A Daily Diary Investigation of the Impact of Flexible Work Arrangements on Physical Activity Among University Staff

Shelby Catherine Borowski

Dissertation submitted to the faculty of the Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of

Doctor of Philosophy
in
Human Development

Anisa Zvonkovic (Co-chair)
Jyoti Savla (Co-chair)
Christine Kaestle
Kathryn Hosig

March 28, 2019
Blacksburg, VA

Keywords: physical activity, flexible work arrangements, daily diary design, university staff

A Daily Diary Investigation of the Impact of Flexible Work Arrangements on Physical Activity Among University Staff

Shelby Catherine Borowski

ABSTRACT

The goal of this investigation was to examine personal and environmental factors that may influence levels of daily physical activity in a sample of university staff employees who use flexible work arrangements (flextime or telework). Our first aim was to investigate the link between self-efficacy, perceived barriers, and flexible work arrangements on daily physical activity. Our second aim was to investigate the link between work stress, job burnout, work-to-family conflict and flexible work arrangements on physical activity. Lastly, we investigated if the use of flexible work arrangements buffered the relationship between barriers, as well as job burnout, on physical activity. University staff employees who worked full-time, currently used a flexible work arrangement, lived with at least one family member were eligible to participate. Using a daily diary design, data were collected from 61 university staff employees. Participants completed an initial survey followed by daily diaries over the course of one workweek, resulting in 281 diary days. Data were analyzed with multilevel negative binomial models. Daily barriers and use of flextime were associated with lower physical activity. Self-efficacy, telework, work stress, and work-to-family conflict were not significantly associated with daily physical activity. Flexible work arrangements did not moderate the association between barriers and physical activity. However, flextime moderated the association between job burnout and physical activity. Individuals with high job burnout engaged in more physical activity on flextime days compared to non-flexible workdays. Implications regarding physical activity, flexible work arrangements, and workplace wellness programs are discussed.

A Daily Diary Investigation of the Impact of Flexible Work Arrangements on Physical Activity Among University Staff

Shelby Catherine Borowski

GENERAL AUDIENCE ABSTRACT

The goal of this study was to examine minutes spent engaging in physical activity each day among university staff members who use flexible work arrangements. Flexible work arrangements can help employees have more control over their work hours and schedules. In our sample, we were interested in exploring how personal factors, such as the confidence in their ability (i.e. self-efficacy), and barriers influenced the amount of time staff spent engaging in physical activity each day. We were also interested in exploring how work factors, specifically stress from work, feeling burned out from work, and feelings of work interfering with family, influenced the amount of time spent engaging in physical activity. Lastly, we examined how the time spent engaging in physical activity differed on workdays staff used a flexible work arrangement and on days they did not use a flexible work arrangement. We collected data from 61 university staff employees. Participants completed an initial survey followed by short surveys each night for one workweek. We found that the more barriers an individual reported, the less time they spent on physical activity. In addition, on workdays when staff used a flextime arrangement (i.e. control over *when* work is completed), they engaged in fewer minutes of physical activity than on days they worked typical hours. Self-efficacy, work stress, feeling that work interfered with family, and telework (i.e. control over *where* work is completed) did not influence physical activity. Interestingly, we found that on workdays that flextime was used, staff with high levels of burnout from their job engaged in more physical activity compared to standard workdays (i.e. no control over their schedule). Implications regarding physical activity, flexible work arrangements, and workplace wellness programs are discussed.

ACKNOWLEDGEMENTS

To my co-chair, Dean Anisa Zvonkovic, thank you so much for making me feel so welcome at Virginia Tech and for believing in me when I did not always believe in myself. My confidence as a scholar has grown so much under your mentorship. I truly cannot thank you enough for everything you have done for me.

To my co-chair, Dr. Tina Savla, thank you for always making the time to mentor me. I have learned so much from you, not only about statistics but about the entire research process. It has been so fun working with you individually, as well as on your research team, over the years.

To my committee members, Dr. Kaestle and Dr. Hosig, thank you so much for your mentorship. I appreciate you both taking the time to always provide your unique perspectives and help me grow as a scholar both in and out of the classroom.

You all have contributed to a dissertation that I am very proud of, and I cannot thank you all enough for your time and dedication to my professional development.

To my parents, Scott and Debbie, you both have always been my biggest fans. Thank you for always providing me with opportunities to learn and grow. Your unconditional love and support is truly amazing and a huge reason for my success in graduate school. I could not have done this graduate school journey without you.

To my sister, Brandi, and her fiancé, Andy, thank you for all the care packages, FaceTime calls, and visits to Blacksburg. I am excited to be closer to you both when I move to Boston!

To the rest of my family, you all have been amazing with all the support from 650 miles away!

A special thank you to Derek, who has been my rock through this entire process. Thank you for always helping me see the positive, even on days it was difficult. You truly are one of a kind. Also, thank you for also bringing the sweetest four-legged girl, Luca, into my life. She is the best canine companion, study buddy, and running partner ever!

Also, a special thank you to Jill, who provided daily messages of encouragement as we both went through this entire dissertation writing process together. You have helped me grow so much as a scholar and a person. I am so glad that we had the opportunity to go on this journey together.

To my friends in Blacksburg, thank you so much for making Blacksburg feel like home. I am so lucky to have met all of you. You make every day an adventure filled with laughs, smiles, and happiness. I am going to miss you all so much!

To my friends outside of Blacksburg, thank you so much for all the supportive messages, FaceTime calls, care packages, and traveling to visit me!

This graduate school journey has truly been one of the best experiences of my life. Thank you to everyone who has been a part of making it so special.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction

Background

Engaging in frequent physical activity can improve health and quality of life (Centers for Disease Control and Prevention (CDC), 2018a). Engaging in physical activity is associated with a lower risk of obesity, type 2 diabetes, cardiovascular disease, breast cancer, colon cancer, high blood pressure, falls, and depression (US Department of Health and Human Services, 2018). In addition, physical activity is also associated with lower levels of premature mortality (Carlson, Adams, Yang, & Fulton, 2018). Yet, in 2017, the CDC reported that 25.9% of the population 18 years and older reported no leisure-time physical activity (CDC, 2018b). In addition, 45.9% of the adult population was not meeting the minimum aerobic physical activity guidelines of at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity physical activity per week (CDC, 2018b).

Kohl and colleagues (2012) estimated that in 2007, between 5.3 to 5.7 million deaths occurred globally from chronic diseases that could have potentially been prevented with adequate levels of physical activity. There is also an economic burden associated with lack of physical activity (Ding et al., 2016). Based on data from 142 countries in 2013, the estimated global cost to health-care systems due to chronic diseases, that could have theoretically been prevented from physical activity, was 53.8 billion dollars (Ding et al., 2016). In North America specifically, the cost was estimated to be 25.7 billion dollars (Ding et al., 2016).

Due to these health and economic concerns, HealthyPeople2020, led by the Department of Health and Human Services, included physical activity in their national agenda (Office of Disease Prevention and Health Promotion, US Department of Health and Human Services). HealthyPeople2020 provides science-based objectives for improving health in the United States

through the creation of a national agenda. Physical activity, in combination with nutrition and obesity, was named one of HealthyPeople2020's leading health indicators. Leading health indicators are selected based on what the advisory committee, comprised of many stakeholders, consider as a high-priority health issue based on empirical evidence (U.S. Department of Health and Human Services).

Research shows that levels of physical activity have decreased in the United States since 1965 (Ng & Popkin, 2012). One partial reasoning for this decrease is the change in the work environment (Ng & Popkin, 2012). Prior to 1965, approximately one half of jobs required moderate-intensity physical activity; however, now in the United States, the percentage of jobs requiring moderate-intensity physical activity decreased to 20% (Church et al., 2011). Projections for 2030 suggest that physical activity at work will continue to decrease (Ng & Popkin, 2012). Many occupations and jobs require workers to sit for most of their workday (Church et al., 2011; Jans, Proper, & Hildebrandt, 2007). This sedentary behavior is related to many adverse health outcomes and premature mortality (Dunstan, Howard, Healy, & Owen, 2012). In a meta-analytic review of correlates and determinants of physical activity, Bauman and colleagues (2012) called for more studies researching subpopulations at risk for low levels of physical activity.

One population that demonstrates high levels of sedentary behavior during the workday is university employees. Not only do these individuals sit for approximately 75% of their work day, they also display higher levels of anxiety, depression, and stress-related illness compared to the general population (Fountaine, Piacentini, & Liguori, 2014; Mark & Smith, 2012). However, many studies examining health and well-being of university employees either: (1) only sample faculty (e.g., Shin & Jung, 2013), (2) examine outcomes without separating faculty and non-

faculty (referred to as staff for the remainder of the paper) in analyses (e.g., Mark & Smith, 2012), (3) do not describe what occupations (e.g., faculty, staff) are included in their university sample (e.g., Adekola, 2010), or (4) only focus on identifying differences between the groups of faculty and staff (e.g., Cooper & Barton, 2016).

Studies examining only faculty are beneficial to provide information about the variation within the faculty population. Studies that do not differentiate between faculty and staff in analyses are problematic because the nature of faculty and staff occupations are vastly different, specifically regarding responsibilities, supervision, and schedule control (Davis, 1996). Davis (1996) referred to faculty and staff as two distinct social structures. An intriguing but less scholarly publication in the Chronicle of Higher Education was written by a faculty member at a university discussing what she called "The faculty-staff divide" (Krebs, 2003). While she noted that faculty worked hard to earn their doctoral degree, Krebs highlighted the point that faculty acquire an instant status inside the university culture when hired, which she described as analogous to upper class and staff members analogous to second class. Krebs made this point for a variety of reasons. First, she discussed how faculty can acquire instant benefits that may take staff much longer to earn (e.g., leave from work with pay, pay raises). The biggest difference is that most faculty have, or will have, job security through tenure. Staff will never have that job security. Lastly, Krebs (2003) made the point that she is not aware of all the staff struggles because, as faculty, she has not had to be aware. Thus, studies that do not describe their university sample as faculty only, staff only, or both are problematic for generalization purposes as faculty and staff are very different. Studies examining differences between faculty and staff provide useful information for between group differences; however, the current research about university employees fails to capture the variation within the university staff population. As the

development and implementation of workplace wellness programs continue to become more prevalent (e.g., Butler, Clark, Burlis, Castillo, & Racette, 2015; Cahalin et al., 2014), studies examining within-group differences of university staff population are warranted to identify the needs of the population.

The use of flexible work arrangements is also becoming increasingly common in the workplace (Gassman-Pines & Goldstein, 2017). Flexible work arrangements allow employees to have more freedom in "when" and/or "where" they complete their work-related tasks (Kelly & Kalev, 2006). One purpose of these arrangements is to prevent work-family conflict (Allen, Johnson, Kiburz, & Shockley, 2013). Thus, much of the current research regarding flexible work arrangements focuses on work- or family-related outcomes (e.g., Masuda et al., 2012; Russell, O'Connell, & McGinnity, 2009), to examine both the effectiveness of these arrangements in preventing work-family conflict, but also to ensure that flexible work arrangements are not influencing productivity in the workplace. However, there is preliminary evidence that suggests that there is a link between job flexibility and health behaviors, specifically physical activity (e.g., Moen, Kelly, Tranby, & Huang, 2011). These preliminary studies are cross-sectional and do not consider the daily use of flexible work arrangements and the subsequent impact on physical activity.

Therefore, the purpose of our study was to investigate both personal and contextual factors that influence daily levels of physical activity in a sample of university staff employees who use flexible work arrangements.

Theoretical Frameworks

Two theoretical frameworks guided our study regarding physical activity among university staff employees who use a flexible work arrangement. The two theoretical frameworks

were: Social Cognitive Theory and Conservation of Resources Theory. Together, these theories help explain behavior through cognitions, resources, and the environment.

Social Cognitive Theory (SCT)

Social Cognitive Theory (SCT; Bandura, 1986, 1997) focuses on the dynamic interaction between personal factors, environmental factors, and behavior (Bandura, 1986). From an agentic perspective, SCT suggests individuals play an active role in influencing their environment, along with their environment influencing them (Bandura, 2001). These interactions help explain how individuals acquire and maintain behavior. In this study, we sought to explore how both personal factors (e.g., self-efficacy) and environmental factors (e.g., work environment, barriers) influence health behavior, specifically physical activity.

Within SCT, there are many constructs that have been identified to influence individuals' behavior (Bandura, 1986). These constructs include reciprocal determinism, self-efficacy, observational learning, behavioral capability, outcome expectancies, outcome expectations, reinforcements, and self-regulation. The focus of this chapter, however, will be on reciprocal determinism and self-efficacy. It is important to note that many of the other constructs are interrelated; thus, a few additional constructs were briefly discussed throughout this chapter.

Reciprocal determinism. The cornerstone of SCT is reciprocal determinism, displayed in Figure 1 (Bandura, 1986). As shown, behavior, personal factors, and environmental factors all have reciprocal influences on each other. These factors do not exist in isolation; thus, in our study, we considered how both personal and environmental factors influence levels of physical activity. In addition, there is a temporal dynamic between the interaction between personal factors, environmental factors, and behavior (Bandura, 1986). To capture these temporal

dynamics, we utilized a daily diary design to examine the variability of these factors from day to day.

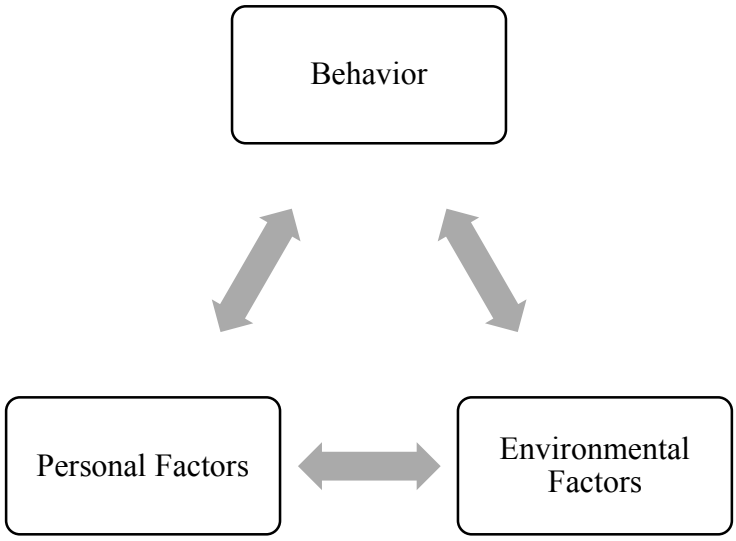


Figure 1. Model of reciprocal determinism (Bandura, 1986)

Environmental factors. In reciprocal determinism, the environment includes both the physical and social environment (Bandura, 1986). Individuals exist in multiple physical and social environments. In the workplace, an example of the physical environment would be the building in which a person works and, more specifically, their actual office space. An example of the social environment at work would be relationships with co-workers and supervisors. In addition, individuals have their own perception of these environments (Bandura, 1986). The environment is a critical factor to consider in relation to health behavior as the environment can provide reinforcement for behavior and provide opportunities for learning or performing the behavior, but it can also hinder behavior (Baranowski, Perry, & Parcel, 2002). For example, there may be many barriers (e.g., weather, family commitments) present in the environment that hinder physical activity (Ross & Melzer, 2016). These environments in which individuals exist

are not static; thus, demonstrating the importance of the daily diary design as the environment may change from day to day

Personal factors. Personal factors include biological, affective, and cognitive factors (Bandura, 1986). An example of a biological factor is biological sex. Affective factors include emotional experiences. Examples of cognitive factors include beliefs, knowledge, skills, and attitudes (Bandura, 1986). The cognitive factor that we were interested in examining, due to its large influence on behavior, was self-efficacy.

Self-efficacy. Self-efficacy is an individual's belief and confidence in their ability to perform a behavior successfully (Bandura, 1977; Maddux 1995). Levels of self-efficacy vary for individuals based on the behavior, situation, and context. Self-efficacy is a central tenent to SCT because levels of self-efficacy both directly and indirectly influence behavior through other constructs of SCT (Bandura, 1986, 1997, 2001; Luszczynska & Schwarzer, 2015). Research findings support this direct and indirect influence of self-efficacy for a wide range of behaviors, such as academic performance (Yusuf, 2011), job performance (Bandura & Locke, 2003), healthy eating (Scholz, Nagy, Göhner, Luszczynska, & Kliegel, 2009), and physical activity (Ayotte, Margrett, & Hicks-Patrick, 2010).

In addition, Bandura suggested that self-efficacy is one of the foundations for human agency because self-efficacy influences people's thoughts, emotions, and behavior (Bandura, 1989, 1997). More specifically, an individual's self-efficacy plays a large role in whether they will choose to participate in the behavior or continue to perform the behavior under difficult circumstances (e.g., many barriers present). Thus, self-efficacy can either hinder or enhance a behavior (Bandura, 1989, 1997). Therefore, in our study, we were interested in examining how an individual's level of self-efficacy influences their daily level of physical activity.

When researching self-efficacy, it is important to understand how individuals rate their level of self-efficacy. Perception of one's self-efficacy is based on four components: past performance, observation of others, social persuasion, and physiological cues (Bandura, 1982, 1997). First, individuals assess their self-efficacy based on how they have performed in the past. For example, if an individual was successful engaging in physical activity in the past, this prior success would increase their self-efficacy. On the other hand, if they had a negative experience engaging in physical activity in the past, this failure would decrease their self-efficacy for physical activity. Individuals also gauge their self-efficacy based on observing others (Bandura, 1982, 1997). For example, if an individual sees their supervisor successfully finding the time and energy to be physically active after work, they may feel more confident to find the time and energy to do the same. However, if an individual sees their supervisor struggling to be physically active after work, they may not feel as confident in themselves to be physically active after work. The social environment is also important when an individual is assessing their level of self-efficacy. Social persuasion, or encouragement from others, can help increase levels of self-efficacy (Bandura, 1982, 1997). If an individual continuously receives words of encouragement to be physically active, from their supervisor or a family member for example, this social support has the potential to increase self-efficacy. Lastly, individuals' emotional and physiological states can influence self-efficacy by influencing the anticipation of the outcome from engaging in the behavior (Bandura, 1982, 1997). For example, if an individual is highly anxious when entering the gym at their worksite, they may relate this negative physiological response to negative consequences of going to the gym (i.e. failure), which in turn lowers self-efficacy.

While all these mechanisms are important for developing self-efficacy, a change in one component does not instantly change an individual's perceived self-efficacy (Bandura, 1982,

1997). Individuals constantly self-reflect and are able to make judgements based on the situation and context (Bandura, 1982, 1997; Gist & Mitchell, 1992). For example, an individual who had one failure being physically active on a stressful workday but has had many successes being physically active on stressful workdays in the past does not automatically have a lower level of self-efficacy for physical activity. However, over time, self-efficacy is malleable and can change (Gist & Mitchell, 1992; Warner et al., 2018), but in our current study, we did not measure self-efficacy on a daily basis. Based on all four components of self-efficacy, we assumed self-efficacy was more of a stable characteristic than it was a fluctuating state and as such that it would not change over the course of our study (i.e. one workweek) (Ohly, Sonnentag, Niessen, & Zapf, 2010; Yeo & Neal, 2006).

In sum, from an agentic perspective, SCT provides the framework for understanding physical activity by considering both the person and the environment. Kirk and Rhodes (2011), in their systematic review, specifically made the call for more researchers to incorporate behavior-change theories, such as SCT, into research regarding occupational factors and physical activity. Incorporating SCT allows us to take into consideration personal and environmental factors associated with work and physical activity (e.g., self-efficacy, flexible work arrangements, perceived barriers) at the daily level.

