03</td>
<td>0.11</td>
</tr>
<tr>
<td>Long Frequency</td>
<td>0.02</td>
<td>0.02</td>
<td>0.11</td>
</tr>
<tr>
<td>Short Length</td>
<td>0.02</td>
<td>0.01</td>
<td>0.20*</td>
</tr>
<tr>
<td>Long Length</td>
<td>0.00</td>
<td>0.00</td>
<td>0.09</td>
</tr>
<tr>
<td>Autonomy</td>
<td>0.05</td>
<td>0.09</td>
<td>0.05</td>
</tr>
<tr>
<td>Short Frequency x Short length</td>
<td>0.00</td>
<td>0.00</td>
<td>0.03</td>
</tr>
<tr>
<td>Long Frequency x Long length</td>
<td>0.00</td>
<td>0.00</td>
<td>0.14</td>
</tr>
<tr>
<td>Short Frequency x Short Length x Autonomy</td>
<td>0.00</td>
<td>0.00</td>
<td>0.05</td>
</tr>
<tr>
<td>Long Frequency x Long Length x Autonomy</td>
<td>0.10</td>
<td>0.00</td>
<td>0.41*</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>0.08</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( F ) for change in ( R^2 )</td>
<td>2.22</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: Short Frequency, Long Frequency, Short Length, Long Length, and Autonomy are centered at their means. *p < .01*
Figure 1. Interaction between long break frequency, long break length, and autonomy.
Since only 73 (out of 141 people) who provided an answer for “On average, how long do your short breaks last?” indicated that their breaks met the author-defined definition of a short break (5 minutes or less), further exploratory analysis was done. Of those 73, 1 (1.4%) said they took 1-minute breaks, 10 (13.7%) indicated taking 2-minute breaks, 15 (20.5%) indicated taking 3-minute breaks, 7 (9.6%) took 4-minute breaks and 40 (54.8%) indicated taking 5-minute breaks. The two regression analyses were run again for only those respondents that indicated taking breaks of five or fewer minutes for short breaks. See Tables 5 and 6.

Again, a simultaneous multiple regression was used to test if break physical activity, break length, break frequency, the ability to choose when to take breaks, and autonomy in break activity influenced post break recovery (H1-H5) using responses from individuals who indicated taking short breaks of five minutes or less. All of the independent variables were mean centered before being run in the regressions. The model explained 38.5% of the variance. However, the group of variables did not predict post break recovery, $R = .62$, $F(6, 10) = 1.04$, $p = .453$. 
Table 5

Regression for Break Activity, Frequency, Choice, and Autonomy (N=17)

<table>
<thead>
<tr>
<th>Variable</th>
<th>$B$</th>
<th>$SE_B$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Breaks</td>
<td>0.30</td>
<td>0.14</td>
<td>0.89</td>
</tr>
<tr>
<td>Inactive Breaks</td>
<td>0.11</td>
<td>0.16</td>
<td>0.32</td>
</tr>
<tr>
<td>Short Frequency</td>
<td>-0.12</td>
<td>0.12</td>
<td>-0.41</td>
</tr>
<tr>
<td>Long Frequency</td>
<td>-0.13</td>
<td>0.18</td>
<td>-0.28</td>
</tr>
<tr>
<td>Choose Breaks</td>
<td>-0.67</td>
<td>0.57</td>
<td>-0.44</td>
</tr>
<tr>
<td>Autonomy</td>
<td>0.09</td>
<td>0.35</td>
<td>0.13</td>
</tr>
</tbody>
</table>

$R^2$ 0.39

F for change in $R^2$ 1.04

Note: **$p < .01$.**

The second regression was run another time as well, including only those who took short breaks of 5 minutes or less. It was again run to determine whether there were potential interactions among break type, frequency, length, and autonomy on recovery. The third model, with the interaction terms, predicted 11.7% of the variance, $R = .341$, $F(9, 57) = .835$, $p = .587$. Thus, the model was not significant and there were no significant correlations or interactions to report. See Table 6.
### Table 6