Conservation of Resources (COR) Theory

The conservation of resources theory (COR; Hobfoll, 1989, 2001) provides a framework for examining the stress process through the interaction of the person and their environment through the management of their resources. Resources refer to objects, conditions, personal characteristics, and energies that are perceived as valuable by the individual and contribute positively to their well-being (Hobfoll, 1989, 2001). The value of a resource is different among

individuals, as individuals value resources based on their personal experiences (Halbesleben, Neveu, Paustian-Underdahl, & Westman, 2014). These resources will also vary depending on the context. For example, there are certain resources individuals may have at work, such as control over work schedule through a flexible work arrangement, and there are certain resources individuals have at home, such as a positive relationship with their spouse and a safe neighborhood. In this study, we sought to explore if the use of flexible work arrangement acted a resource to workers, specifically for physical activity.

Hobfoll (1989) suggests resources can generally be divided up in to four types. Object resources tend to be physical and valued for what they provide the individuals. Examples of object resources include food, shelter, transportation, and office space. Conditions are resources that are sought after because of their value such as job security or good health. Personal characteristics include resources that may help buffer the effects of stress. An example of a personal characteristic resource in our study is self-efficacy. Lastly, energy resources provide access to other resources. For example, time and money are considered energy resources.

The central tenent of COR theory is that individuals seek to acquire, protect, and maintain resources (Hobfoll, 1989, 2001). Stress arises when there is a lack of resources, potential loss of resources, or an actual loss of resources. For example, stress may occur when employees want to engage in physical activity but do not have enough physical energy or time (i.e. a lack of resources) after work. In addition, stress can occur when individuals invest resources but fail to gain resources in return. Employees may invest their resources (e.g., time, energy) in their job, but if they do not receive resources in return (e.g., pay raise, permission to use a flexible work arrangement), they may become stressed and experience a continuous loss of resources over

time. Hobfoll (1989) suggests that resource loss is more salient to an individual than gain, as the loss disproportionately affects well-being more so than gain.

The concept of resource loss occurring over time is referred to a resource loss spiral (Hobfoll, 1989, 2001). Resource loss spirals occur when individuals lack resources to deal with stressful events, which causes them to lose more resources (Hobfoll, 1989). Employees who do not have the resources (e.g., a flexible work arrangement) to assist in balancing their work and personal life may then lose resources they perceive as valuable, such as family stability, time with loved ones, or stable employment. In relation to physical activity, if an individual perceives many barriers to physical activity in their environment and lack self-efficacy (i.e. personal characteristic resource) to overcome those barriers, over time that individual may engage in less physical activity which leads to more resource loss (e.g., lower levels of self-efficacy, personal health, stamina). Both examples presented are ways in which losses can spiral over time. Our study sought to examine if flexible work arrangements could act as resources to buffer the effects of resource loss from work conditions (e.g., burnout) on physical activity.

This resource loss spiral then makes it difficult to invest in other valuable resources. A principle of COR theory is people must invest resources to protect against resource loss, recover from other resource loss, and to gain resources (Hobfoll, 2001). People who lack resources are more vulnerable to resource loss and future loss because they have little to invest (Hobfoll, 2001). For example, employees with high levels of job burnout may have little resources to invest from continuous resource loss, perpetuating the high levels of burnout. This resource loss spiral makes a person vulnerable to chronic stress and subsequent adverse health outcomes (Juster, McEwen, & Lupien, 2010).

Individuals who have many resources are more likely to have resource gains in the future from the ability to invest their resources, also known as resource gain spiral (Hobfoll, 2001). In other words, these resources can accrue over time. For example, employees with low levels of job burnout have resources (e.g.. energy, health) to invest in other resources, resulting in subsequent resource gain. Our study examined both stable (i.e. burnout) and day-to-day (i.e. work stress, work-to-family conflict) work factors to better understand how these factors influence resource investment (e.g., energy, time) into physical activity.

Resources also tend to occur or be absent together, a concept known as resource caravans, which can be immediate or exist across the lifespan (Hobfoll, 2001). For example, an individual with high levels of self-efficacy also tends to have higher levels of social support, while those with lower levels of self-efficacy have lower levels of social support (Hobfoll, 2001). However, more recently, Hobfoll (2011) proposed the concept of resource caravan passageways, that is, the environmental conditions in which these resources exist.

Resource caravan passageways are environmental conditions that either support and protect resources or deplete and obstruct resources of individuals, families, and communities, with some of these environmental conditions are out of people's control (Hobfoll, 2011). For example, a person who is in an environment that is safe and has high walkability will more likely engage in physical activity and social interactions, which leads to better health outcomes (Ding & Gebel, 2012). In other words, based on the environmental conditions, resources are aggregating to produce better health outcomes. However, individuals who live in environmental conditions that make them vulnerable or put them at risk can deplete or obstruct resources (Hobfoll, 2011). An example is those individuals who were living in areas with high levels of

neighborhood violence, who are less likely to engage in physical activity and have subsequently worse health (Bennett, McNeill, Wolin, Duncan, Puleo, & Emmons, 2007).

One limitation of current studies using a COR framework is the lack of focus on resources which may change on a daily basis in the work environment. Therefore, in our study, we utilized a daily diary method, as this design allows us to better understand what resources are available in the environment and which resources may co-occur within those environments. Daily diary methods also allow scholars to better understand how these resources are accruing over time as this design occurs over the course of multiple days.

Integration of Theoretical Frameworks

While these theories are valuable separately, together they assist in a better understanding of the influence of personal and environmental factors on physical activity, the outcome of this study. Instead of a unidimensional view of behavior, SCT provides a framework for the dynamic interaction between the person, environment, and behavior. Although COR theory does not provide an explanation for behavior, Hobfoll (1989) proposed that personal appraisals of stress and the environment need to be considered together, not in isolation. Therefore, the major theorists associated with each theory (Bandura for SCT and Hobfoll for COR) demonstrate the importance of considering the person in relation to their environment. Together, we used these theories in the study to examine how personal factors (e.g., self-efficacy) and perceptions of their environment (e.g., barriers, work stress) influence physical activity.

SCT also views the individual as agentic. Similarly, COR theory views individuals as having agency by actively obtaining, protecting, and maintaining their resources. However, SCT is a broader theory and lacks specific detail about what specific resources exist within an individual's environment that can hinder or enhance behavior. COR theory provides more detail

to these processes. More specifically, COR theory categorizes resources and details how individual's gain and lose their resources. We were interested in exploring if the use of a flexible work arrangement acted as a resource to university staff to maintain or protect their other resources. In addition, one particular resource that has been elaborated in SCT, which we were interested in exploring in relation to daily physical activity, was self-efficacy.

Overall, SCT provides the framework for studying the person, environment, and behavior. COR theory provides a description of the resources individuals have within themselves and their environment. Exploring these resources helps to solve the puzzle of how to understand and improve the lives of workers.

The Current Study

Due to the changing nature of personal and environmental factors, we used a daily diary design to capture daily variation in resources and subsequent physical activity in a sample of university staff using flexible work arrangements. Our first study specifically focused on the use of a flexible work arrangement as a resource to adjusting from setbacks caused by barriers with regard to physical activity. The study also explored the link between self-efficacy and physical activity. Our second study focused on an individual's level of job burnout, daily stressful experiences at work, and daily work-to-family conflict in relation to physical activity. More specifically, if an individual had lower levels of burnout, stress, and conflict, we were interested in exploring if they had more resources to invest in physical activity. In contrast, if an individual had higher levels of burnout, stress, and conflict, we were interested in exploring if using a flexible work arrangement protected their resources that they could then subsequently invest in physical activity.

Chapter 2: Literature Review

This review of the literature provides information regarding the findings from recent research, as well as critiques of the current research. Specific research areas covered include: work experiences and health of university staff employees, personal and environmental influences on physical activity, and occupational factors related to physical activity, specifically job burnout, work stress, work-to-family conflict, and flexible work arrangements. Lastly, strengths and limitations of a specific type of methodology, a daily diary design, are discussed.

University Staff: A Population of Interest

Davis (1996) stated that within the university workplace there are two different social structures: the academic staff (referred to faculty from hereon) and non-academic administrative and support staff (referred to as staff from hereon). Davis specified that these two distinct groups rarely share the same job responsibilities or tasks. Staff have more of a hierarchical structure to their work with clear rules, responsibilities, and supervision. Faculty on the other hand, tend to have more freedom within their job (e.g., research, ability to choose when and where to do work) (Davis, 1996). Nonetheless, there are many studies examining university employees' health that do not differentiate between the two (e.g., Bos, Donders, Bouwman-Brouwer, & Van der Gulden, 2009; Butler, Clark, Burlis, Castillo, & Racette, 2015; Mark & Smith, 2012), but these differences proposed by Davis (1996) are why these groups need to be teased apart in research. The needs, problems, and concerns of one group may be very different than the other. Differences within the group may also exist and are important to understand.

There are a select number of studies that have differentiated between the two occupations. In the United Kingdom, staff reported higher levels of stress related to relationships at work, job security, resources, pay and benefits, and lack of job control compared to faculty

(Tytherleigh, Webb, Cooper, & Ricketts, 2007). These results were supported among an American sample. Faculty reported more opportunities for promotion, more job control, support between work and family, and respect from students compared to staff (Horton, 2006). In a cross-sectional study examining the health of South African university support staff, Rothmann and Essenko (2007) found that job demands and lack of job resources were related to exhaustion. This exhaustion, in turn, was related to worse health problems. Thus, staff at universities are at-risk for ill health based on factors in the work environment stressors (e.g., lack of resources), as well as the sedentary nature of the job.

When examining physical activity levels among staff, Fountaine and colleagues (2014) differentiated between faculty and staff. Faculty reported engaging in leisure time physical activity more days per week than staff. Similarly, in a sample of university employees in a metropolitan university, fewer staff met the physical activity guidelines compared to faculty (Leininger, Adams, & DeBelisio, 2015). When specifically examining types of physical activity (i.e. low, moderate, high), staff reported less low- and moderate-intensity physical activity but more high-intensity physical activity compared to faculty; however, these differences were not statistically different (Cooper & Barton, 2016). Preliminary evidence from these studies suggests that university staff is a population that may benefit from workplace wellness programs, due to the structure of their jobs and the findings related to physical activity. Thus, more research is necessary to better understand this population.

Physical Activity

Physical activity is defined as “any bodily movement produced by skeletal muscles that results in energy expenditure” (Caspersen, Powell, & Christenson, 1985, p. 126). Exercise, however, is a subcategory of physical activity. Although many times these terms are used

interchangeably (Caspersen et al., 1985), exercise technically refers to physical activity that is planned or structured with the objective to improve or maintain physical fitness. In the following review of the literature, we used the terminology used by the scholars in their studies. However, when referencing our current study, we use the umbrella term of physical activity, as we were interested in the time spent on physical activities that was both structured and unstructured.

In order to effectively develop programs and interventions targeting physical activity, it is important to understand factors that influence physical activity. In the following sections, we discuss factors that influence physical activity, specifically socio-demographic factors, self-efficacy, barriers, the environment, and policy.

Socio-Demographic Factors

There are multiple socio-demographic factors that research suggests are related to participation in physical activity. Those factors are education, income, age, gender, marital status, child status, and general health status.

Education, income, and general health status are positively related to levels of physical activity (Bauman, Reis, Sallis, Wells, Loos, & Martin, 2012; Trost et al., 2002). Age, however, is negatively related to levels of physical activity (Van Dyck et al., 2015; Trost et al., 2002). Currently there is a focus on older adults in physical activity research, as older adults are the least physically active (Sun, Norman, & While, 2013). There are also gender differences in physical activity wherein men tend to participate in physical activity more than women (Bauman et al., 2012; Nomaguchi & Bianchi, 2004; Pan, Cameron, DesMeules, Morrison, Craig, & Jiang, 2009; Van Dyck et al., 2015).

In addition, studies have found that marital status and children influence physical activity. Married individuals participate in physical activity less than individuals not married (Dinç, 2017;

Nomaguchi & Bianchi, 2004). When examining multiple categories of marital status, Pan et al. (2009) found that individuals who are widowed were the least physically active, followed by those living with a spouse/partner. Individuals who were separated/divorced or single/not married reported the highest levels of physical activity. It is possible that these findings are also confounded by age. There is mixed evidence for the influence children have on adults' physical activity. Nomaguchi & Bianchi (2004) found having children was not related to the amount of time spent on physical activity but having young children (i.e. 5 or younger) was negatively related to physical activity. More recently, Pan et al. (2009) found that Canadian parents with children ages 15 or younger were participating in similar amounts of physical activity as people who had no children.

Grzywacz and Marks (2001) considered the intersection of a few select individual characteristics among a nationally representative sample in the United States. They found that women with a higher income participated in more vigorous exercise compared to those with lower incomes. Women with higher levels of education participated in more exercise during young adulthood but had the steepest decline in exercise as they aged compared to women with other levels of education (Grzywacz & Marks, 2001). For men, the opposite was true for education during young adulthood. Men with the least amount of education participated in the highest level of exercise during young adulthood and had the steepest decline in exercise as they aged compared to men with other levels of education. Income was not a significant predictor of exercise for men (Grzywacz & Marks, 2001).

Self-Efficacy

Many studies examining physical activity have found a positive association between self-efficacy and physical activity (e.g., Bauman et al., 2012). In a study of adults, Ross and Melzer

(2016) found that physical activity self-efficacy was higher among adults who met the recommended amount of physical activity. Similarly, Pan et al. (2009) found that self-efficacy was the strongest correlate in relation to physical activity for all age groups, gender, education levels, and income levels in their cross-sectional study of Canadians. In a cross-sectional study done in Southwestern Virginia, similar to the location of our current study, higher levels of self-efficacy were associated with higher levels of physical activity (Anderson, Wojcik, Winett, & Williams, 2006). In a sample of Web-health users, participants kept a log of their daily physical activity for seven days (Anderson-Bill, Winett, & Wojick, 2011). Self-efficacy predicted higher levels of daily physical activity. Research suggests this association between self-efficacy and physical activity holds true across different populations, such as those with chronic diseases (Daniali, Darani, Eslami, & Mazaheri, 2017; Knittle, De Gucht, Hurkmans, Vlieland, Peeters, Ronday, & Maes, 2011), postnatal women (Cramp & Bray, 2011), and individuals recovering from injuries (Kroll et al., 2012) for example.

In addition, other studies have suggested self-efficacy is indirectly related to physical activity as well. Ayotte and colleagues (2010) found that self-efficacy was indirectly related to physical activity through outcome expectancies, perceived barriers, and self-regulatory behaviors in their cross-sectional study of young and middle-aged married adults. In line with those results, in a sample of middle-aged and older adults, White, Wójcicki, and McAuley (2011) found an indirect effect through outcome expectations in their cross-sectional study. There was also evidence of an indirect effect of self-efficacy to physical activity through self-regulation in a sample of adults who used the internet for health-related information (Anderson-Bill et al., 2011). Thus, many physical activity interventions focus on increasing self-efficacy to increase levels of physical activity (see Ashford, Edmunds, & French, 2010).

However, a select few studies suggest that self-efficacy is not related to physical activity. Larkin and colleagues (2016) also found no association between self-efficacy and the level of physical activity within the past week or the past month for individuals with arthritis. Koeneman and colleagues (2011) suggested there was insufficient evidence to support the link between self-efficacy and physical activity in their systematic review of healthy older adults. More specifically, they found a limited number of high quality studies and inconsistent findings among low quality studies, which led them to suggest there was not enough evidence to support the link between self-efficacy and physical activity.

McAuley and Blissmer (2000) proposed that self-efficacy might not consistently predict physical activity due to context and the temporal nature of physical activity. The majority of studies discussed previously are cross-sectional, which do not adequately capture the context in which the behavior, physical activity, is occurring. In order to capture this context, it is important to examine the link between self-efficacy and physical activity with a more precise measurement of time, that is, at the daily level, which few studies examining self-efficacy and physical activity have done.

Personal Barriers

Personal barriers are also related to the level of physical activity. For the purposes of this literature review, personal barriers include intrapersonal barriers (e.g., lack of motivation). Cross-sectional research suggests that there is a negative association between number of perceived barriers and levels of physical activity (Ball, Rice, & Maljak, 2017; Pan et al., 2009; Ross & Melzer, 2016). In other words, as an individual perceives more barriers, their levels of physical activity decrease.

The most commonly reported personal barriers across the literature were: not enough time, lack of motivation, feeling tired, other duties, and cost (Ball, Bice, & Maljak, 2017; Dinç, 2017; Joseph, Ainsworth, Keller, & Dodgson, 2017; Justine, Azizan, Hassan, Salleh, & Manaf, 2013; Hoare, Stavreski, Jennings, & Kingwell, 2017; Ross & Meltzer, 2016). These studies were all conducted in various regions of the world, which may suggest that personal barriers to physical activity are similar across the general population. Similar barriers are reported in populations that are regularly active (e.g., Sas-Nowosielski, Nowicka, & Kowalczyk, 2017). Lack of time and energy were the top barrier reported by university employees (faculty and staff) in a cross-sectional study (Leicht, Sealey, & Devine, 2013). However, unlike these studies, one study in a sample of Australian adults, found that lacking motivation and feeling too tired were the least reported barriers. However, only 39% of this sample was employed full-time. The rest of the sample were students, unemployed, or employed part-time so lack of full-time employees in the sample may account for the difference in top barriers reported.

In the barriers to physical activity research, age and gender are also often examined. When examining age, Ross and Meltzer (2016) found, in a sample of Australian adults, that perceived barriers were highest among the age group 18 to 25. In a study comparing middle-aged to elderly individuals in Malaysia, there were no significant differences in the number of personal barriers perceived by each age group (Justine et al., 2013). However, middle-aged individuals reported social/family activities and cost as barriers more often than the elderly. In regard to gender, more woman than men reported they do not have enough time than did men (Dinç, 2017; Hoare et al., 2017).

However, it is important to note that the study design weakness of most of these studies. These studies are cross-sectional. Both perceived barriers and level of physical activity were

measured at one time point. Most participants were asked to estimate the number of minutes spent in various levels of physical activity each week. In addition, participants were asked to rate the degree they felt each barrier was a barrier to being active in general. These designs are subject to recall bias, compared to other types of studies that measure these perceptions and activities daily in the individual's natural environment (Reis, 2012).

Environmental Factors

The environment consists of both an individual's physical and social environment. Research regarding barriers to physical activity suggests that individuals perceive barriers within the environment. Unlike personal barriers, there is no one common universal environmental barrier across populations.

Social environmental barriers reported in past studies were: lack of social support, lack of physical activity partner, and family responsibilities (Joseph et al., 2015; Mailey, Huberty, Dinkel, & McAuley, 2014; Ross & Meltzer, 2016). When examining the family, Mailey and colleagues (2014) held focus groups with working mothers and fathers about barriers to physical activity. Family responsibilities was a large barrier for parents, especially fathers reported children as barriers more than mothers did. However, women reported work as a barrier more than fathers did. When examining the literature regarding the social support and physical activity, research has found that higher levels of social support are related to higher levels of physical activity. More specifically, individuals who lived in socially cohesive neighborhoods reported more physical activity (Sawyer, Ucci, Jones, Smith, & Fisher, 2016; Karusisi, Bean, Oppert, Pannier, & Chaix, 2012). In addition, individuals who were invited by friends to be physically active or had a workout partner when working out reported higher levels of physical activity (Florindo et al., 2013; Granner, McDonald, Parry, Oliveira, & Denehy, 2007).