**Summary of Hierarchical Regression Analysis for Variables Predicting Break Recovery (N = 67)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$B$</td>
<td>$SEB$</td>
<td>$β$</td>
</tr>
<tr>
<td>Short Frequency</td>
<td>0.03</td>
<td>0.04</td>
<td>0.12</td>
</tr>
<tr>
<td>Long Frequency</td>
<td>0.15</td>
<td>0.10</td>
<td>0.25</td>
</tr>
<tr>
<td>Short Length</td>
<td>0.09</td>
<td>0.07</td>
<td>0.17</td>
</tr>
<tr>
<td>Long Length</td>
<td>0.00</td>
<td>0.01</td>
<td>0.02</td>
</tr>
<tr>
<td>Autonomy</td>
<td>0.03</td>
<td>0.13</td>
<td>0.03</td>
</tr>
<tr>
<td>Short Frequency x Short length</td>
<td>-0.04</td>
<td>0.04</td>
<td>-0.85</td>
</tr>
<tr>
<td>Long Frequency x Long length</td>
<td>-0.00</td>
<td>0.01</td>
<td>-0.14</td>
</tr>
<tr>
<td>Short Frequency x Short Length x Autonomy</td>
<td>0.00</td>
<td>0.01</td>
<td>0.02</td>
</tr>
<tr>
<td>Long Frequency x Long Length x Autonomy</td>
<td>-0.01</td>
<td>0.01</td>
<td>-0.18</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.08</td>
<td>0.11</td>
<td>0.12</td>
</tr>
<tr>
<td>$F$ for change in $R^2$</td>
<td>1.09</td>
<td>0.99</td>
<td>0.84</td>
</tr>
</tbody>
</table>

*Note: Short Frequency, Long Frequency, Short Length, Long Length, and Autonomy are centered at their means.*
Chapter IV: Discussion

Since Americans are spending much of their day at work (Sianoja, Kinnunen, de Bloom, Korpela, & Geurts, 2016), it was important to investigate the variables that lead to optimal rest break recovery during the workday. In this study, a survey was created to collect information about individuals’ break type (active vs. inactive), break frequency, break length, ability to choose when to take breaks, and level of autonomy (what to do during a break). Results indicated that the number of active breaks, short break length, and the interaction between long break frequency, long break length, and autonomy significantly influenced post break recovery.

According to this study, the more active breaks taken at work, the better recovery one experiences. Since many of the respondents worked in sedentary jobs (e.g., computer programming, software development), this finding shows how important it is for individuals who spend most of their workdays sitting to get up and move around. Doing so can decrease cognitive load and replenish the resources that were depleted during the work task (Trougakos & Hideg, 2009). It can also prevent further resource depletion by improving mood (Tice, Baumeister, Shmueli, & Muraven, 2007). Some individuals may feel like if they get up and walk around, the employer will view them negatively for “wasting time” and not being productive. Given this information, employers should encourage employees to walk around during their breaks. As a result, employees should not feel guilty about taking a break and going for a walk. They may even consider organizing group walk breaks throughout the day or step competitions to make walking around during breaks with co-workers enjoyable. As a result, employees may feel more recovered, and therefore, be more productive throughout the workday. Activity is also beneficial for physical health of employees as it results in less stress and burnout (Toker & Biron, 2012). This can help increase overall employee wellbeing at work.
Moreover, the longer the short break, the more recovered employees reported feeling. A short break was considered anything five minutes or less. Any break that is less than five minutes almost requires an individual to stay at their work station or desk. Getting a five-minute break may give the individual enough time to get away from their work environment. Even if the break involves walking to another location in the building, it enables employees to engage in some type of activity or participate in a short activity of their choosing. This is beneficial as previous research by Hunter and Wu (2016) shows participating in preferred rest break activities is related to greater cognitive resources after the break, which leads to greater recovery. Giving employees this information may encourage them to take five-minute short breaks. However it is important to keep in mind that the average short break length indicated by respondents was nine minutes. This suggests that respondents did not think about short breaks the same way researchers did. Therefore, future research should confirm this result.

Another significant finding was that there is an interaction between long break length, long break frequency, and autonomy on break recovery. Results indicate that high break frequency leads to higher recovery when individuals experience the same level of break length and break autonomy (high length, high autonomy and low length, low autonomy). This means that individuals who have a higher number of long breaks, longer break length, and are able to do what they want during their breaks experience the highest recovery. The second highest recovery is experienced by those who have a higher number of long breaks, shorter long breaks, and less autonomy. On the contrary, when break frequency is low, break recovery is higher when break length and autonomy differ (high length, low autonomy and low length, high autonomy). If employees can only take a few long breaks, and have low autonomy, they should try to take longer breaks for better recovery. If employees can take more long breaks, and have high
autonomy they would recover better with shorter long breaks. These factors vary based on every employee’s work situation. Thus, these findings should provide them with directions on how best recover from long breaks given those factors.

**Limitations and Directions for Future Research**

It is important to mention the limitations of the study design, survey, and sample. One study design limitation is that break activity level, frequency, length, and autonomy were all based on recall. Therefore, results may not have been as accurate as if participants recorded those variables during work. Another limitation is that the researcher was not present as individuals were taking the survey. Therefore, participants were not able to have questions answered during it. As a result, participants may have misinterpreted the questions and answered them incorrectly. Lastly, participants were surveyed during the summer. Perhaps if they were surveyed during the holiday season (e.g. November and December) break requirements would be different.

There were also various limitations to the survey itself. There were differences in how individuals classified short breaks, for example. Many of them considered a short break longer than five minutes in length. Thus, short break results were likely not as accurate as if respondents had complied with the definition of a short break. Additionally, there may have been differences in the activities individuals considered to be breaks. This survey listed possible short and long breaks, which could have been leading. Moreover, work environment may have influenced what was classified as a short or long break. Distance from the bathroom or water fountain, may result in a longer walk to each of those destinations, which many lead individuals to classify them as short or long breaks. As a result, one person may consider getting a drink a long break, while others consider it a short break. Another limitation was the questions asked to answer Hypothesis 2 (Those who take more short breaks throughout the day will experience better
recovery than those who take fewer long breaks. Since short break frequency, long break frequency, short break length, and long break length were separate questions, it was difficult to analyze the hypothesis using all four variables. Additionally, to answer the research question “break type” was meant to be active versus inactive breaks. However, we could not separate those who took active breaks from those who took inactive breaks because all participants took both types of breaks. Lastly, total break frequency was strongly correlated with the other individual variables in the first regression. Therefore, it was removed. Future researchers should conduct an exploratory analysis as to why this was the case, and attempt to limit this in other studies.

Also, there were participant limitations as well. A prerequisite of taking this study was working full time. Perhaps individuals who work part time may benefit from different types of breaks. Furthermore, since half of the sample came from Facebook and half came from Amazon’s MTurk, the sample of people may have been unique in that they are tech savvy or are in need of extra income. They may also be a group that has extra time to take surveys. Due to the evolution from manual labor jobs to today’s sedentary jobs, and the fact that the mean age is 36.17, it is likely the sample is more inactive during the day as well.

There are many actions that future researchers can take to avoid these limitations. For instance, they should consider having participants record their break frequency, break length, and break activity during the study in order to collect more accurate data. Additionally, they should try being present during data collection or be in contact with participants to answer their questions throughout the survey. This study could be conducted during different times of the year to account for busy seasonal differences as well.
To address survey limitations, researchers should retest the findings on short breaks using a longer timeframe, perhaps defining short breaks as up to ten minutes in length. Also, how far away individuals sit from the bathroom, breakroom, drinking fountain, etc. may be important to know when considering how many short or long breaks they take. In terms of survey design, it may be important to ask individuals which activities they do during their breaks without including a sample list. This would likely prevent any leading answers. To better answer the second hypothesis, it should be reworded or broken down into separate hypotheses since it involves break length and frequency. To be able to include activity in the research question, a question such as, “which types of breaks (active vs. inactive) do you take more often?” This would allow the sample to be segmented by break type. As a result, activity interactions could be included in the analysis.

To address participant limitations, there are also actions that can be taken by future researchers. Since the ideal break may differ for someone who works part time, future studies should include different types of workers. Moreover, future researchers could survey some individuals through paper and pencil to get a wider variety of individuals and age ranges as well.

**Conclusions**

Overall, sharing this information with full-time employees is beneficial because it will allow them to make break decisions that lead to better recovery and hopefully better productivity throughout their workday. These results should encourage them to get up and do something active during their breaks. It should indicate that breaks at least five-minutes in length can provide more recovery benefits than breaks shorter in length. The interaction information between long break frequency, long break length, and autonomy on recovery should make employees realize how they can maximize post break recovery benefits given their situation for
each of the factors. In sum, this research is necessary because it can help individuals decide what to do during breaks, how often they should take breaks, and how long their breaks should last, to increase resources and decrease resource depletion for better post-break recovery and overall wellbeing at work.
References


doi:10.1145/2858036.2858066

doi:10.1016/j.orgdyn.2013.07.005


doi:10.1037/apl0000045


doi:10.1037/1072-5245.11.4.366


Appendix: Qualtrics Survey

UW-Stout Implied Consent Statement for Research Involving Human Subjects
Consent to Participate In UW-Stout Approved Research