Physical environmental barriers reported in studies included: weather, no access to facilities, inadequate facilities, safety concerns, lack of sidewalks, and lack of transportation (Booth, Bauman, Owen, & Gore, 1997; Dinç, 2017; Joseph et al. 2015; Justine et al., 2013; Ross & Meltzer, 2016). Perceptions of the physical environment have a direct effect on physical activity (McNeill, Kreuter, & Subramanian, 2006). In Bauman and colleagues' review (2012), they suggested physical environmental correlates to physical activity were: walkability, street connectivity, safety of crossings, pavement, and aesthetics (e.g., green space). These are all aspects of the built environment. In one study of healthy adults, individuals reported the most frequent informal facility they used to engage in physical activity were the streets, followed by public open space (Giles-Corti & Donovan, 2002); thus, demonstrating the importance of the built environment in relation to physical activity if individuals are not able to afford to go to a gym or facility.

Safety is also another aspect of the environment that appears in the literature. Safety can be considered both a social aspect of the environment and a physical aspect of the environment. In regard to the social environment, safety concerns are related to perceived crime. Research suggests there is a positive association between the perception of crime and physical activity (Eichinger, Titze, Haditsch, Dorner, & Stronegger, 2015; Granner et al., 2007). Concerning the physical environment, people's perception of safety is in relation to safety of the streets (e.g., road conditions, presence of streetlights, street connectivity, presence of crosswalks and sidewalks). Research suggests that the safer an individual perceives their physical environment, the more likely they are to participate in physical activity (Sallis & Glanz, 2009; Oyeyemi, Adegoke, Sallis, Oyeyemi, & De Bourdeaudhuij, 2012).

Through an intersectional lens, the environment is a crucial aspect to consider when examining physical activity, because the environment can exacerbate health disparities among certain groups of people. One study found that African Americans engaged in physical activity less than Caucasians (Grywacz & Marks, 2001); however, the difference in physical activity between races was no longer significant once neighborhood safety and health status was accounted for in the model. Similarly, in a study examining low- and high-income groups, Sallis and Glanz (2009) found that neighborhoods in higher income groups were more walkable, which was associated with more physical activity. In addition, lower SES and high minority neighborhoods also have reduced access to physical activity spaces, such green space, which is related to lower levels of physical activity (Gordon-Larsen, Nelson, Page, & Popkin, 2006). These results demonstrate the multiple factors influencing individuals' lives (e.g., personal factors, environment) we need to consider when examining physical activity to understand the full picture.

Policy

Policy also has an influence on physical activity at the local, organizational, regional, and national levels (Bauman et al., 2012). At the local level, policies include ordinances, resolutions, budgets, or plans adopted by the local area. For example, bike-to-work resolutions were adopted by local governments in Pennsylvania to increase the number of individuals biking to work (H.R. 857, 2018).

Organizational policies are policies adopted by the organization, such as the workplace. Flextime is a work policy that allows individuals to adjust their standard work schedule, which the CDC suggests can be useful for creating opportunities for employees to be physically active. The Oregon Department of Human Services adopted a flextime policy to support physical

activity such that employees were encouraged to dedicate time for physical activity during breaks and lunch breaks, as well as use of the flexible work schedules to make time to exercise (Department of Human Services Oregon Public Health Division, Healthy Worksites Initiative, n.d.). In the 2007 survey of Oregon State Agency Employees, 54% of employees with a flextime policy reported using it for physical activity (Oregon Health Authority Public Health Division, 2007). For employees without a flextime policy, 87% reported if they had a flextime policy, they would use it for physical activity. About half (55%) of this sample reported they did not have a flextime policy available to them.

At the regional level, policies can include laws, resolutions, statutes, and budgets approved by state legislatures. From 2006 to 2012, the sum of bills introduced at the state level regarding physical activity was 1,542; however, enactment rates vary by state with a range from 0% to 100% (Eyler, Budd, Camberos, Yan, & Brownson, 2016). Kentucky state legislature adopted a policy to create a council to develop and implement a wellness program for the state of Kentucky (KY Rev Stat § 12.550, 2014). Outcomes from this council included signs encouraging stair use, more walking trails, and cafeterias with healthy food options. Some states also adopt policies that influence the workplace. State legislature in Mississippi passed the State Employee Wellness Program act in 2010, to create wellness councils and appoint a statewide wellness coordinator (Miss. Code. Ann. § 41-97-9, 2010). The wellness program included: health education, health assessments, health programming, environmental changes, and participation incentives.

At the national level, policies can provide guidance by responding to public health concerns and make a call to action to strengthen the nation through improving health (World Health Organization [WHO], 2019). Currently, there is the National Physical Activity Plan,

which includes a set of policies, programs, and initiatives to increase levels of physical activity in the United States (National Physical Activity Plan Alliance, 2016). This national plan was developed by a coalition of organizations. Hundreds of individuals from public and private organizations participated in providing the overarching priorities, strategies, and tactics for nine societal sectors (business and industry, community recreation, fitness, and parks, education, faith-based settings, healthcare, mass media, public health, sport, and transportation, land use and community design) (National Physical Activity Plan Alliance, 2016). In sum, policies can help create an environment conducive for opportunities to engage in physical activity.

Occupational Factors and Physical Activity

Occupational factors are also related to physical activity in the United States. Employed individuals participate in more physical activity than non-employed individuals (Kwak, Berrigan, Domelan, Sjöström, & Hagströmer, 2016). The amount of time spent at work is associated with less time spent on physical activity (Kirk & Rhodes, 2011; Nomaguchi & Bianchi, 2004). Individuals with sedentary jobs also spend less time on physical activity outside of work compared with individuals who have active jobs (Kwak et al., 2016). In addition, in their systematic review, Kirk and Rhodes (2011) found that individuals with a higher-status occupation had higher levels of physical activity compared to individuals with lower-status occupations. In their review, they made a call for researchers to examine how psychological work demands (i.e. work stress) are related to levels of physical activity, as it is clear that psychological factors from work negatively influences physical and mental health.

Much of the work-health research focuses on health outcomes, such as depression or obesity (e.g., Biankie & Milkie, 2010; Ganster & Rosen, 2013), but few studies examine the health behaviors, such as physical activity, that may buffer the negative connection between

work and health. Thus, our study sought to explore how psychological work factors, specifically job burnout, work stress, the work interference with family, influences levels of physical activity. The few studies that do examine work in relation to physical activity are presented below.

Work Stress

Ganster and Rosen (2013) defined work stress as the "process by which workplace psychological experiences and demands (stressors) produce both short-term (strains) and long-term changes in mental and physical health." (p. 1088). In their multidisciplinary review, they found consistent evidence supporting the link between higher levels of work stress and poorer physical and mental health (Ganster & Rosen, 2013).

There is evidence that engaging in physical activity can buffer the link between stressors in the workplace and health outcomes. For example, in a cross-sectional study of registered nurses, engaging in physical activity moderated the relationship between stress and depression (Sliter, Sinclair, Cheung, & McFadden, 2014). Work stress was operationalized as patient stressors, staff demands, and workload. Findings suggested the link between patient stressors and staff demands on depression was weaker for nurses who engaged in higher levels of physical activity compared to nurses with lower levels of physical activity.

Studies also examine the direct effect of work stress on physical activity. In these studies, work stress is often measured by job strain, that is, the interaction of job demands and job control. The job-demands control model (Karasek, 1979) posits that jobs with high demands and low control are stressful. In a latent profile analysis of cross-sectional data from Swedish healthcare workers and social insurance officers, participants classified as high stress, based on job strain, reported the lowest levels of physical activity (Gerber, Jonsdottir, Lindwall, & Ahlborg Jr., 2014). Cross-sectional findings from a larger European study found that the odds of

physical inactivity for employees with high strain jobs were 26% higher than employees with low-strain jobs (Fransson et al., 2012). When physically active participants were examined over time, the odds of becoming physically inactive were 21% higher for high strain jobs, suggesting that work stress overtime leads to an increased risk of physical inactivity (Fransson et al., 2012). Similarly, in the London Whitehall II study, work stress, also conceptualized as job strain, at Time 1 and Time 2 was negatively associated with levels of physical activity (Chandola et al., 2008). In a daily diary study, job demands and control were measured at one time point and affect and work hours were measured daily (Jones, O'Connor, Conner, McMillan, & Ferguson, 2007). Daily affect and work hours significantly predicted levels of physical activity, but demands and control were not significant (Jones et al., 2007), suggesting that aggregate levels of work stress may not adequately predict daily physical activity.

Measuring work stress via job strain or demands provides an overall picture of the employee's stress level of the job. However, job strain measures do not capture daily stressful events (i.e. challenges, hassles) that might occur at work, such as a disagreement with someone at work. These daily stressful events occurring in the individual's environment have immediate effects on the individual's emotional and physical functioning (Almeida, 2005; Almeida, Neupert, Banks, & Seriod, 2005; Stawski, Sliwinski, Almeida, & Smith, 2008). Daily work stressors create an increase in arousal on the specific day compared to chronic stressful events at work that create prolonged arousal overtime (Almeida, 2005; Almeida et al., 2005). Measuring daily stressors provides information about the individual's subjective experience of stressors with a more precise measurement of time, as well as how these stressors influence daily functioning (Almeida, 2005).

In addition, measuring stress at the daily level also allows researchers to capture how individuals vary in their perceptions of work stress from day-to-day, that is within-person variability, and to examine how people within a similar occupation vary in their reported levels of stress, that is between-person variability (Almeida, 2005). In a daily diary study over the course of one work week, Nägel, Sonnentag, and Kühnel (2015) measured work stress through daily situational constraints (e.g., working with outdated/incomplete material). Their participants were recruited from locations that individuals typically engage in exercise. Little information was provided regarding other work characteristics of their sample. They found daily work stress did not predict the number of minutes employees were physically active after work (Nägel, Sonnentag, & Kühnel, 2015). However, there are limited studies examining the specific connection between daily work stress from stressors in relation to time spent on physical activity.

The majority of daily work stress research in relation to behavior investigates ways in which individuals recover from daily work stress. These studies do not examine if daily work stress directly predicts physical activity, but instead examine how individuals feel after recovery activities, such as physical activity. Recovery is defined as an individual's return to their pre-stressor level of functioning from the work day or reverse the negative consequences of work stress (Binnewies & Sonnentag, 2008; Meijman & Mulder, 1998). Physical activity is considered a way in which individuals recover from work stress, through mechanisms such as psychological detachment from work, to improve well-being at the end of the day (e.g, Feuerhahn, Sonnenta, & Woll, 2014; Wichers et al., 2012).

There is also evidence that workplace physical activity interventions decrease work stress (Conn, Hafdahl, Cooper, Brown, & Lusk, 2009). However, for employees not currently participating in workplaces intervention, it is important to gain a better understanding of how

daily stressful work events, in combination with other daily work factors, may influence daily physical activity, as there is limited research regarding the daily fluctuations of work stress and physical activity.

Job Burnout

Job burnout is a prolonged response of chronic exposure to work stress (Maslach & Jackson, 1981; Maslach, Schaufeli, & Leiter, 2001). The primary indicator of job burnout is emotional exhaustion. Two other aspects of job burnout are cynicism and professional inefficacy (reduced personal accomplishment; Maslach et al., 2001). Job burnout is important to examine in studies related to resources as burnout can deplete resources, more specifically, individuals who have higher levels of burnout are depleted of their physical and cognitive resources to cope with their work demands, as well as demands outside of work (i.e. family) (Bakker & Costa, 2014; Bakker & Demerouti, 2007; Demerouti, Mostert, & Bakker, 2010). Therefore, even though job burnout is a chronic state, levels of burnout can influence daily functioning through resources.

In the cross-sectional research on job burnout and physical activity, studies consistently find a negative relationship between burnout and physical activity. More specifically, as levels of burnout increase, levels of physical activity and exercise decrease (e.g., Ahola, Pulkki-Råback, Kouvonen, Rossi, Aromaa, & Lönnqvist, 2012; Moustou, Panagopoulou, Montgomery, & Benos, 2010; Sane, Devin, Jafari, & Zohoorian, 2012). In terms of physical activity guidelines, individuals who met physical activity guidelines were less likely to be burned out than individuals who did not meet these guidelines (Olson, Odo, Duran, Pereire, & Mandel, 2014). However, these cross-sectional studies cannot determine causality.

Longitudinal studies suggest that participating in regular physical activity can decrease levels of job burnout. Toker and Biron (2012) collected data across three time points and found

an increase in job burnout for employees who did not actively engage in physical activity but not for employees who were engaging in high levels of physical activity. In a Swedish cohort study, Jonsdottir and colleagues (2010) found that at baseline, individuals who engaged in physical activity had lower levels of job burnout. Two years later, they found that the risk of burnout was significantly lower for those individuals who reported engaging in physical activity at baseline, suggesting that engaging in physical activity lowered the risk of burnout.

There are also interventions that examine burnout and physical activity due to the high prevalence of burnout in the workplace (Bretland & Thorsteinsson, 2015). In a four-week randomized control trial, 49 inactive employees were assigned to either cardiovascular exercise, resistance exercise, or control (no exercise) group (Bretland & Thorsteinsson, 2015). Both exercise groups reported larger decreases in burnout compared to the control group. In a 12-week training program, specifically for employees with high burnout, Gerber and colleagues (2013) found increased exercise reduced symptoms of burnout.

There are studies that examine how levels of job burnout impact an individual's daily life, but few studies specifically focus on burnout and daily physical activity. Nägel and Sonnentag (2013) examined daily levels of exercise, personal resources (defined as positive states), and emotional exhaustion, an indicator of job burnout, over five consecutive working days. They found that exercise was related to an increase in personal resources the next day. In turn, these personal resources were related to lower emotional exhaustion after work. In another daily diary study, Oerlemans and Bakker (2014) found that time spent on physical activities was positively related to daily recovery (i.e. recovery of resources) for employees of all levels of burnout. Daily diary research demonstrates the importance of physical activity in relation to daily resource gain for all individuals. Longitudinal research shows how these resources from

engaging in physical activity accrue over time by lowering the risk or presence of job burnout; thus, demonstrating the importance of physical activity in relation to job burnout.

Work-to-Family Conflict

Work-to-family conflict is a type of inter-role conflict that occurs when demands in the work role interfere with fulfilling demands in the family role (Greenhaus & Beutell, 1985). Inter-role conflict also exists in the opposite direction of family interfering with work (i.e. family-to-work conflict); however, for the purposes of our study examining psychological work factors, our focus was work-to-family conflict.

Antecedents of work-to-family conflict include, high job demands, high levels of work stress, high work hours, high job involvement, and low supervisor support (Amstad, Meier, Fasel, Elfering, & Semmer, 2011; Bianchi & Milkie, 2010). The link between work-to-family conflict and health and well-being is well documented in the literature (Amstad et al., 2011; Greenhaus, Allen, & Spector, 2006). However, much of the work-to-family conflict and health research focuses solely on health outcomes (e.g., mental and physical health), but does not examine the processes underlying this connection between work-family-conflict and health. In other words, health behaviors, with the exception of alcohol use, are rarely studied in work-family conflict research.

Of the few studies that have examined work-to-family conflict and physical activity there are inconclusive findings. In a nationally representative sample, Grzywacz and Marks (2001) found that individuals engaged in more physical activity when they felt little interference from work on their family role. Similarly, Caudroit and colleagues (2011) found a negative correlation between physical activity and work interfering with family amongst a sample of teachers in

France. However, Allen and Armstrong (2006) did not find a link between work-to-family conflict and physical activity in a study of employees from a variety of occupations.

In sum, there is limited research exploring the link between work-to-family conflict and physical activity. The few studies are cross-sectional. Research suggests that work-to-family conflict and the consequences of work-to-family conflict fluctuate from day to day (Greenhaus et al., 2006; Ilies, Schwind, Wagner, Johnson, DeRue, & Ilgen, 2007); therefore, research studies would benefit from utilizing a daily diary design to examine how work-to-family conflict is associated with physical activity. Currently, there are no daily diary studies examining the influence of work-to-family conflict on physical activity. The current daily diary research examining work-to-family conflict and health behaviors are limited to alcohol use (e.g., Wang, Liu, Zhan, & Shi, 2010).

Flexible Work Arrangements

Flexibility policies can help provide control of work hours and schedules (Kelly & Kalev 2006). Flexible work arrangements, broadly defined, allow flexibility "where" work is completed or "when" work is completed (Allen, Johnson, Kiburz, & Shockley, 2013). Flextime and telework are two types of flexibility policies in the workplace and the focus of our study. Flextime arrangements vary, but the common theme is that individuals regularly work outside of the typical work schedule, upon agreement with their supervisor. Usually, the work schedule is set up such that it can vary flexibly, though sometimes flextime can mean that workers have a regular work schedule that falls slightly outside of a typical 8am – 5 pm schedule (e.g., starting the work day at 7am and ending at 4pm, for example). A telework arrangement occurs when the employee works remotely and is not physically in the office (Kelly & Kalev, 2006).

Flexible work arrangements are proposed as a tool to prevent work-family conflict (Allen et al., 2013); however, findings are inconsistent with regard to whether these arrangements assist in preventing work-family conflict (e.g., Baltes, Briggs, Huff, & Wright, 1999; Byron, 2005). Allen and Shockley (2009) suggested these inconsistent findings are based on the variability in types and use of flexible work arrangements. They posited that flexibility be viewed as a valued resource in the workplace (Allen et al., 2013). The majority of research on flexible work arrangements focuses on work and family-related outcomes, such as job performance (Gajendran & Harrison, 2007), work exhaustion, (Sardeshmukh, Sharma, & Golden, 2012), work stress (Gajendran & Harrison, 2007), work motivation (Barney & Elias, 2010), job satisfaction (McNall, Nicklin, & Masuda, 2010), turnover (McNall et al., 2010), work-family conflict (Russell et al., 2009), and work-life balance (Morganson, Major, Oborn, Verive, & Heelan, 2009).

However, there are a few studies that suggest a link between flexibility and health behaviors. Moen and her colleagues (2011) suggest that flexibility can facilitate positive health behaviors, such as getting more sleep, less likelihood of working when sick and subsequently infecting others, and more time for exercise. In their study, exercise was measured using the average number of days per week the individuals were physically active over the past four weeks and flexible work arrangements were not measured directly, only perceptions of schedule control were reported. Similarly, Grzywacz, Casey, and Jones (2007) found that perceived flexibility was related to increased physical activity in a sample of pharmaceutical company employees. Workplace flexibility was measured as an individual's perception of their flexibility at work to meet work and family demands. In a cross-sectional study using objective measures of flexible

work, employees who teleworked reported less physical inactivity compared to employees who did not telework (Henke, Benevent, Schulte, Rinehart, Crighton, & Corocran, 2015).

In sum, most of the current research investigating the link between flexibility and physical activity is limited to perceptions of flexibility but not the actual use of the flexible work arrangement. In addition, the majority of these studies are cross-sectional and do not take in to account the day-to-day fluctuations in the use of a flexible work arrangement. In other words, these studies do not measure the outcome on workdays a flexible work arrangement is used or outcomes on workdays a flexible work arrangement is not used.

Flexible work arrangements in United States. Currently in the United States there is no law that requires employers to allow their employees to have access to flexibility arrangements (Gassman-Pines & Goldstein, 2017). However, in 2010, the Telework Enhancement Act of 2010 was signed into law, providing employees of federal agencies the right to telework. Other locations within the United States have adopted the "right to request," which are laws that allow all employees the right to request flexibility. In 2014, Vermont expanded their equal pay law to include flexible work arrangements. This provision allows employees the right to request flexibility for any reason and employers must consider these requests at least twice a year (21 V.S.A. § 309). Also in 2014, the Family Friendly Workplace Ordinance of San Francisco was approved. San Francisco's law allows employees the right to request flexible or predictable work arrangements for caregiving purposes, but only applies to businesses of 20 or more employees. The law is also limited to employees employed in San Francisco, those employed for six months or more by their current employer working at least eight hours per week (SF Admin Code § 12Z). More recently, in 2018, New York City passed the Temporary Schedule Change Law that allows employees to make two temporary schedule changes per year for select personal events

(NY § 1399-2016). Employees must be employed with the current employer for at least four months and work at least 80 hours in a calendar year.

Even though only three select locations have passed laws regarding flexible work arrangements, many workplaces do have arrangements available (Gassman-Pines & Goldstein, 2017). However, just because a work arrangement is available does not mean the employee can use the arrangement (Butts, Casper, & Young, 2013). For employees to use these flexible arrangements, their supervisors or managers must approve or deny them. Kelly and Kalev (2006) suggested that individuals who are perceived as more valuable and productive to the company would most likely get approval. However, the average worker who needs a flexible arrangement to meet their family and personal life demands may not be approved for the flexible arrangement, putting them at risk for poor health and well-being. In addition, some employees may not use a flexible work arrangement, as they believe it may have negative consequences on their career, as there is some research suggesting a stigma associated with flexible work arrangements (Kelly & Moen, 2007). However, if employees were granted or used flexible work arrangement, they may be better able to manage their multiple roles (at home and at work) and become a more productive worker (Odle-Dusseau, Britt, & Greene-Shortridge, 2012).

Flexible work arrangements at site of data collection. Currently, there are two types of flexible work arrangements, telework and flextime, offered to employees at the worksite used for data collection in our study. A wellness department on campus manages the contracts for formal arrangements. In addition, there are specific guidelines to have a formal arrangement with the university both for flextime and telework. However, both arrangements require supervisor approval and are determined on a case-by-case basis. Salary and benefits are not affected by

using a flexible work arrangement. An individual can have both a telework and flextime arrangement, as well.

For a formal telework agreement, an employee must complete all their job responsibilities in addition to teleworking a minimum of eight hours per week or 32 hours a month. Employees who occasionally telework are not required to have a formal agreement with the university, but instead a "standing" agreement with their supervisor. If employees live with children or adults who need care to be provided to them during work hours, the employee must have another individual present to provide care to that child or adult.

For flextime, employees do not need a formal agreement if they shift their schedule one hour or less than the standard working hours of 8:00am to 5:00pm. For example, if the employee shifted their start and end times to 7:00am and 4:00pm, they would not be required to have a formal agreement with the university. Employees have the following options for shifting their times: start and end times each work day, adjusted meal breaks, and a compressed work week.

Daily Diary Designs

Many studies examining work, family, and health behaviors are cross-sectional. These cross-sectional studies, as well as some longitudinal studies, fail to capture daily variation of behaviors and cannot adequately examine the within-person variability. Daily diary designs are a sophisticated study design that can capture these processes.

Diary methods have become increasingly common in social science disciplines (Iida, Shrout, Laurenceau, & Bolger, 2012). These methods involve intensive, repeated self-reports, in which participants report on their daily lives, specifically about events and experiences (Bolger, Davis, & Rafaeli, 2003; Iida et al., 2012). Daily diary studies allow researchers to investigate various processes (e.g., social, psychological) within everyday situations of individuals, dyads,

families, or organizations for example (Bolger, David, & Rafaeli, 2003). Examining links between work, family, and health from day to day allows for a deeper understanding of processes, emotions, stressors, and behaviors occurring in various contexts.

Three general categories of diary designs are interval-contingent, signal-contingent, and event-contingent recording (Bolger & Laurenceau, 2013; Laurenceau & Bolger, 2005). During interval-contingent recording, the participant records their experiences at a predetermined, regular time, such as the end of the day before bed. The predetermined time is decided by the researcher. Signal-contingent recording is different from interval-contingent recording in that participants record their experiences whenever they are contacted by the researcher. The third category, event-contingent recording, is a design that requests participants to report every time an event has occurred. The event is predefined by the researcher prior to the study, such as a conflict between an employee and their supervisor (Bolger & Laurenceau, 2013; Laurenceau & Bolger, 2005). Data collection methods for these diary designs will vary. Ways in which daily diaries can be collected include: paper and pencil data collection, augmented paper diaries (e.g., ecological monetary assessment), and handheld and electronic data collection. Data collection can be done by the participant or by the researcher (e.g., over the telephone; Bolger et al., 2003).

Strengths

There are many strengths to using diary methods as the design for a research study. Strengths include: ecological validity, investigation of within-person processes and variability, and minimization of recall bias. These strengths are discussed in detail below.

Ecological validity. A strength of diary studies is ecological validity. Ecological validity, which could also be referred to as representativeness or applicability to real life, refers to whether a study accurately represents conditions and the effect of those conditions in the real

world (Reis, 2012). Ecological validity is one of the three primary criteria for external validity (Brewer & Crano, 2014). Ecological validity is essential when the research is descriptive, which is the case for diary studies as there is no experimental control in these designs (Conner & Lehman, 2012). Ecological validity is important for research, theory, and practice so the results of the study are representative of the real world. Research in an unnatural setting or with invasive technology may alter people's experiences, making the data not representative (Reis, 2012).

In diary studies, data can capture the nature and repercussions of events that may not be ethically or realistically studied in laboratory settings, such as a health crisis (Reis, 2012). Diary designs capture daily processes, emotions, behaviors, and stressors that other study designs (e.g., laboratory experiments) could not capture. In addition, because data are collected in the participant's natural environment, daily life measures are sensitive to contextual factors that occur simultaneously with events (e.g., a health crisis of a child in the hospital may require the parent to leave work for a few days to care for their sick child) (Reis, 2012).

Minimization of recall bias. Studying events retrospectively can lead to methodological biases regarding validity; therefore, daily diaries are a methodological approach to address concerns about distortion and inaccuracies created by recall (Larson & Almeida, 1999). Diary studies minimize this bias by collecting data on a daily basis (Reis, 2012). Collection of data each day only requires participants to recall information for that day, not from an event that has occurred long ago which may not capture their current emotions, feelings, or perceptions. The strength of daily diary designs is that this method captures data each day as it occurs (Reis, 2012). Although daily diaries help minimize recall bias, it should be noted that diary studies do not completely remove retrospective bias. For example, participants may experience a very stressful day and may not fill out the diary because they are angry or they forget, in which cases,

the data reported lack key experiences of that day which may lead to an underestimation of certain processes, behaviors, or emotions (Larson & Almeida, 1999).

Within-person processes and variability. Diary designs recognize the nonlinear effects of processes (Gunthert & Wenze, 2012). One of the greatest strengths of diary studies compared to other methodological designs (e.g., cross-sectional designs), is the ability to examine within-person processes (Almeida, 2005). Many processes, such as stress, occur within the individual and research designs should allow for investigation of how individuals' experiences vary over time, otherwise known as within-person processes. A diary study could examine work-to-family conflict and stressors repeatedly, which allows researchers to examine intraindividual variability (Laurenceau & Bolger, 2005). Within-person analyses can also examine how stressors are associated with changes in a person's psychological and physical well-being from one day to the next (Almeida, 2005).

Researchers should think within-person, because when averaging across individuals, also known as the aggregate, the result is only informative about averages and not individual experience. In one study, examining daily job characteristics and work-family conflict, Butler and his colleagues (2005) found that within person variation account for 62% of the total variation in work-family conflict, compared with 38% explained by between-person variation. This example of a large within-person variation demonstrates the importance of considering within-person processes when designing a study. Within-person processes are also imperative to consider with work-life research because work stressors, work conditions, and family demands, may change from day to day (Ohly, Sonnentag, Niessen, & Zapf, 2010). This within-person approach allows researchers to examine the proximal predictors of work, family, and health constructs. Diary designs also allow researcher to identify correlates and consequences of these

fluctuations (Reis & Gable, 2000). In addition, this within-person approach allows researchers to rule out confounding variables that are stable over time, such as general health status (Almeida, 2005; Reis & Gable, 2000). It is important to note that because of the within- and between-person differences there should be separate reliability analyses to describe these differences (Iida et al., 2012).

Limitations

There are many strengths with diary studies; however, diary studies have limitations as well. Limitations include issues with reactivity, participant compliance, and the cost and amount of resources needed to conduct a diary study. With repeated measurements, participants may slightly alter their behavior or responses, such as engaging more in physical activity, if they know they must report on it at the end of the day study (Barta, Tennen, & Litt, 2012). Secondly, due to the nature of the intensive longitudinal design of diary studies, participant recruitment may be difficult or result in a sampling bias (e.g., not a representative sample) due to motivational or personality factors (Scollon, Kim-Prieto, & Diener, 2003). Therefore, it is important to find ways to decrease the burden of diary designs on participants, such as finding an optimal time, frequency, and length for the assessment (Gunthert & Wenze, 2012). Participant fatigue and subsequent habituation are also common during diary studies. It is possible that participants start responding with a particular response every time or more randomly over time. This fatigue and habituation of the participants may threaten the internal reliability over the course of the study (Gunthert & Wenze, 2012). However, even with the limitations, we feel that the strengths of the daily diary design are much greater than the limitations mentioned.

Research Questions

The current studies expand on previous research in numerous ways. First, research examining health behaviors and well-being among university employees rarely focuses on staff. Our study sought to examine only university staff employees, as opposed to faculty, to understand this population and differences that exist within this group of employees.

Second, much of the research investigating personal and environmental factors on physical activity is cross-sectional. While these studies provide useful information, from an SCT perspective, the person, environment, and behavior are dynamically interacting; therefore, it stands to reason that many factors (e.g., barriers, job burnout) related to physical activity would fluctuate from day-to-day. Therefore, we utilized a daily diary design to capture the temporal nature of physical activity in the environment.

First Study

For the first study, we were interested in exploring the types and frequency of barriers to physical activity occurring in the daily lives of university staff, as the majority of research on this topic is cross-sectional. Therefore, the following was our first research question:

> *Research Question #1:* What are daily barriers to engaging in physical activity for university staff employees and how frequently do these barriers occur over the course of one workweek?

We were also interested in exploring how daily levels of physical activity varied on flexible and non-flexible workdays based on the number of barriers reported, as there is currently no research on how flexible work arrangements may influence perceptions of the environment and subsequent health behavior. These limitations within research led us to our next research question:

Research Question #2: How do minutes of physical activity among university staff differ based on the number of perceived barriers present on flexible and non-flexible workdays?

We then explored correlates of physical activity among university staff members, specifically self-efficacy and barriers. We examined levels of self-efficacy because self-efficacy is considered one of the primary determinants of behavior in SCT and a strong correlate to physical activity in cross-sectional and interventions. We also aimed to investigate how the number of perceived barriers each day had a direct influence on physical activity, as past research in the general population suggests a negative relationship between barriers and physical activity. We were interested in investigating if these associations were similar for university staff.

In addition, the majority of the research examining flexible work arrangements is cross-sectional and focuses mainly on work-related or work-family outcomes. Our current study extends this research by focusing on the daily use of a flexible work arrangement, as well as the link to daily levels of physical activity, a health behavior worth exploring as job responsibilities require the workers to be more and more sedentary. Our specific research question for exploring personal and environmental correlated on physical activity was:

Research Question #3: How do self-efficacy, daily barriers, and daily use of a flexible work arrangement influence daily levels of physical activity?

The last line of inquiry for our first study was to explore if the daily use of a flexible work arrangement acted as a resource. More specifically, we were interested in exploring if flexible workdays protected an individual's resources that might otherwise be lost to barriers (e.g., energy), and if the individual then subsequently invested those protected resources into physical activity. Our last research question for the first study was:

Research Question #4: Does the use of a daily flexible work arrangement influence the association between daily barriers and levels of physical activity?

Second Study

For our second study, we were interested in extending the current research between psychological work factors and health behaviors. Three specific psychological work factors were selected to explore: daily work stress, job burnout, and daily work-to-family conflict. Previous research suggested that all three factors are linked to health. More specifically, higher levels of stress, burnout and conflict deplete an individual's resources and lead to subsequently poorer health. We examined work stress to capture if daily levels of stress impact daily resources an individual can invest in physical activity. We investigated job burnout because burnout has a pervasive association with resource depletion. Lastly, we investigated work-to-family conflict to capture the resources that may be lost because of inter-role conflict between work and family. Due to the fact university staff are understudied, we were interested in exploring the extent to which university staff were stressed and conflicted between work and family, more specifically on flexible and non-flexible workdays. These gaps within the literature led to the research question:

Research Question #5: What are the levels of daily work stress, daily work-to-family conflict, and daily physical activity university staff employees exhibit on flexible workdays compared to non-flexible workdays?

We also examined the direct effects of these psychological work factors on daily physical activity, as research and theory suggest these work factors can deplete an individual's resources. Our specific research question was:

Research Question #6: How does daily work stress, daily work-to-family conflict, levels of job burnout, telework, and flextime work schedules influence daily levels of physical activity?

Similar to our first study, we examined if the daily use of a flexible work arrangement could possibly act as a resource to mitigate the negative effects of these psychological work factors on daily physical activity, which led to our last research question:

Research Question #7: Does the use of a flexible work arrangement influence the association between work factors and minutes of physical activity?

Chapter 3: Method

Study Overview

Participants in this study were part of a larger project examining the effect of flexible work arrangements on health and family factors among university staff members. Data were collected from February 2018 to July 2018. This study utilized a daily diary design. Participants responded to an initial online survey that asked questions about their work, family, and health. This initial survey was followed up by seven daily surveys that asked questions regarding health behaviors, work experiences, and feelings at the end of the day.

Study Demographics and Recruitment Procedures

Participants were recruited from a large southeastern university in United States. In the Fall of 2018, there were roughly 3,433 university staff employed at the university according to their Office of Institutional Research. At this university, staff refer to a wide array of positions from entry-level positions to administrative and managerial employees. Participants were recruited through a Staff Senate Listserv and a health and wellness department at the university. In addition, trained graduate assistants visited department buildings and offices at the university to hand out recruitment flyers for the study. The most effective recruitment strategy was the Staff Senate Listserv.

Inclusion and exclusion criteria. Individuals who were full-time, university staff members using a flexible work arrangement and living with at least one family member were eligible for this study. At the university staff positions include a variety of jobs from entry-level positions to administrative and managerial positions. The university's wellness department defines flexible work arrangements as work arrangements that offer alternatives to the traditional work schedules or workweek and the traditional workplace. Exclusion criteria included

individuals that worked part-time, lived alone, showed interest in a flexible work arrangement but were not currently using one, or were faculty (i.e. teaching and research faculty, administrative and professional faculty, special research faculty, adjust teaching faculty).

Based on these criteria, data were gathered from 61 participants, as depicted in Figure 2. Data from 61 participants who completed the initial survey and a total of 281 days of daily diary were included in the analysis.

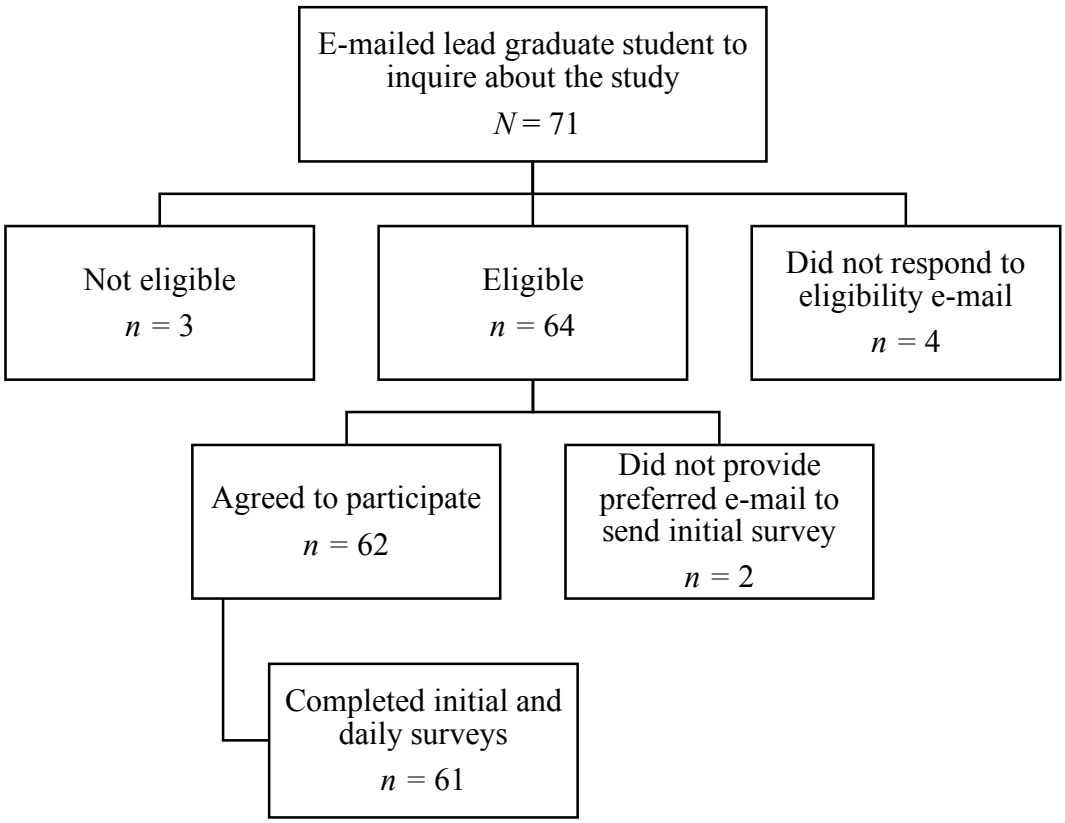


Figure 2. Flow chart of recruitment and data collection

Study Procedures

All contact with the participant was done via e-mail. If participants were interested, they contacted the lead graduate student on the project via e-mail. A more detailed description of the study was sent to the participant along with eligibility criteria questions. Participants self-reported if they were eligible for the study. If the participant met all qualifications, they were

asked which e-mail they preferred to use for this study. Next, participants were sent an e-mail with an identification number assigned by a graduate research assistant, as well as a copy of the informed consent form (see Appendix A). Participants were also sent the Qualtrics link to the initial survey in that e-mail. Participants were instructed the initial survey could be completed at any time of day. If participants had not completed the initial survey within two weeks of contacting the lead graduate student, they were sent a reminder e-mail with the initial survey link. At the beginning of the initial survey, participants read the informed consent and gave consent to participate by checking, "Yes, I have read the participation details and would like to participate in the study." The initial survey was estimated to take about 30 minutes. The initial survey contained the informed consent

At the end of the initial survey, participants selected their next upcoming work week they would be using a flexible work arrangement and have access to internet to start the seven daily surveys. Participants started these surveys at the beginning of their work week. These daily surveys were completed between 4:30pm and 10:00pm. Participants received a link each day at 4:30pm via Qualtrics to complete these surveys. The surveys could be completed on any device that had internet access (e.g., laptop, cell phone, tablet).

At the end of the study, participants received an amazon.com e-gift card for up to $50.00 for participating ($15 for the initial survey and $5 per daily survey completed). Data were collected on Qualtrics and downloaded on a password protected computer. This project was approved by the Virginia Tech Institutional Review Board, Protocol #17-1231.

Expected Sample Size and Statistical Power

To have sufficient power to estimate a 2-level model, it is recommended to have at least 30 subjects at level-2 (Raudenbush & Bryk, 2002); however, Mass and Hox (2005), now

recommend at least 50 subjects. They recommended at least 5-10 data points at level-1 (Mass & Hox, 2005). When running ANOVA repeated measures, within factors power analyses in G*Power, the recommended sample size for this model was 40-50 subjects for sufficient power (.80) to detect a small effect (0.1). The final sample size for the study was 61 participants.

Measures

All initial survey measures can be found in Appendix B. All daily survey measures can be found in Appendix C.

Descriptive information. Descriptive information collected from the participants included information about socio-demographic factors and their flexible work arrangements.

Demographic information. Information regarding gender, race, ethnicity, education level, household income, marital status, children, and individuals currently living in the household were collected in the initial survey. The coding of these measures is displayed in Table 6.