**Project Title:** Breaks and Recovery in the Workplace

**Description:** The purpose of this project is to gather more information about what type of work break provides the best recovery at work. You will be asked to complete a survey regarding your break behavior in the workplace. The survey will contain a series of questions inquiring about the amount of physical activity you receive during your breaks, how long your breaks last, how often you take breaks, and your ability to choose what you do during breaks. The last part of the survey will contain demographic questions that ask you about yourself.

**Risks:** Reflecting on and answering the questions in this survey are not likely to cause more than minimal psychological harm or stress, as it asks you to recall work-related experiences that you likely engage in and talk about during a typical work day. However, should you feel uncomfortable answering any question, you may skip over it without answering.

**Benefits:** By completing this survey you will contribute to the body of break-taking research. Unique findings may be able to be applied in work settings.

**Confidentiality:** Due to the voluntary nature of the study, you have the right to refuse to participate. You may skip questions you are uncomfortable answering or terminate your participation by closing the survey at any time. The information you provide will remain completely confidential.

**Future Use:** The data will be kept in a password protected location.

**Time Commitment:** The survey should take you no longer than 5 to 10 minutes to complete.

**Right to Withdraw:** Your participation in this study is entirely voluntary. You may choose not to participate without any adverse consequences to you. You have the right to stop the survey at any time. However, should you choose to participate and later wish to withdraw from the study, once you submit your response, the data cannot be linked to you and cannot be withdrawn.

**IRB Approval:** This study has been reviewed and approved by The University of Wisconsin-Stout's Institutional Review Board (IRB). The IRB has determined that this study meets the ethical obligations required by federal law and University policies. If you have questions or concerns regarding this study, please contact the Investigator or Advisor. If you have any questions, concerns, or reports regarding your rights as a research subject, please contact the IRB Administrator.
Investigator: Stephanie Lynch
lynchs0438@uwstout.edu

IRB Administrator: Elizabeth Buchanan
Office of Research and Sponsored Programs
152 Vocational Rehabilitation Bldg.
UW-Stout
Menomonie, WI 54751
715.232.2477
Buchanane@uwstout.edu

Advisor: Alicia Stachowski
stachowskia@uwstout.edu
715.232.2237

Statement of Consent:
Clicking the “--->” button on the survey indicates that I am at least 18 years old and am giving my informed consent to participate in the study.

Q2: Do you have a full-time job? (35+ hours per week)?

- Yes (1)

- No (2)

Skip To: End of Survey If Q2 = No

Q3: Do you normally take breaks during the workday?

- Yes (1)

- No (2)
If Q3 = No

Q4: Why don't you normally take breaks at work?

________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________

Q5: Short breaks are defined as breaks that last **five minutes or less**. Examples of short breaks include making a private phone call, going to get coffee or water, and stretching your fingers.

**Long breaks** are defined as breaks **longer than five minutes in length**. Examples of activities you might do during your long breaks include eating lunch, conversing in a breakroom with co-workers, running errands, or going for a walk.
Q6 What things do you typically do during your short breaks? (check all that apply)

☐ Make a to-do list (1)

☐ Have a snack (2)

☐ Send a personal email or text (3)

☐ Talk to a friend or co-worker (4)

☐ Get a drink (5)

☐ Get up and walk around (6)

☐ Stand up and stretch (7)

☐ Browse a social media site (8)

☐ Other (9) _______________________________________________________________________

☐ I typically don't take short breaks (10)
Q7: What things do you typically do during your long breaks? (check all that apply)

☐ Eat Lunch (1)

☐ Go for a walk (2)

☐ Run an errand (3)

☐ Sit somewhere and relax (4)

☐ Go home for a bit (5)

☐ Converse in the breakroom with co-workers (6)

☐ Nap (7)

☐ Read something (8)

☐ Smoke (9)

☐ Watch a TV episode or part of a movie (10)

☐ Other (11) ________________________________________________

☐ I typically don't take long breaks (12)

Q8
An active break is defined as a break where you spend most of your time moving around.
An **inactive break** is defined as a break where you spend **most of your time sitting**.