Flexible work arrangement type and purpose. Participants were asked, "What flexible work arrangement are you using at your current job? (check all that apply)" with response options: *telework* and *alternative work schedule* (referred to as flextime from hereon based on the definitions within the literature). These are currently the only two types of flexible work arrangements documented through the university. Participants were also given the option to select *other* and provided a textbox for further explanation; however, participants did not report other forms of flexible work arrangements used. Participants were also asked, "Is this work flexibility documented through the university?" with response options 1 = *yes* and 2 = *no*. Lastly, participants were asked the open-ended question, "Why do you use work flexibility at your current job?" Participant responses were thematically coded, with some responses having

multiple codes. Reasons for the use of flexibility (i.e. themes) were then developed from these codes.

Independent variables. Independent variables included: physical activity self-efficacy, daily barriers, daily work flexibility, daily work-to-family conflict, daily work stress, and job burnout.

Physical activity self-efficacy. Physical activity self-efficacy was measured with 5 items (Marcus, Selby, Niaura, & Rossi, 1992) in which participants rated their confidence in participating in regular exercise. Previous research demonstrates good test-retest reliability (.90; Marcus et al., 1992) and internal consistency (.72 to .85; Marcus & Owen, 1992; Mendoza-Vasconex, Marquez, Benitez, & Marcus, 2018) for this scale. A 1-factor structure of this construct was also tested and indicated good model fit (Mielenz, Edwards, & Callahan, 2011). Specific items were, "I am confident I can participate in regular exercise when I am tired," "I am confident I can participate in regular exercise when I am in a bad mood," "I am confident I can participate in regular exercise when I feel I don't have time," "I am confident I can participate in regular exercise when I am on vacation," and "I am confident I can participate in regular exercise when it is raining or snowing." Response options ranged from 1 = *not at all confident* to 5 = *very confident*. Item responses were averaged with possible scores ranging from 1 to 5. Higher scores indicated higher physical activity self-efficacy.

Daily barriers. Participants were asked, regardless if they engaged in physical activity or not that day, if they felt any of the following 14 barriers made it difficult to exercise today. The list of barriers was compiled by Salmon, Owen, Crawford, Bauman, & Sallis (2003) and Booth, Bauman, Owen, & Gore (1997). Item wordings were adjusted for daily measurement. Participants were asked, "Did you feel any of the following were barriers that made it difficult to

exercise today?" The barriers measured were: cost, air or noise pollution, safety, no sidewalks/places outside to exercise, no access to facilities, disability or injury, feeling tired, weather, not enough motivation, lack of time, work commitment, family commitment, not feeling well, and other priorities. Response options were 0 = *no* and 1 = *yes*. Item responses for each day were summed with possible scores ranging from 0 to 14. Higher scores indicated a greater number of barriers experienced that day.

Daily work flexibility. Participants were asked, "Did you use a flexible work option at your job today?" If participants responded '*yes*', they were asked "What kind of work flexibility did you use today?" with response options, *telework, flextime,* and *other*. For the response option '*other*' participants could describe the work flexibility in a textbox. Participants did not report other forms of flexible work arrangements. Flexible work arrangements were coded as 1 = *used telework today*, 2 = *used flextime today*, and 3 = *no flexible work arrangement used today*.

Daily work-to-family conflict. The work-to-family conflict subscale developed by Netemeyer, Boles, and McMurrian (1996) and adapted by the Work, Family, and Health Study (WFHS; Bray et al., 2013 & King et al. 2013) was used to measure daily work-to-family conflict. Almeida and colleagues (2016) reported adequate reliability for this scale in the WFHS study, more specifically between-person reliability was .85 and within-person reliability was .76. Participants responded to five items each day. The five items were: "Since this time yesterday, how much did the demands of your work interfere with your family time?" "Since this time yesterday, how much did your time spent at work make it difficult to fulfill your family responsibilities?" "Since this time yesterday, how much did things you wanted to do at home not get done because of the demands your job put on you?" "Since this time yesterday, how much did your job produce strain that made it difficult to fulfill your family duties?" and "Since this

time yesterday, due to your work-related duties, how much did you have to make changes to your plans for family activities?" Response options ranged from 1 = *not at all* to 4 = *a lot*. Items were averaged; thus, possible scores ranged from 1 to 4. Higher scores indicated greater daily work-to-family conflict.

Daily work stress. Participants were asked questions about four possible work stressors adapted by the WFHS (Bray et al., 2013 & King et al. 2013) study from the Daily Inventory of Stressful Events (DISE; Almeida, Wethington, & Kessler, 2002). Participants were asked, "Did you have an argument or disagreement with anyone at work since this time yesterday?" "Since yesterday, did anything happen at work that you could have argued about but you decided to let pass in order to avoid a disagreement?" "Since yesterday, did you have demands placed on you at your job that were stressful (such as facing a deadline like a release date, being on call, or too many conflicting meetings)?" and "Other than what you already mentioned, since this time yesterday, did anything else happen at your job that was stressful?" If participants responded '*no*', for a stressor, they were not asked any follow-up questions for that stressor. If participants responded '*yes'* to a stressor, they responded to the follow-up question, "How stressful was this for you?" Response options ranged from 1 = *not at all stressful* to 4 = *very stressful.* Items were summed to create a total score. Possible scores ranged from 0 to 16. Higher scores indicated greater daily work stress.

Job burnout. In the daily survey, participants were asked to respond to five items from the emotional exhaustion subscale developed by Maslach and Jackson (1981). These items were adjusted for day-to-day measurement similar to other daily studies (e.g., Derks, van Mierlo, & Schmitz, 2014). Cronbach's alpha in their study ranged from .74 to .88. The items were, "Today, I felt frustrated by my job," "Today, I felt burned out from my work," "Today, I felt like I

worked too hard on my job," "Today, I felt emotionally drained from my work," and "Today, I felt like I am at the end of my rope." Response options ranged from 1 = *totally disagree* to 5 = *totally agree.* To create an aggregate job burnout score for each participant, each item was averaged for all daily diaries with possible scores from 1 to 5. The average scores for each item were then summed, with higher scores indicating higher levels of job burnout (Possible score range = 5 to 25).

Covariates. Self-reported health and daily work hours were included in the models as covariates. Demographic variables, were entered into the model as covariates; however, these variables were not significant at the .10 level; thus, not included in final analyses.

Self-reported health. Self-reported health of the participant was assessed with one item from the SF-36 (Ware & Sherbourne, 1992) in the initial survey. Previous studies have reported strong reliability and validity for this single item measure of health (DeSalvo, Fisher, Tran, Bloser, Merrill, & Peabody, 2006). Participants were asked: "In general, would you say your health is?" with response options 1 = *poor* to *5 = excellent*. Possible scores ranged from 1 to 5, with higher scores indicating better health.

Daily work hours. In the daily survey, the number of hours a participant worked was measured with one item, "How many hours did you work today?" Participants were instructed to enter a numeric value of the number of hours worked. Participants entered the value zero if they did not work that day and were not asked any follow up questions about work.

Dependent variable. The outcome of this study was the number of minutes per day that individuals engaged in physical activity. We were interested in the time spent in all physical activities, structured (i.e. exercise such as running) and unstructured (i.e. physical activity such

as light walking). Thus, we used the umbrella term, 'physical activity' to refer to our dependent variable.

Daily minutes of physical activity. An adapted version of the Godin Leisure-Time Exercise Questionnaire (GLTEQ; Godin & Shepard, 1985) was used to measure daily physical activity. Test-retest reliability for this measure was estimated between .74 and .80 (Godin & Shepard, 1985). Participants were asked, "Did you engage in physical activity since this time yesterday?" on each daily survey. If participants responded '*no'*, they were not asked any follow-up questions. If participants responded '*yes'*, they responded to follow-up questions about the type of physical activity. Participants were asked, "How many minutes were strenuous exercise (heart beats rapidly) (e.g., running, jogging, hockey, football, basketball, soccer, aerobics classes, vigorous swimming, fast bicycling, etc.)?" "How many minutes were moderate exercise (not exhausting) (e.g., brisk walking, yoga, volleyball, etc.)?" and "How many minutes were mild exercise (minimal effort) (e.g., easy walking, fishing, golf, bowling, etc.)?" Participants entered the number of minutes for strenuous, moderate and mild exercise. The number of minutes for strenuous, moderate, and mild exercise were summed for each day for the total number of minutes engaging in physical activity.

Minutes, as opposed to units of energy expenditure, such as Metabolic Equivalents (METs), were used in our study because we were not interested in the energy expenditure from participants each day. Flexible work arrangements can provide individuals a greater control over their time, so we were interested in the amount of time individuals invested in physical activity each day while using flexible work schedules. Similar work-related studies and reports focusing on physical activity have also measured physical activity in units of time (e.g., Mullahy & Robert, 2008; Nägel et al., 2015; Nomaguchi & Bianchi, 2004).

Data Analysis

For the purposes of this study, only data from work days (i.e. working greater than zero hours) were used, as we were interested in physical activity on days in which a flexible work arrangement could be used.

Data preparation. Prior to data analyses, the data were examined and prepared for analyses, which included examining multicollinearity, outliers, missing data, and psychometrics properties of the variables.

Multicollinearity. Multicollinearity, which occurs when more than two variables are highly correlated, is an issue because regression coefficients are estimated to be larger than the true value (Hayes, 2013; Kline, 2016). To examine multicollinearity, collinearity diagnostics were run with continuous variables examining the tolerance and the variance inflation factor (VIF) in SPSS version 25. Variables that had a tolerance value less than .10 or a VIF value greater than 10 were flagged to indicate multicollinearity.

Outliers. Outliers are values that are extreme compared to the other cases (Acock, 2006; Kline, 2016). Outliers are important to examine before data analysis occurs because outliers can bias the mean and estimates. Univariate outliers were examined using frequency distributions of the standardized values (z-scores). A z-score of greater than |3| was used to determine a univariate outlier (Kline, 2016). Data were screened for each of the cases to decide if the case was included in the analyses, in addition to sensitivity analyses. Sensitivity analyses included running two sets of analyses, first with the outliers removed from analyses and second with the outliers included in analyses then screening the coefficients for changes in the two sets of analyses.

A multivariate outlier is an extreme value on at least two or more variables in the model (Kline, 2016). Multivariate outliers were flagged by computing Mahalanobis Distance which indicates the distance in variance units between the scores for a specific case and the centroid, while correcting for intercorrelations (Kline, 2016, p. 73). Outliers were identified if the Mahalanobis Distance was equal to one, that is, the p-value for each case is less than .001 (Kline, 2016). Similar to univariate outliers, data were screened and sensitivity analyses were conducted.

Missing data. Missing data can be problematic because it can threaten the validity of the study (Black, Harel, & Matthews, 2012). There are three different patterns of missing data: missing at random (MAR), missing completely at random (MCAR), and missing not at random (MNAR) (Enders, 2010; Little & Rubin, 2002). MAR refers to missing data that is not correlated with the outcome variable of interest. The loss of data is because of another variable or variables in the model (Enders, 2010; Little & Rubin, 2002). MCAR refers to missing data that is not correlated with the outcome variable of interest or other variables in the model (Enders, 2010; Little & Rubin, 2002). In other words, the missing data is completely unrelated to the data. MNAR, considered non-ignorable, is missing data that is related to the outcome variable of interest even after controlling for other variables (Enders, 2010; Little & Rubin, 2002).

To address missing data, scores of the independent and dependent variables for participants who completed all 7 days of the daily surveys were compared to participants who did not complete all seven daily surveys using t-tests. If no significant group differences are found, then it can be assumed that the data is not missing at random and full-information maximum likelihood (FIML) will be used in the analytic models. (Black et al., 2012). Full-information maximum likelihood estimation, which uses all available data for analysis, is a

fruitful strategy for recovering unbiased parameter estimates, standard errors and confidence intervals under MAR and MCAR conditions.

Psychometrics. Cronbach's alpha values (Cronbach, 1951) were computed in STATA to assess the internal consistency of items of a scale (i.e. scale reliability). Using a general rule of thumb, Cronbach's alpha of .70 to .80 were adequate, .80 and .90 were good, and .90 and higher were considered excellent. For measures from the initial survey (measures collected only once from participants), one Cronbach's alpha value was reported. For measures from the daily survey, Cronbach's alpha was calculated for each day; therefore, a range was reported.

Confirmatory factor analysis (CFA). Measurement models, specifically confirmatory factor analysis (CFA), were run in STATA to examine if a set of items fit together to measure and validate a 1-factor construct (Kline, 2016). Measurement models were used for constructs that were measured by three or more continuous items (i.e. self-efficacy, job burnout).
Fit indices were examined to determine if there was an acceptable fit between the model and the observed data. The chi-square (χ^2) value was reported, as well as fit indices, which included: root mean squared residual (SRMR) and comparative fit index (CFI). A SRMR value in the range of 0 to 0.08 was used to indicate good to adequate fit (Hu & Bentler, 1999; MacCallum, Browne & Sugawara, 1996). A CFI value ranging from 0.95 to 1 was used to indicate adequate to good fit (Hu & Bentler, 1999).

After a model was determined to have fit the data, factor loadings, that is the coefficients of each indicator, were examined to determine if an indicator significantly represented the construct. The unstandardized factor loadings in the CFA models are the unstandardized coefficients. For these coefficients, t-values were estimated to determine if the factor loading was significantly different from zero, indicating the item was a good indicator for the construct. A

cutoff value of |1.96| was used for the t-statistic (Kline, 2016). The standardized factor loadings in the CFA models were also reported. Loadings greater then .70 indicated evidence of convergent validity, that is, all items related to the same construct; however, factor loadings of .30 or greater were considered acceptable and used as the cut off in all CFA models in this study (Kline, 2016).

Multilevel confirmatory factor analysis (MCFA). To evaluate the factor structure of scales with continuous items across multiple days (i.e. work-to-family conflict) at the daily and person level, multilevel confirmatory factor analyses (MCFA; Muthén, 1994) were run in Mplus. MCFAs, that take into account the nested data, were necessary to assess the factor structure of scales used in the daily diaries. Factor loadings at the between-person level (i.e. participants) and within-person level (i.e. daily) were estimated separately (Muthén, 1994). In addition to the validity of the constructs measured in the daily diaries, one within-person reliability estimate was reported using an omega value (Bolger & Laurenceau, 2013). Values greater than .70 were considered acceptable.

Analysis for RQ1, RQ2, and RQ5. For descriptive information regarding the sample, means, standard deviations, and range of scores were examined for all continuous variables. Frequencies were examined for categorical variables. To answer the first research question regarding barrier type and frequency of occurrence, frequency statistics were run. To answer the second research question, four groups from the continuous barriers variable were formed based on quartiles, resulting in groups of 0, 1-2, 3-4, and 5 or more barriers. Next, descriptive statistics were run for each barrier group for each type of workday (i.e. flextime, telework, non-flexible workdays) to examine the average minutes of physical activity for each barrier group (i.e. 0, 1-2, 3-4, and 5 or more). For the fifth research question, an ANOVA was run to examine mean

differences of physical activity, work stress, and work-to-family conflict across the three types of workdays (i.e. flextime, telework, non-flexible workdays).

Multilevel analysis for RQ3-RQ4 and RQ6-RQ7. Due to the nested data (daily observations within individuals), shared variance between observations of the same individual needed to be considered for the third, fourth, sixth, and seventh research question (Raudenbush & Bryk, 2002). Ignoring the shared variance, by using OLS regression models, may lead to misestimated standard errors which could result in a Type 1 error (Raudenbush & Bryk, 2002). Multilevel modeling is the most common approach used to analyze nested data to account for this shared variance.

Multilevel regression analyses assume variables are normally distributed (Hox, 2010). Therefore, skewness and kurtosis values were examined for all continuous variables. If a variable had a kurtosis or skewness value above the cut off value off |2|, the violation of normality was corrected with transformation procedures to stabilize the sample variance. For example, the dependent variable, daily physical activity (in minutes) was positively skewed with overdispersion (i.e. variance greater than the mean), in other words, our dependent variable was not normally distributed. A logarithmic transformation of this variable did not stabilize the variance, and interpreting a multilevel model with a log-transformed dependent variable would be difficult.

An alternative to transforming a non-normally distributed dependent variable for multilevel linear models are to instead estimate multilevel Poisson or negative binomial models. These alternate models are specifically used to fit multilevel models with count-dependent variables (e.g., 0, 1, 2, 3), such as minutes of physical activity. Poisson distributions assume the variance and mean are equal, while negative binomial models allow for the variance to be larger

than the mean. Because of the overdispersion in the count-dependent variable (i.e. a large occurrence of zero minutes of physical activity), multilevel negative binomial models were found to be most appropriate for the study data (STATA XTNBREG; Rabe-Hesketh & Skrondal, 2008).

Estimation steps for the two-level negative binomial models. Two-level negative binomial models with daily minutes of physical activity as the dependent variable were estimated for the study analyses. Level-1 variables included time-varying constructs measured during the daily diary days. Level-1 variables included work hours, work stressors, work-to-family conflict, physical activity barriers, use of telework, and use of flextime. Level-2 variables included person-level constructs: self-efficacy, self-reported health, and average job burnout.

The level-1 equation specifies the outcome (i.e. physical activity), Y_{ij}, for each day, i, nested within each participant, j. Y_{ij} is a sum of the components in the equation (Raudenbush & Bryk, 2002). In other words, each participant has their own set of regression equations to predict their minutes of physical activity each day based on the predictor variables. The number of level-2 equations depends on the number of coefficients in the level-1 equation (Raudenbush & Bryk, 2002). More detailed equations are provided in the following sections.

*Centering***.** Prior to analyzing models to answer the research questions, certain independent variables were centered. Centering is important because it makes it easier to interpret the parameters of the intercept and slope (Bolger & Laurenceau, 2013; Enders & Tofighi, 2007). Continuous variables can be grand mean centered or group mean centered. Grand mean centering subtracts the overall mean of the group from each individual's raw score. Group mean centering subtracts the individual's mean of a variable from their raw score. All level-1

continuous variables were group mean centered. Level-1 dichotomous variables were not centered (i.e. telework, flextime). Level-2 variables were not centered.

Unconditional model (Intercept-only model; Model 1). The Level-1 model was examined first to provide information about the variance of physical activity between and within individuals. This empty model (i.e. no predictors) is helpful for preliminary information about how much variation in the outcome (i.e. physical activity) lies within and between persons (Raudenbush & Bryk, 2002) and whether a multilevel model is warranted. The equation for the unconditional model is the following:

$$\text{Level-1: } Y_{ij} = \beta_{0j} + u_{ij}$$

$$\text{Level-2: } \beta_{0j} = \Upsilon_{00} + u_{0j}$$

Where Y_{ij} represents the number of minutes of physical activity, β_{0j} represents the intercept, and u_{ij} and u_{0j} represent the error terms at level-1 and level-2, respectively. Since there are no predictors in this model, there is only one level-2 equation to represent the intercept.

The unconditional model chi square statistic was reported. The intraclass correlation (ICC), which estimates how much variance in physical activity lies between individuals, was also calculated. If the ICC is greater than .05, the assumption of regression that observations are independent may be violated so multilevel analysis for the data is necessary (Raudenbush & Bryk, 2002). The 95% confidence intervals were also calculated for this variability. According to Bolger and Laurenceau (2013), an ICC in the .2-.4 range is expected for self-reports.

Conditional models estimating with main effects (Model 2). The conditional random-intercept model is the next step after the unconditional model, which allows for covariates to be added in the model. In this model, the level of physical activity is allowed to vary over days after controlling for covariates (Rabe-Hesketh & Skrondal, 2008) and slopes are assumed to be fixed.

The coefficients, standard errors, and incidence rate ratios (IRRs) were reported in a table for the main effects intercept and slopes.

Coefficients in negative binomial models can be interpreted as the logarithm (called log from hereon) of expected counts (Hilbe, 2011), that is, the log of expected minutes of physical activity for this study. For continuous predictors, coefficients were interpreted as the log of expected minutes of physical activity for a one unit increase in the independent variable, with all other variables held constant. For categorical predictors, coefficients were interpreted as the difference in log of expected minutes of physical activity from two groups, with all other variables held constant. The intercept of the model is interpreted as the log of expected minutes of physical activity when all variables in the model have a value of zero. For the first study, the level-1 equation for Model 2 is the following:

$$Minutes\ of\ physical\ activity_{ij} = exp(\beta_{0j} + \beta_{1j}Telework_{ij} + \beta_{2j}Flextime_{ij} + \beta_{3j}Barriers_{ij} + \beta_{4j}Work\ hours_{ij} + \beta_{5j}Self efficacy_{ij} + \beta_{6j}Health_{ij} + r_{ij} + \delta_{ij})$$

Where, r_{ij} represents the residual term that is specific to each person and δ_{ij}represents the overdispersion parameter. Level-2 equations for the first study in Model 2 are the following:

$$\beta_{0j} = \Upsilon_{00} + u_{ij} + \varepsilon_{ij}$$

$$\beta_{1j} = \Upsilon_{10}$$

$$\beta_{2j} = \Upsilon_{20}$$

$$\beta_{3j} = \Upsilon_{30}$$

$$\beta_{4j} = \Upsilon_{40}$$

$$\beta_{5j} = \Upsilon_{50}$$

$$\beta_{6j} = \Upsilon_{60}$$

Where Υ_{00} through Υ_{60} represent the estimated fixed effect parameters in the model, in other words, β_{1j} through β_{6j} have fixed slopes. The intercept, β_{0j}, has a random slope. The equation for β_{0j} represents that each participant's intercepts differ with u_{ij} representing the residual error and ε_{ij} representing overdispersion. For the second study, the level-1 equation for Model 2 was:

$$Minutes\ of\ physical\ activity_{ij} = exp(\beta_{0j} + \beta_{1j} Telework_{ij} + \beta_{2j} Flextime_{ij} + \beta_{3j} Work\ Stress_{ij} + \beta_{4j} Work\ to\ family\ conflict_{ij} + \beta_{5j} Work\ hours_{ij} + \beta_{6j} Job\ burnout_{ij} + \beta_{7j} Health_{ij} + r_{ij} + \delta_{ij})$$

The level-2 equations for the second study for Model 2 were:

$$\beta_{0j} = \Upsilon_{00} + u_{ij} + \varepsilon_{ij}$$

$$\beta_{1j} = \Upsilon_{10}$$

$$\beta_{2j} = \Upsilon_{20}$$

$$\beta_{3j} = \Upsilon_{30}$$

$$\beta_{4j} = \Upsilon_{40}$$

$$\beta_{5j} = \Upsilon_{50}$$

$$\beta_{6j} = \Upsilon_{60}$$

$$\beta_{7j} = \Upsilon_{70}$$

Similar to the first study, Υ_{00} through Υ_{70} represent the estimated fixed effect parameters in the model, in other words, β_{1j} through β_{7j} have fixed slopes.

Model coefficients were exponentiated to obtain the Incidence rate ratios (IRR; Hilbe, 2011). The IRR can be interpreted as the rate of physical activity per day. For continuous predictors, the IRR was interpreted as the difference in rate of physical activity for a one unit increase in the independent variable, with all other variables held constant. For categorical

predictors, the IRR was interpreted as the difference in rates of physical activity among the two groups, with all other variables held constant. To calculate the percentage of these rates, the IRRs were subtracted from 1 (1 - IRR; Hilbe, 2011).

In both studies, we also tested for lagged effects, but no lagged effects were significant; therefore, these effects were not included in the final model.

Interaction effects (Model 3). In this step, interaction effects were entered in to the model. Only interaction effects that were significant ($p < .05$) or approached significance ($p < .10$) were kept in the model.

For the first study, the interactions terms were added in to the equation, specifically the level-1 equation for Model 3 was the following:

$$Minutes\ of\ physical\ activity_{ij} = exp(\beta_{0j} + \beta_{1j}Telework_{ij} + \beta_{2j}Flextime_{ij} + \beta_{3j}Barriers_{ij} + \beta_{4j}Work\ hours_{ij} + \beta_{5j}Selfefficacy_{ij} + \beta_{6j}Health_{ij} + \beta_{7j}Barriers \times Telework_{ij} + \beta_{8j}Barriers \times Flextime_{ij} + r_{ij} + \delta_{ij}$$

For the first study, the level-2 equations for Model 3 were the following:

$$\beta_{0j} = \Upsilon_{00} + u_{ij} + \varepsilon_{ij}$$

$$\beta_{1j} = \Upsilon_{10}$$

$$\beta_{2j} = \Upsilon_{20}$$

$$\beta_{3j} = \Upsilon_{30}$$

$$\beta_{4j} = \Upsilon_{40}$$

$$\beta_{5j} = \Upsilon_{50}$$

$$\beta_{6j} = \Upsilon_{60}$$

$$\beta_{7j} = \Upsilon_{70}$$

$$\beta_{8j} = \Upsilon_{80}$$

For the second study, the interactions terms were also added into the equation, specifically the level-1 equation for Model 3 was the following:

$$Minutes\ of\ physical\ activity_{ij} = exp(\beta_{0j} + \beta_{1j}Telework_{ij} + \beta_{2j}Flextime_{ij} + \beta_{3j}Work\ stress_{ij} + \beta_{4j}Work\ to\ family\ conflict_{ij} + \beta_{5j}Work\ hours_{ij} + \beta_{6j}Job\ burnout_{ij} + \beta_{7j}Health_{ij} + \beta_{8j}Job\ burnout \times Telework_{ij} + \beta_{9j}Job\ burnout \times Flextime_{ij} + r_{ij} + \delta_{ij})$$

For the first study, the level-2 equations for Model 3 were the following:

$$\beta_{0j} = \Upsilon_{00} + u_{ij} + \varepsilon_{ij}$$

$$\beta_{1j} = \Upsilon_{10}$$

$$\beta_{2j} = \Upsilon_{20}$$

$$\beta_{3j} = \Upsilon_{30}$$

$$\beta_{4j} = \Upsilon_{40}$$

$$\beta_{5j} = \Upsilon_{50}$$

$$\beta_{6j} = \Upsilon_{60}$$

$$\beta_{7j} = \Upsilon_{70}$$

$$\beta_{8j} = \Upsilon_{80}$$

$$\beta_{9j} = \Upsilon_{90}$$

Only interactions that were significant ($p < .05$) were interpreted in the following three-step process to interpret the interaction term (Hilbe, 2011). Specifically, the following procedures were used for the second study.

The first step to interpret the significant interaction was to interpret the IRR of the interaction term between job burnout, *JB*, and flextime, *F*:

$$IRR_{JBxF} = exp[\beta_2 + \beta_9(job\ burnout\ score)]$$

First, the model coefficient for the flextime (β_2) was added to the product of the model coefficient for the interaction term between job burnout and flextime (β_9) and the value of the continuous variable, job burnout. This value was then exponentiated. Job burnout was categorized into three levels, no burnout ($x = 5.00$), average burnout of the sample ($x = 9.37$), and high burnout, calculated as two standard deviations above the mean ($x = 17.21$). Therefore, three IRR values were calculated for the interaction term.

Second, the standard errors were calculated. To calculate the standard errors, a covariance matrix of the coefficients in the model was generated. Next, the variance, *V,* of the interaction was calculated using the following formula (Hilbe, 2011):

$$V_{JBxF} = \sqrt{V(\beta_2) + x^2V(\beta_9) + 2[\mathrm{Cov}(\beta_2, \beta_9)]}$$

The third step for the interaction term was to calculate the 95% confidence intervals (CI). Confidence intervals were calculating the following equation:

$$95\%\ CI = [exp[[\beta_2 + \beta_9(job\ burnout\ score)] \pm (z_{1-a2} * SE)]$$

The test statistic, z_{1-a2}, for 95% confidence interval is 1.96, therefore +/-1.96 was multiplied by the standard errors, *SE*. Percentages for the IRR of the interaction term and the confidence interval were generated in the following way: If the value of the CI was less than 1, the value was subtracted from 1 and multiplied by 100. If the value generated of the CI was greater than 1, 1 was subtracted from the value and multiplied by 100 to generate the percentage. For ease of interpretation, interactions that were significant at the .05 level were graphically represented.

Chapter 4: Results

In this chapter, results are presented in three sections. In the first section, results of the data preparation for the manuscripts are presented. Data preparation included examining multicollinearity, outliers, normality, missing data, and psychometric properties of the variables. Descriptive statistics of the sample were also examined. In the second and third section, results of our study are presented in two manuscripts. The first manuscript examining self-efficacy, barriers, flexible work arrangements, and physical activity will be submitted to *Health Psychology*. The second manuscript examining work stress, job burnout, work-to-family conflict, flexible work arrangements, and physical activity will be submitted to the *Journal of Occupational Health Psychology*. Appendix D provides information about scope, impact factor, and submission guidelines for each journal.

Results of Data Preparation for Manuscripts

Prior to examining the research questions for the two articles, the data was prepared for analysis, which included examining multicollinearity, outliers, normality, missing data, and psychometric properties of the variables. Descriptive statistics of the sample were also examined.

Multicollinearity

All tolerance values were greater than .10 and all VIF values were less than 10. No evidence of multicollinearity was present among the continuous variables.

Outliers

Univariate outliers and multivariate outliers were examined. Data points and participant cases were screened to see if there were any noticeable issues. Any noticeable outliers were flagged. As for univariate outliers, there were zero outliers for self-efficacy and self-rated health, one outlier for burnout, two outliers for work hours, four outliers for barriers, five outliers for work stress, and seven outliers for work-to-family conflict and minutes of physical activity. As for multivariate outliers, there were zero multivariate outliers for the first study (i.e. Article 1) and five multivariate outliers for the second study (i.e. Article 2). Sensitivity analyses with outliers and without outliers were considered. No large differences in the coefficients were found; therefore, all cases flagged as outliers were included in data analysis for the two articles.

Table 1

Predictor Variables Skewness and Kurtosis Prior to Transformations

Predictor	Skewness	Kurtosis	Transformation
Self-Reported Health	0.31	-0.15	-
Self-Efficacy	-0.04	-0.60	-
Job Burnout	1.20	1.32	-
Daily Work Hours	-0.71	2.56	-
Daily Work Stress	1.97	5.03	Square root
Daily Barriers	0.84	0.53	-
Daily Work-to-Family Conflict	1.75	2.53	Log-transform

Normality

Skewness and kurtosis values were examined for all variables. Skewness and kurtosis values for predictors in the model are presented in Table 1. Except for daily work hours, all variables with skewness or kurtosis greater than |2| were transformed so values were less than |2|.

After the square root transformation, the skewness value for daily work-to-family conflict was 1.08 and kurtosis was 0.14. After the log-transformation, the skewness value for daily work stress was .77 and kurtosis was -0.83. Multiple transformations were run for daily work hours, but no transformation lowered the kurtosis to less than |2|. As for minutes of physical activity, skewness was 2.20 and kurtosis was 5.61. This non-normality in the data may be due to the large percentage of people not engaging in physical activity. Therefore, negative binomial models, as previously mentioned in the data analysis plan, were used to examine the research questions.

Missing Data

Data were examined for missingness on the initial survey and daily surveys. No data were missing for any of the predictor variables. Seventy percent of the sample (n = 43) completed all 7 days of the daily surveys. Participants who completed the daily survey outside the survey time window (e.g., the next morning) were coded as a non-response and not used in the analyses. Participants who completed all 7 days were compared to participants who did not complete all 7 days on all predictor variables. There were no systematic differences among the groups.

Psychometrics

All Cronbach's alpha values were greater than .70, indicating all variables used in the models had good to excellent reliability. More specifically, Cronbach's alpha for job burnout was .89, indicating good reliability. Cronbach's alpha for self-efficacy was .84, indicating good

reliability. Lastly, Cronbach's alpha across all days for work-to-family conflict was .93, indicating excellent reliability. Over the course of the daily surveys, Cronbach's alpha ranged from .89 to .98 for work-to-family conflict.

Confirmatory factor analysis (CFA). Confirmatory factors analyses were run for the latent construct at the between-person level for self-efficacy and job burnout.

Self-efficacy. A confirmatory factor analysis was run to examine the five items measuring the construct of self-efficacy. All items had significant factor loadings for the construct self-efficacy ($p < .001$). Unstandardized and standardized coefficients are displayed in Table 2. Fit indices were the following: $\chi^2(5) = 5.09$ ($p = 0.41$), SRMR = .03, and CFI = 1.00. The values indicated a good fit between the model and the observed data. No post-hoc modifications were made to the self-efficacy scale.

Table 2

Standardized and Unstandardized Coefficients for the Confirmatory Factor Analysis (CFA) for Self-Efficacy

Item Stem: I am confident I can participate in regular exercise when…	*B*	*SE B*	β	*t*
I am tired.	1.00	-	0.77	-
I am in a bad mood.	1.18	0.17	0.87	7.01*
I feel I don't have time.	0.96	0.16	0.77	5.83*
I am on vacation.	0.69	0.19	0.49	3.58*
When it is raining or snowing.	0.97	0.18	0.72	5.47*

Note: *p < .05

Burnout. All five burnout items had significant factor loadings for the construct of burnout ($p < .001$). Unstandardized and standardized coefficients are displayed in Table 3. Fit indices indicated a good model fit: $\chi^2(5) = 30.18$ ($p = 0.00$), SRMR = .02, and CFI = 0.96. No post-hoc modifications were made to the burnout scale.

Table 3

Standardized and Unstandardized Coefficients for the Confirmatory Factor Analysis (CFA) for Burnout

Item Stem: Today I felt like…	*B*	*SE B*	β	*t*
I am at the end of my rope.	1.00	-	0.58	-
Frustrated by my job.	1.75	0.18	0.77	9.78*
Burned out from my work.	1.85	0.19	0.80	9.93*
Like I worked too hard on my job.	1.63	0.17	0.75	9.43*
Emotionally drained from my work.	2.21	0.21	0.89	10.40*

Note: *p < .05

Multilevel confirmatory factor analysis (MCFA). A MCFA was run to estimate the within- and between-level coefficients for the five work-to-family conflict items. All items had a significant factor loading for the construct work-to-family conflict ($p < .001$). Unstandardized and standardized within-level coefficients are displayed in Table 4.

Table 4

Unstandardized and Standardized Within-level Coefficients for the Multilevel Confirmatory Factor Analysis (MCFA) for Daily Work-to-Family Conflict

Item Stem: Since this time yesterday…	*B*	*SE B*	β	*t*
How much did the demands of work interfere with your family time?	0.40	0.06	0.67	6.37*
How much did your time spent at work make it difficult to fulfill your family responsibilities?	0.48	0.05	0.79	9.14*
How much did things you wanted to do at home not get done because of the demands your job put on you?	0.53	0.06	0.76	9.52*
How much did your job produce strain that made it difficult to fulfill your family duties?	0.40	0.07	0.71	6.04*
Due to your work-related duties, how much did you have to make changes to your plans for family activities?	0.40	0.06	0.69	6.44*

Note: *p < .05

Unstandardized and standardized coefficients between-level coefficients are displayed in Table

5. Fit indices indicated good fit, specifically $\chi^2(10) = 14.25$ ($p = 0.16$), SRMR-within = .02, SRMR-between = .02 and CFI = 0.99. In addition, the omega value was .85, which indicated good within-person reliability. No post-hoc modifications were made to the work-to-family conflict scale based on the MCFA.

Table 5

Unstandardized and Standardized Between-level Coefficients for the Multilevel Confirmatory Factor Analysis (MCFA) for Daily Work-to-Family Conflict

Item Stem: Since this time yesterday…	*B*	*SE B*	β	*t*
How much did the demands of work interfere with your family time?	0.58	0.10	0.99	5.82*
How much did your time spent at work make it difficult to fulfill your family responsibilities?	0.54	0.10	0.99	5.58*
How much did things you wanted to do at home not get done because of the demands your job put on you?	0.55	0.08	0.92	6.71*
How much did your job produce strain that made it difficult to fulfill your family duties?	0.45	0.08	0.88	5.33*
Due to your work-related duties, how much did you have to make changes to your plans for family activities?	0.57	0.10	0.99	5.90*

Note: *p < .05

Description of the Sample

Data were collected on workdays from 61 participants, resulting in 281 diary days. Of the 281 workdays used in this study, the average number of diary days completed was 4.6 days (range: 2 to 7; *Mdn* = 5). The median length of time participants took to complete the initial survey was 23.72 minutes. The median length of time used to complete the daily survey was 5.73 minutes. On average, participants worked 7.44 hours (*SD* = 2.13) per day. Twenty-two participants (36.1%) worked more than 8 hours per day on at least one day of the workweek. More specifically, participants worked more than 8 hours on 17.4% of study days (*n* = 49).

A description of the characteristics of the sample can be found in Table 6. The majority of participants were female, White, married/partnered, and received a Bachelor's degree or higher. In addition, most participants lived with their spouse and children or their spouse only. The age of participants ranged from 20 to 62 years (M = 41.4, SD = 9.89).

Table 6

Socio-demographic Descriptive Statistics of the Sample

	Participants	
Variables	N	Percent
Gender (female = 1)	54	88.5
Race		
White (1)	55	90.2
Asian (2)	5	8.2
More than one race (3)	1	1.6
Ethnicity (Not Hispanic/Latina/o = 1)	58	95.1
Education		
High School (1)	7	11.7
Associate's Degree (2)	8	13.3
Some College (3)	1	1.7
Bachelor's Degree (4)	28	46.7
Graduate or Professional School (5)	16	26.7
Household Income		
Less than $40,000 (1)	1	1.7
$40,001 to $70,000 (2)	13	22.1
$70,001 to $100,000 (3)	23	39.0
$100,001 to $140,000 (4)	13	22.1
$140,001 or greater (5)	9	15.3
Marital Status		
Single/never married (1)	3	4.9
Married/partnered (2)	53	86.9
Divorced/separated (3)	5	8.2
Have children (yes = 1)	44	72.1
Currently living with		
Spouse and Child(ren) (1)	32	52.5
Spouse, Child(ren) and Parent (2)	1	1.6
Spouse and Parent (3)	1	1.6
Spouse, Child(ren), and Other (4)	1	1.6
Spouse (5)	21	34.4
Child(ren) (6)	5	8.2

Note: Assigned codes for labels are displayed in parentheses

Flexible work arrangement descriptive statistics. In regard to participants' flexible work arrangement, 32 (52.5%) had their flexible work arrangement documented through the university and the remaining participants (n = 29, 47.5%) had an agreement with their supervisor for the use of their flexible work arrangement. Twelve (19.7%) participants reported they used telework, 35 (57.4%) reported using flextime, and 14 (23.0%) reported using both telework and flextime. The average length of time participants had been using their flexible work arrangement was 2.83 years (SD = 3.10; range: 0.08 to 18 years). A flexible work arrangement was used on 75.8% (n = 213) of the diary days. Of the 281 days, telework was used on 55 days (19.6%) and flextime was used on 158 days (56.2%). Participants also reported their reason(s) for using a flexible work arrangement, described in Table 7.