Q9: How many active breaks do you typically take during your work day?

▼ 0 (1) ... 20 (21)

Q10: How many inactive breaks do you typically take during your work day?

▼ 0 (1) ... 20 (21)

Q11: On average how long do your short breaks typically last (in minutes)?

________________________________________________________________

Q12: How many short breaks do you typically take during the first half of your workday? (select a number from the drop-down below)

▼ 0 (1) ... 20 (21)

Q13: How many short breaks do you typically take during the second half of your workday? (select number from drop-down below)

▼ 0 (1) ... 20 (21)

Q14: On average, how long do your long breaks typically last (in minutes)?

________________________________________________________________

Q15 How many long breaks do you typically take during the first half of your workday (include lunch break here)?

▼ 0 (1) ... 20 (21)

Q16 How many long breaks do you typically take during the second half of your workday (do not include lunch break here)?

▼ 0 (1) ... 20 (21)
Q17 For each statement indicate your level of agreement by choosing one of the options provided.

<table>
<thead>
<tr>
<th>Statement</th>
<th>I do not agree at all (1)</th>
<th>I mostly do not agree (2)</th>
<th>Neutral (3)</th>
<th>I mostly do agree (4)</th>
<th>I fully agree (5)</th>
<th>N/A (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>During short breaks, I determine for myself how I will spend my time (1)</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>During short breaks, I decide my own activities (2)</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>During short breaks, I feel like I can decide for myself what to do (3)</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>During short breaks, I take care of the things the way I want (4)</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>During long breaks, I determine for myself how I will spend my time (5)</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>
During long breaks, I decide my own activities (6)

During long breaks, I feel like I can decide for myself what to do (7)

During long breaks, I take care of the things the way I want (8)
Q18: For each statement indicate your level of agreement by choosing one of the options provided.

<table>
<thead>
<tr>
<th>Statement</th>
<th>I do not agree at all (1)</th>
<th>I mostly do not agree (2)</th>
<th>Neutral (3)</th>
<th>I mostly do agree (4)</th>
<th>I fully agree (5)</th>
<th>N/A (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel recovered after taking short breaks (1)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I feel recovered after taking long breaks (2)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I feel relaxed after taking short breaks (3)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I feel relaxed after taking long breaks (4)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I am in a good mood after taking short breaks (5)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>During short breaks, I use the time to relax (7)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>During long breaks, I use the time to relax (8)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
I feel more recovered after active breaks compared to inactive breaks (9)

I feel more relaxed after active breaks compared to inactive breaks (10)

I am in a good mood after taking active breaks compared to inactive breaks. (11)

Q19: What is your age?

Q20: What is your sex?

O Male (1)

O Female (2)

O Other (3)
Q21: What is the highest level of education you've obtained?

- Some high school (1)
- High school graduate (2)
- Some college (3)
- Associate's Degree (4)
- Bachelor's Degree (5)
- Master's Degree (6)
- Doctorate Degree (7)

Q22: What is your occupation?

____________________________________________________________
Q23: Some occupations require people to move around more than others. Please rate how active you are during the workday.

O Not at All Active (1)

O Rarely Active (2)

O Sometimes Active (3)

O Mostly Active (4)

O Always Active (5)

Q24: When do you usually start work? (Example: 8:00 AM)

________________________________________________________________

________________________________________________________________

Q25: When do you usually end work? (Example: 5:00 PM)

________________________________________________________________

________________________________________________________________
Q26: Apart from lunch, does your employer give you scheduled breaks throughout the day?

- Yes (1)
- No (2)
- Other (3) ________________________________

Display This Question:
If Q27 = Yes

Q27: Does your employer require you to take breaks at the same time every day?

- Yes (1)
- No (2)
- Other (3) ________________________________

Q28: **Break-Taking Debrief** Thank you so much for taking the time to answer the questions on this survey! Research like this would not be possible without the time and consideration you took to respond.

The purpose of this study was to gather more information about what type of work break provides the best recovery at work. Via Facebook, you were asked to complete a survey consisting of questions about your break times, break activities, break duration, break frequency, freedom to choose what activities to partake in during your breaks, and recovery. It is predicted that being mostly active, taking short breaks, taking frequent breaks, and having the ability to choose how your break time will be spent will lead to the best post-break recovery.

If you have a question or would like more information about the study please contact Stephanie Lynch at lynchs0438@my.uwstout.edu.