Table 7

Reason(s) for Using Flexible Work Arrangements

Reason	Percent
Child care/accommodate children's schedule	37.7
Work-life balance/More time for family	21.3
Avoid commute/traffic	14.8
Personal health reasons	13.1
Work with no interruptions/increase productivity	13.1
To complete work related tasks/job requires flexibility	13.1
Taking online/college courses	8.2
Personal schedule preference	6.6
Carpool with other to work	4.9
Caring for parent	3.3
Avoid office stress	1.6
Increase moral	1.6
Have other job	1.6
Caring for sick pet	1.6
Go to the gym	1.6
Long distance spouse	1.6
Be home for services/deliveries	1.6

The top reasons for using a flexible work arrangement were to accommodate their children's schedule or to take care of children and to achieve work-life balance/have more time with their family. Other reasons mentioned were: avoid traffic/commute, personal health reasons, and increased productivity.

Physical activity descriptive statistics. Out of the 281 days, on average, participants reported 28.77 minutes (*SD* = 43.26; range: 0 to 380) of daily physical activity. Eighty-four percent of participants (*n* = 51) reported engaging in physical activity on at least one of the diary days. More specifically, of the 281 days, participants engaged in physical activity on 139 days (49.47%). Of those 139 days, on average, participants reported 58.17 minutes (*SD* = 45.55; *Mdn* = 45; range: 15 to 380) of physical activity. Moreover, the average number of minutes reported for strenuous activity was 21.60 minutes (*SD* = 42.80), 19.87 minutes (*SD* = 24.22) for moderate activity, 19.57 minutes (*SD* = 30.66) for mild activity.

The unconditional multilevel model indicated that there was systematic within- and between-person variability in minutes of daily physical activity. The intraclass correlation (ICC) was 0.207 (95% CI [.11, .35]), which indicated that 20.7% of the variance in physical activity lie between individuals (i.e. some participants engaged in more physical activity than others) and 79.3% of the variance in physical activity lies within individuals (i.e. participant's physical activity varied from day to day). Because of considerable between-person and within-person variance in physical activity (minutes; dependent variable), the nested structure of the data cannot be ignored and the use of multilevel models is warranted.

Article 1

Title: Daily Impact of Flexible Work Arrangements, Self-Efficacy, and Barriers on Physical Activity

Abstract

Objective: Prior research examining flexible work arrangements focuses mainly on work-related or work-family outcomes. Little is known about the link between flexible work arrangements and health behaviors. The goal of this study was to explore how self-efficacy and daily barriers influence daily levels of physical activity in a sample of university staff members using a flexible work arrangement (flextime or telework). The daily use of a flexible work arrangement was also explored as a potential buffer to the link between barriers and physical activity. ***Method:*** Full-time university staff employees (N=61), using a flexible work arrangement and living with at least one family member, participated in this daily diary study. Participants completed an initial survey followed by daily diaries over the course of one work week, resulting in 281 diary days. For analysis, multilevel negative binomial models were analyzed. ***Results:*** The most frequently reported barriers were: lack of time, feeling tired, and not enough motivation. Multilevel models revealed that as the number of barriers increased, levels of physical activity significantly decreased. Self-efficacy was not significantly related to daily physical activity. Participants reported fewer minutes of physical activity on flextime days compared to days a flexible work arrangement was not used. Daily use of a flexible work arrangement did not moderate the association between barriers and physical activity. ***Conclusions:*** This study identified how daily barriers and flexible work arrangements influence levels of physical activity in university staff employees. Implications regarding flexible work arrangements and workplace wellness programs are discussed.

Keywords: flexible work arrangements, physical activity, daily diary, barriers, self-efficacy

Daily Impact of Flexible Work Arrangements, Self-Efficacy, and Barriers on Physical Activity

Introduction

Higher levels of physical activity are linked to positive health outcomes and well-being, as well as a decrease in the risk of chronic diseases (Centers for Disease Control and Preventions (CDC), 2018a), yet in 2017 approximately 46% of adults did not engage in the recommended amount of physical activity (CDC, 2018b). HealthyPeople2020, led by the Department of Health and Human Services (Office of Disease Prevention and Health Promotion), considers physical activity a high-priority health issue in their national agenda aimed to improve the health of the United States.

The work environment may contribute to the lack of physical activity in the United States. Since 1965, there has been a decrease in the amount of occupations involving physical activity (Church et al., 2011). In addition, many occupations have work-related activities that requiring employees to be sedentary (Church et al., 2011; Jans, Proper, & Hildebrandt, 2007). Too much sedentary behavior is linked to adverse health outcomes and premature mortality (Dunstan, Howard, Healy, & Owen, 2012). One population within the workforce of interest, based on their sedentary nature of the job, are university employees.

University employees sit for approximately 75% of their workday and display worse mental health and higher levels of stress-related illness compared to the general population (Fountaine, Piacentini, & Liguori, 2014; Mark & Smith, 2012). The majority of studies examining university employee health and well-being tend to only examine faculty or examine differences between the groups of faculty and non-faculty (referred to as staff from here on). This research suggests that staff have different occupational stressors in the work environment compared to faculty (e.g., Biron, Brun, & Ivers, 2008; Tytherleigh, Jacobs, Webb, Ricketts, &

Cooper, 2007). Specific stressors include a lack of job security, resources, pay and benefits, and job control (Horton, 2006; Tytherleigh et al., 2007). It is rare that studies focus solely only staff; thus, an investigation of within-group differences of university staff is warranted to identify the needs of the population. The first aim of this paper was to contribute to the knowledge of personal and environmental factors that may influence levels of physical activity among university staff.

In addition, flexible work arrangements are becoming more common throughout the workplace (Gassman-Pines & Goldstein, 2017), yet the effects of these arrangements on health behaviors are rarely examined. Studies suggest that perceived flexibility at work is related to higher levels of physical activity (e.g., Moen, Kelly, Tranby, & Huang, 2011); however, there is limited evidence if specific types of flexible work arrangements influence physical activity. Two specific types of flexible work arrangements common are telework, that is, control over *where* work is completed (e.g., working from home), and flextime, that is, control of *when* work is completed (e.g., shifting start and end times) (Kelly & Kalev, 2006). Therefore, the second aim of this paper was to examine how the use of flexible work arrangements, specifically telework and flextime, influence levels of physical activity in university staff.

Many studies examining work in relation to health behaviors are cross-sectional or collect data a few times over the course of a few months or years (e.g., Kouvonen et al., 2007; Moen et al., 2011; Taris, Ybbema, Beckers, Verheijden, Geurts, & Kompier, 2011). These studies are subject to recall bias and fail to capture the daily context in which the behavior is occurring. Daily diary methods involve repeated self-reports, in which participants report daily on their lives, that are representative of real life, reduce recall bias, and allow researchers to examine variability within the individual (Bolger, Davis, & Rafaeli, 2003; Iida, Shrout, Laurenceau, &

Bolger, 2012). Jones and colleagues (2007) suggested that the within-person variation plays a more important role when explaining health behaviors than between-person variation. Hence, examining the connection between work and health behaviors from day to day allows for a deeper understanding of perceptions, stressors, and behaviors occurring in various contexts. This study sought to extend the work-health behavior research by utilizing a daily diary design to capture daily fluctuations in the use of flexible work schedules and physical activity.

Theoretical Frameworks

An important concept from Social Cognitive Theory (SCT; Bandura, 1986, 1997) is reciprocal determinism, which posits that the physical/social environment, the person, and behavior continuously interact over time. In other words, one must investigate the environment and the person to better understand subsequent health behaviors, such as physical activity. One specific personal factor explored in this study was self-efficacy. Environmental factors explored in this study were flexible work arrangements and perceived barriers to physical activity. Daily diary designs assist in capturing these temporal dynamics of the person and environment interacting over the course of one work week.

An important consideration within a person's environment is their resources. The Conservation of Resources (COR; Hobfoll, 1989) theory provides a framework for examining how an individual interacts with their environment through the management of their resources (i.e. objects, conditions, personal characteristics, energies). The perceived value of resources vary across people and contexts. In addition, the loss of resources over time (i.e. resource loss spiral) can lead to chronic stress (Hobfoll, 1989, 2001); thus, individuals actively seek to protect, maintain, acquire, and invest their resources (Hobfoll, 1989, 2001). One possible resource at

work that could be useful for protecting and maintaining other resources are flexible work arrangements.

Physical Activity

In the literature, physical activity and exercise are often used interchangeably but are different concepts (Caspersen, Powell, & Christenson, 1985). Physical activity is an umbrella term for bodily movements beneficial to health. Exercise is a subset of physical activity that is structured or planned with the objective to improve or maintain physical fitness (Caspersen et al., 1985). The focus of the current study was to examine both structured and unstructured physical movement; thus, we use the umbrella term of physical activity to refer to our current study. However, in this review of the literature, the language and terms used by scholars in their research will be used.

Demographic factors, such as education, income, age, gender, marital status, and general health status influence levels of physical activity. Individuals that are highly educated, have higher incomes, and better health are more likely to engage in physical activity (Bauman, Reis, Sallis, Wells, Loos, & Martin, 2012; Trost et al., 2002). Older adults and women report less physical activity and exercise (Bauman et al., 2012; Nomaguchi & Bianchi, 2004; Pan, Cameron, DesMeules, Morrison, Craig, & Jiang, 2009; Van Dyck et al., 2015). In addition, married individuals participate in physical activity and exercise less than individuals not married (Dinç, 2017; Nomaguchi & Bianchi, 2004).

Self-efficacy. A personal factor that plays a large role in behavior is self-efficacy. Self-efficacy, the central tenet in SCT and the foundation for behavior, is an individual's belief and confidence in their ability to perform a behavior successfully (Bandura, 1977). An individual's self-efficacy plays a large role in whether an individual will choose to participate in the behavior

or continue to perform the behavior under difficult circumstances (e.g.., many barriers present). Thus, self-efficacy can either hinder or enhance behavior (Bandura, 1989, 1997).

Many cross-sectional studies examining physical activity have found a positive association between self-efficacy and physical activity (e.g., Anderson, Wojcik, Winett, & Williams, 2006; Bauman et al., 2012; Pan et al., 2009). In a sample of Web-health users, participants kept a log of their daily physical activity for seven days (Anderson-Bill, Winett, & Wojick, 2011). Findings suggested that self-efficacy predicted higher levels of daily physical activity. Research suggests this association between self-efficacy and physical activity, as well as exercise, holds true across different populations, such as those with chronic diseases (Daniali, Darani, Eslami, & Mazaheri, 2017; Knittle, De Gucht, Hurkmans, Vlieland, Peeters, Ronday, & Maes, 2011), postnatal women (Cramp & Bray, 2011), and individuals recovering from injuries (Kroll et al., 2012) for example.

However, there are a select few studies that suggest that self-efficacy is not related to physical activity. Larkin and colleagues (2016) found no association between self-efficacy and the level of physical activity within the past week or the past month for individuals with arthritis. Koeneman and colleagues (2011) suggested there was insufficient evidence to support the link between self-efficacy and physical activity or exercise in their systematic review of healthy older adults. However, it is possible self-efficacy may not consistently predict physical activity due to context and the temporal nature of physical activity (McAuley & Blissmer, 2000). The majority of studies discussed previously are cross-sectional, which do not adequately capture the context in which the behavior, physical activity, is occurring. In order to capture this context, it is important to examine the link between self-efficacy and daily physical activity, which few

studies have done. Examining data each day (e.g., daily diaries) also permits investigators to examine variation of physical activity within people over the course of time.

Barriers. Cross-sectional research suggests that there is a negative association between the number of perceived barriers and levels of physical activity (e.g., Ball, Rice, & Maljak, 2017; Pan et al., 2009; Ross & Melzer, 2016). In other words, as an individual perceives more barriers, their levels of physical activity decrease. The most commonly reported personal barriers across the literature were: not enough time, lack of motivation, feeling tired, other duties, and cost (Ball et al., 2017; Dinç, 2017; Hoare, Stavreski, Jennings, & Kingwell, 2017; Joseph, Ainsworth, Keller, & Dodgson, 2017; Justine, Azizan, Hassan, Salleh, & Manaf, 2013; Ross & Melzer, 2016). Lack of time and energy were the top barrier reported by university staff in a cross-sectional study (Leicht, Sealey, & Devine, 2013). However, unlike the findings of these studies, one study in a sample of Australian adults, found that lacking motivation and feeling too tired were the least reported barriers. However, only 39% of this sample was employed full-time. The rest of the sample were either students, unemployed, or employed part-time, so perhaps lack of full-time employees in the sample may account for the difference in barriers reported.

Social environmental barriers reported in past studies were: lack of social support, lack of physical activity partner, and family responsibilities (Joseph et al., 2015; Mailey, Huberty, Dinkel, & McAuley, 2014; Ross & Melzer, 2016). In a sample of working parents, family responsibilities were a large barrier for parents (Mailey et al., 2014). When examining the literature regarding the social support and physical activity, individuals who lived in socially-cohesive neighborhoods or were invited by friends to engage in physical activity reported more physical activity (Florindo et al., 2013; Granger, McDonald, Parry, Oliveira, & Denehy, 2007; Karusisi, Bean, Oppert, Pannier, & Chaix, 2012; Sawyer, Ucci, Jones, Smith, & Fisher, 2016).

Physical environmental barriers reported in studies include: weather, no access to facilities, inadequate facilities, safety concerns, lack of sidewalks, and lack of transportation (Booth, Bauman, Owen, & Gore, 1997; Dinç, 2017; Joseph et al. 2015; Justine et al., 2013; Ross & Melzer, 2016).

However, it is important to note that the weakness of most of these studies involves the design of the study. These studies are cross-sectional, that is, both perceived barriers and level of physical activity are measured at one time point. Most participants were asked to estimate the number of minutes spent in various levels of physical activity on an average each week. In addition, participants were asked to rate the degree they felt each barrier hindered their physical activity with no context of the situation. These designs are subject to recall bias, compared to other types of studies (e.g., daily diary) that measure these perceptions and activities as they occur each day in the individual's natural environment, as well as allow for the investigation of within-person variation compared to only between-person variation (Reis, 2012).

The Present Study

The present study addresses limitations and gaps within the literature by focusing solely on university staff employees, an understudied population that is often grouped together with faculty in health and well-being studies. In addition, many studies examining barriers to physical activity are cross-sectional. From an SCT perspective, the person, environment, and behavior are constantly interacting; therefore, it stands to reason that barriers to physical activity would fluctuate from day-to-day. A daily diary design was utilized to capture these daily fluctuations. To capture all forms of bodily movement we examined minutes of daily physical activity. More specifically, participants reported on minutes spent in physical activities that structured (i.e.

exercise), such as playing sports, as well as physical activities that are not as structured or planned (i.e. physical activity), such as walking.

Lastly, the majority of research examining flexible work arrangements are cross-sectional and focus mainly on work-related or work-family outcomes. The current study extends this research by focusing on the daily use of a flexible work arrangement in relation to physical activity, a health behavior worth exploring as job responsibilities require the workers to be more and more sedentary. This study aimed to understand if the daily use of a telework or flextime arrangement acted as a resource to engaging in physical activity or impacted the relationship between barriers within the environment and subsequent physical activity.

Drawing on a SCT and COR framework, specific questions addressed were: (1) What are daily barriers to engaging in physical activity for university staff employees and how frequently do these barriers occur over the course of one workweek? (2) How do minutes of physical activity among university staff employees differ based on the number of perceived barriers present on flexible workdays and non-flexible workdays? (3) How do self-efficacy, daily barriers, and daily use of a flexible work arrangement influence daily levels of physical activity? and (4) Does the use of a daily flexible work arrangement influence the association between daily barriers and levels of physical activity?

Method

Participants and Procedure

Participants in this study were part of a larger project examining the use of flexible work arrangements among university staff employees. At the university staff refers to a variety of jobs from entry-level positions to administrative and managerial positions. Individuals were eligible if they currently used a flexible work arrangement at their job, were employed full-time, and lived

with at least one family member. Individuals that were faculty worked part-time, lived alone, or showed interest in a flexible work arrangement but were not currently using one were not eligible for the study.

Participants were recruited through a staff listserv, a university wellness department listserv, and through flyers distributed to departments around campus. Employees that were interested ($N = 72$), e-mailed the lead graduate student on the project and received a detailed description of the study, as well as eligibility questions. If participants self-identified as eligible ($n = 64$), they were sent an identification number and a Qualtrics survey link to the initial survey. Of the 64 eligible employees, 62 agreed to participate and 61 provided complete data (Response rate: 84.7%).

In this daily diary study, participants first responded to an initial online survey that asked general questions about their work, family, and health. At the end of this initial survey, participants selected a week to start their daily surveys over the course of one work week. The daily diaries were started at the beginning of the participant's work week. The daily surveys included more detailed questions about health behaviors, work experiences, and feelings at the end of the day. Daily surveys were completed between 4:30pm and 10:00pm. Participants were sent reminders to complete the survey at 4:30pm each day. At the end of the study, participants were compensated with up to a $50 amazon.com e-gift card. Data were collected from February 2018 to July 2018. This project was approved by the University's Human Subjects Institutional Review Board.

Initial Survey Measures

Demographics. Participants reported their age, gender, race, ethnicity, education level, household income, marital status, if they had children, and family members in their household.

Flexible work arrangement type and reason. Participants were asked what type of flexible work arrangement they were currently using at their job. Types of arrangements available at the university were *telework* or *flextime*. Participants were also asked if the arrangement was officially documented through the university. In addition, they were asked to describe why they chose to use a flexible work arrangement. Responses were coded, resulting in 17 categories.

Physical activity self-efficacy. Physical activity self-efficacy was measured with 5 items (Marcus, Selby, Niaura, & Rossi, 1992) in which participants rated their confidence in participating in regular exercise. Previous research demonstrates good test-retest reliability (.90; Marcus et al., 1992) and internal consistency (.72 to .85; Marcus & Owen, 1992; Mendoza-Vasconex, Marquez, Benitez, & Marcus, 2018). Example items were, "I am confident I can participate in regular exercise when I am tired," and "I am confident I can participate in regular exercise when I feel I don't have time." Response options ranged from 1 = *not at all confident* to 5 = *very confident*. Item responses were averaged with possible scores ranging from 1 to 5. Higher scores indicated higher physical activity self-efficacy. Internal consistency for this sample was good (α =.84). Confirmatory factor analysis also indicated good model fit (SRMR = .03, and CFI = 1.00).

Self-reported health. Self-reported health was assessed with one item from the SF-36 (Ware & Sherbourne, 1992). Participants were asked: "In general, would you say your health is?" with response options 1 = *poor* to *5 = excellent*.

Daily Survey Measures

Daily barriers. Participants were asked, "Did you feel any of the following were barriers that made it difficult to exercise today?" The list of barriers was compiled from measures by

Salmon, Owen, Crawford, Bauman, & Sallis (2003) and Booth et al (1997). Item wordings were adjusted for daily measurement. Barriers measured were: cost, air or noise pollution, safety, no sidewalks/places outside to exercise, no access to facilities, disability or injury, feeling tired, weather, not enough motivation, lack of time, work commitment, family commitment, not feeling well, and other priorities. Response options were 0 = *no* and 1 = *yes*. Item responses for each day were summed with possible scores ranging from 0 to 14. Higher scores indicated a greater number of barriers experienced that day.

Daily work flexibility arrangement use. Each day, participants were asked if they used a flexible work arrangement at work. If they responded yes, participants reported if they used a *telework arrangement* or a *flextime arrangement.*

Daily work hours. The number of hours a participant worked each day was measured with one item, "How many hours did you work today?" Participants were instructed to enter a numeric value of the number of hours worked.

Daily minutes of physical activity. An adapted version of the Godin Leisure-Time Exercise Questionnaire (GLTEQ; Godin & Shepard, 1985) was used to assess daily physical activity. Previous research estimated test-retest reliability between .74 and .80 (Godin & Shepard, 1985). Each day, participants were asked to report number of minutes they spent in strenuous, moderate, mild exercise. Minutes were summed for each day for the total number of minutes engaging in physical activity.

Analytic Strategy

Frequency statistics and measures of central tendency were analyzed for descriptive statistics. To address RQ1, frequency statistics were generated. For RQ2, descriptive statistics (i.e. measures of central tendency) were analyzed for telework days, flextime days, and non-

flexible workdays. To analyze the nested data (days within employees) for RQ3 and RQ4, a multilevel model approach was used. To account for the positive skew and overdispersion of the dependent variable, minutes of physical activity, multilevel negative binomial models were analyzed (STATA XTNBREG; Rabe-Hesketh & Skrondal, 2008).

A two-level negative binomial model was used to estimate daily minutes of physical activity. Level-1 variables included time-varying constructs: work hours, barriers, use of telework, and use of flextime. Work hours and barriers were group mean centered. Level-2 variables included person-level constructs. This included: self-efficacy and self-reported health. Level-2 variables were not centered. The unconditional model (Model 1), a model with no predictors, was tested and demonstrated significant variability in minutes of physical activity. Thus, a conditional random-intercept model (Model 2), which allows for predictors to be entered in the model, was used to estimate daily physical activity. Coefficients were interpreted as the logarithm (referred to as log from hereon) of expected counts (Hilbe, 2011). Incidence Rate Ratios (IRR; Hilbe, 2011), interpreted as the rate of physical activity per day, were also calculated by exponentiating model coefficients. IRRs were subtracted from 1 (i.e. 1 - IRR; Hilbe, 2011) to obtain percentages. Lastly, in Model 3, interaction effects were entered in to the model.

In Model 2 and 3, daily work hours and self-reported health were included as covariates. Demographic variables, were entered into the model as covariates; however, these variables were not significant at the .10 level; thus, not included in final analyses.

Results

Descriptive Statistics

Data were collected on workdays from 61 employees, resulting in 281 diary days. The average number of diary days completed was 4.6 days (range: 2 to 7; *Mdn* = 5). The age of participants ranged from 20 to 62 years (*M* = 41.4, *SD* = 9.89). The majority of the sample was female (*n* = 54, 88.5%), White (*n* = 55, 90.2%), and not Hispanic or Latino (*n* = 58, 95.1%). Seventy-three percent (*n* = 44) of participants received a Bachelor's degree or higher. The median household income was $80,000 to $90,000. In addition, the majority of participants were married/partnered (*n* = 53, 86.9%), and lived with their spouse and children (*n* = 32, 52.5%) or their spouse only (*n* = 21, 34.4%). Average scores of self-reported health were 3.38 (*SD* = 0.90) and self-efficacy were 3.00 (*SD* = 1.07). The average number of hours worked per day was 7.44 hours (*SD* = 2.13).Twelve participants (19.7%) reported telework as their flexible work arrangement, 35 (57.4%) reported flextime, and 14 (23.0%) reported both telework and flextime as their flexible work arrangement used at their job.

Of the 281 days, telework was used on 55 days (19.6%), flextime was used on 158 days (56.2%), and no flexible work arrangement was used on 68 days (24.2%). The most prevalent reasons for using flexible work arrangements included: accommodate children/childcare (*n* = 23*;* 37.7%), promote work-life balance (*n* = 13; 21.3%), avoid the commute/traffic (*n* = 9; 14.8%), for personal health reasons (*n* = 8; 13.1%), work without interruptions (*n* = 8; 13.1%), and duties at the job require flexibility (*n* = 8; 13.1%).

Eighty-four percent of participants (*n* = 51) were physically active on at least one of the diary days. Of the 281 days, participants engaged in physical activity on 139 days (49.5%), spending, on average, 58.17 minutes (*SD* = 45.55; range: 15 to 380) per day when they engaged in physical activity. On telework days, the average number of minutes of physical activity was 47.85 minutes (*SD* = 58.79). The average number of minutes was lower on flextime days (*M* =

19.51, *SD* = 39.57). Lastly, on non-flexible workdays, participants reported engaging in, on average, 39.36 minutes (*SD* = 50.54)

RQ1: Barriers to Physical Activity

The top barrier to participating in physical activity was lack of time (54.8%; *n* = 154 days), followed by feeling tired (41.6%*; n* = 117 days) and not enough motivation (41.6%; *n* = 117 days). Other barriers reported by university staff employees are detailed in Table 8.

Table 8

Daily Barriers to Engaging in Physical Activity (N=281 days)

Barrier	Percent
Lack of time	54.8
Feeling tired	41.6
Not enough motivation	41.6
Family commitments	32.0
Work commitments	26.3
Weather	25.3
Other priorities	18.1
No access to facilities	11.7
Not feeling well	11.4
Disability or injury	8.5
No sidewalks/places outside to exercise	6.4
Cost	3.9
Safety	0.7
Air or noise pollution	0.4

On average, participants reported experiencing 2.83 barriers (*SD* = 2.31) each day. On 228 of the study days (81.1%), participants reported one or more barriers to physical activity. More specifically, participants reported zero barriers to physical activity on 18.7% (*n* = 53) of study days, 1 to 2 barriers on 30.3% (*n* = 85) of study days, 3 to 4 barriers on 29.9% (*n* = 84) of study days, and 5 or more barriers on 21.0% (*n* = 59) of the study days.

RQ2: Barriers and Physical Activity on Flexible and Non-Flexible Workdays

On days where no flexible work arrangement was used, the average number of barriers to physical activity individuals reported was 3.38 (*SD* = 2.94). The average number of barriers reported on telework days was 2.35 (*SD* = 2.41) and was 2.76 (*SD* = 1.89) on flextime days. Figure 3 displays the average number of minutes participants engaged in physical activity by the number of barriers reported on flexible and non-flexible work days.

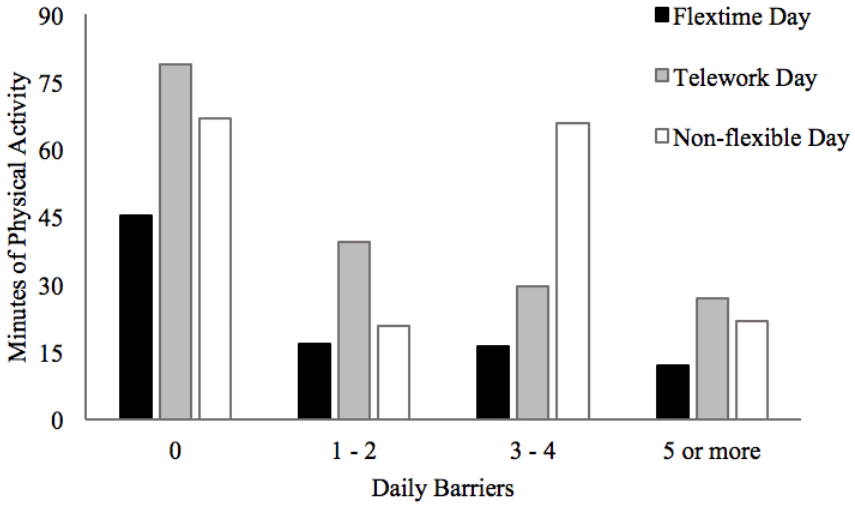


Figure 3. Minutes of physical activity by number of barriers on flexible and non-flexible workdays

On both flextime and telework days, as the number of barriers increased, physical activity decreased. Minutes of physical activity on flextime days were consistently lower compared to telework and non-flexible workdays regardless of the number of barriers reported. Minutes of physical activity were higher on telework days compared to non-flexible days when 0, 1-2, or 5 or more barriers were reported.

RQ3 and RQ4: Flexible Work Arrangements, Barriers, and Self-efficacy on Physical Activity

Results from the multilevel negative binomial models are presented in Table 9. Daily barriers were significantly associated with time spent on physical activity (β = -.32, *p* = .00, 95% CI [-.44, -.20]). After controlling for all other variables in the model, for each one unit increase

in the average number of barriers, the log of expected minutes of physical activity decreased by a factor of 0.32. In other words, for each additional barrier, individuals participated in 27% fewer minutes of physical activity.

Regarding daily flexible work arrangements, flextime was significantly related to time spent on physical activity (β = -.71, p = .00, 95% CI [-1.10, -.31]). The log of expected minutes of physical activity on flextime days was 0.71 lower than the log of expected minutes on non-flexible workdays. In other words, individuals participated in 51% fewer minutes of physical activity on flextime days compared to non-flexible workdays. However, teleworking was not significantly related to daily minutes of physical activity (β = 1.17, p = .48, 95% CI [-.27, .59]). Similarly, self-efficacy was not associated with daily physical activity (β = 1.13, p = .13, 95% CI [-.04, .29]). Daily work hours were not associated with physical activity (β = -.02, p = .58, 95% CI [-.11, .06]). As would be expected, however, self-reported health was positively associated with higher daily physical activity (β = .62, p = .00, 95% CI [.40, .84]).

Table 9

Daily Physical Activity Predicted by Self-efficacy, Barriers, and Flexible Work Arrangements

	Estimate	*SE*	IRR
Main Effects			
Daily Level			
Telework	.16	.22	1.17
Flextime	-.71***	.20	.49
Barriers	-.32***	.06	.73
Work Hours	-.02	.04	.98
Person Level			
Self-efficacy	.13	.08	1.14
Self-reported health	.62***	.11	1.86
Intercept	-3.97	.40	-
Interaction Effects			
Barriers x Telework	-.14	.15	.87
Barriers x Flextime	-.26†	.40	.77

† p < .10 *** p < .001

To understand if daily flexible work arrangements intensified the association between barriers and physical activity, two moderation effects were tested. Teleworking did not moderate the association between daily barriers and minutes of physical activity (β = -.14, p = .37, 95% CI [-.43, .16]). However, the moderating effect of flextime approached significance (β = -.26, p = .08, 95% CI [-.55, .03]), suggesting slightly less time spent on physical activity on days participants experienced barriers and used flextime compared to no flexible work arrangement.

Discussion

Using social cognitive theory and a conservation of resources framework, the goal of this study was to explore how personal and environmental factors, specifically self-efficacy and barriers, influence daily levels of physical activity in a sample of university staff members using a flexible work arrangement. Barriers perceived by these employees, as well as the frequency of the barriers throughout the work week and subsequent physical activity on both flexible and non-flexible workdays were examined. The use of a flexible work arrangement as a resource to act as a potential buffer between daily barriers and daily physical activity was also investigated.

The barrier reported most frequently by university staff was lack of time. This finding was in line with cross-sectional studies examining perceived barriers to physical activity in the general population (Booth et al., 1997; Hoare et al., 2017; Justine et al., 2013). Time barriers were also the most commonly reported barrier in a sample of physically active adults (Sas-Nowosielksi, Nowicka, & Kowalczyk, 2017). Thus, lack of time seems to be a top barrier across the both active and inactive populations. This finding of perceived lack of time demonstrates the importance of using a daily diary design as time, or lack of, may vary day-to-day based on work and family demands for example.

Feeling tired and lacking motivation were the second and third most reported barrier among university staff in the current study, consistent with highly reported barriers in cross-sectional studies (e.g., Cerin et al, 2010; Justine et al., 2013). Interestingly, feeling too tired and lacking motivation were the two least reported in a cross-sectional study of healthy weight adults (Ross & Melzer, 2016). Although our measure of barriers was not identical to Ross and colleagues, it stands to reason that lack of motivation and feeling too tired may be personal factors that fluctuate daily based on daily events and context, which shows the importance of capturing barriers to physical activity on a daily level.

In the current study, work and family commitments were in the top five barriers reported among university staff. In a study of working mothers and fathers, parents reported feeling guilty if they took the time to be physically active instead of being at home with their children (Mailey et al., 2014). Many individuals in the current study were parents, which may explain why many individuals perceived family commitments as a barrier as they felt they needed to be at home with their family instead of being physically active, for example. From a SCT perspective, their social environment influenced their behavior. In addition, these individuals may have highly valued their family resources, such as their family time; thereby investing their resources into family rather than into resources to engage in physical activity (e.g., energy, time).

Environmental barriers, such as pollution, safety, lack of places outside were a few of the least frequently barriers reported in the current study. This finding may be because, in the current study, the built environment (e.g., walkability, aesthetics, safety, green space) in which the sample resided and the seasons in which the data were collected were conducive to physical activity. Similarly, Salmon and colleagues (2003) also reported few environmental barriers to physical activity in their cross-sectional study of adults. Overall, it appears that the social

environment had a larger influence on behavior than the physical environment for university staff.

When the number of daily barriers reported on flexible workdays were compared to days a flexible work arrangement was not used, results suggested that individuals reported the fewest number of barriers on flexible workdays. The environment created by a flexible work arrangement appears to alleviate certain barriers or perhaps provides the resources to the employees to overcome those barriers. In other words, a flexible work arrangement may help protect an individual's resources, such as their time, stamina, mental health, or balance between work and family, so they may not perceive many barriers on flexible workdays.

In the multilevel model, there was a significant main effect for flextime days on minutes of physical activity, more specifically the expected minutes of physical activity were much lower on flextime days compared to non-flexible workdays. At first, this result appeared paradoxical, as there had been an expectation that flexible work arrangements would help promote physical activity. On further reflection, a compelling explanation could be that there were demands outside work, such as family demands, that prompted the employees to adopt a flextime arrangement at work, and these same demands prevented physical activity each day. In this situation, we see flextime as a resource for meeting other demands outside of work, but not a resource for physical activity. In addition, participants did not report if their intention was to be physically active each day. It could be that university staff arrange their physical activity around their non-flexible workdays as they are meeting their family demands on flextime days.

Although not significant in the multilevel model, descriptive statistics displayed that individuals generally engaged in more physical activity on telework days compared to non-flexible days. One explanation for the higher levels of physical activity on telework days may be

that a benefit of telework is reducing the amount of time commuting to the office (Major, Virive, & Joice, 2008). In other words, the time spent driving to and from work can be reallocated to other activities, such as physical activity. Also, individuals may have more ability to organize their work schedule and to arrange their work activities in line with their natural activity rhythms. From a SCT perspective, employees are playing an active role in influencing their environment by organizing their work schedule and arranging other daily activities. In addition, on days in which an employee works remotely, they may have a more suitable environment at their home to engage in physical activity; thus, demonstrating how the environment influence behavior as well.

In line with results from other studies (e.g., Pan et al., 2009; Ross & Melzer, 2016), as the number of perceived barriers increased, minutes of daily physical activity decreased significantly among university staff in the current study. In other words, the environment of university staff was influencing their behavior. In terms of resources, as the number of barriers increased, other resources may be threatened or lost, depleting an individual's resources, which in turn, may make it difficult to then invest resources (e.g., energy, time) into physical activity. Another possibility is that as more barriers were present in the environment, instead of investing resources to overcome those barriers, individuals instead protect the resources they perceive as most valuable, such as their stable employment or time with family.

Lastly, university staff had average levels of self-efficacy. Unlike past cross-sectional research (e.g., Ayotte et al., 2010; Pan et al., 2009), in the current study, there was not a significant direct effect of self-efficacy on daily physical activity. One possible explanation is that university staff may have felt confident in their ability to be physically active when asked to think generally, but at a daily level, they may just not have had enough time in the day, based on

other commitments. In addition, individuals with limited free time each day may reallocate this time to other activities or others health behaviors, such as sleep (Tudor-Locke, Leonardi, Johnson, & Katzmarzyk, 2010).

Implications

There are numerous implications from results of the current study. First, as discussed, on flextime days, individuals engaged in less physical activity than on traditional (i.e. non-flexible) workdays. Individuals using flextime may do so because of other priorities not related to physical activity, specifically addressing work-life demands. Therefore, these individuals using flextime may have more demands outside of work to meet, and may need specialized health and wellness interventions and programs. For example, potential workplace wellness programs could discuss strategies to find ways to incorporate children into physical activity programs. Mailey and colleagues (2014) reported that parents said they would engage physical activity if they knew of activities in which they could be active with their children. Employers should encourage joint physical activity with family members. Employers could provide employees with a list of parks and recreational areas proximal to the workplace and/or schools or start a listserv of employees with families who can coordinate with others to engage in physical activity together. Family physical activity planning interventions suggest that providing families with planning material can increase levels of family physical activity (Rhodes, Naylor, & McKay, 2010).

Wellness champions, who are peers to the workers, may be positioned to understand daily barriers to physical activity and other components of health of university staff. and they are tasked with designing opportunities for participation in wellness programs. Wellness champions do so by providing opportunities for participation in wellness activities, promoting a culture of health in the workplace, and increasing positive health behaviors by focusing on the needs of the

workplace (Amaya, Battista, & Melnyk, 2018; Wieneke et al., 2016). From a SCT perspective, champions modeling good health behaviors, offering encouragement, support, and opportunities to engage in good health behaviors may assist in developing an individual's self-efficacy and future positive health behaviors (Wieneke et al., 2016). In other words, these wellness champions are assisting employees in protecting their resources, as well as gaining resources, such as self-efficacy.

Health and wellness champions should have knowledge of flexible work arrangements so they can better understand the needs of this population. A wellness champion for the group of teleworkers at the university could possibly hold wellness activities virtually and encourage physical activity through virtual support groups. Flextime wellness champions could also promote programs during the workday (e.g., walking meeting) or wellness activities early in the workday before individuals feel they are too fatigued or lose motivation. Wellness champions are beneficial to workplaces as they are minimal in cost and can improve workplace productivity indirectly by improving employee health (Quick & Tetrick, 2011; Wieneke et al., 2016).

Limitations and future research

This study is not without limitations. First, this sample was from one university in Southwest Virginia and relatively small, so it is difficult to generalize to all university staff. Similar studies should be replicated in universities in other geographic areas, as well as different occupational settings. This study also lacked a comparison group; thus, future studies should consider sampling university staff are similar in job and family demands to the flexible work arrangement sample in order to examine the systematic differences in physical activity on workdays between the two groups. In addition, most of the sample was women. While women are more likely to use and benefit from flexible work arrangements (Carlson, Grzywacz, &

Kacmar, 2010), future research should attempt to sample more men to better understand if men experience the same daily barriers, such as lack of time or family commitments, on days in which they use flexible work arrangements.

In addition, a great strength of this study was the daily diary design to reduce recall bias and observe daily variation; however, data were collected only over the course of one work week, which may not have provided the best representation of the individuals' typical work week. Future studies should collect data for more than one work week. Data were also collected in seasons during which there were longer periods of daylight, possibly providing more opportunity for outdoor physical activity. Future research utilizing daily diary designs should consider the seasonality of physical activity and possibly collect data from the same participants over the course of four seasons.

Regarding the measure of physical activity, although literature suggests reasonably good agreement between self-report questionnaires and accelerometers for adults (Miller, Freedson, & Kline, 1994; Slootmaker, Schuit, Chinapaw, Seidell, & van Mechelen, 2009) and minimal evidence of social desirability on scores of the GLTEQ (Motl, McAuley, & DiStefano, 2005), a limitation is the self-report of physical activity. Future research of workers and physical activity should consider using more objective measures, such as accelerometers or personal trackers (e.g., AppleWatch, Fitbit). Lastly, we did not account for all SCT constructs that are related self-efficacy (e.g., self-regulation, observational modeling) in the model. Future research could consider multiple constructs of SCT in their daily diary study.

Conclusion

To our knowledge, this study was the first to examine barriers to physical activity in a daily context in a population of university staff with flexible work arrangements. As the number

of individuals using flexible work arrangement continues to increase, research about these arrangements and subsequent health behaviors is crucial, as the focus in previous research has heavily been on the conflict and balance between work and family. It is also important to utilize the daily diary design in studies to examine how flexible versus non-flexible days may differ with regard to a variety of health behaviors. Results from daily diary research about health behaviors are pivotal for health and wellness programs, as these programs can be tailored to the needs of employees when they are informed by daily experiences.

References

Amaya, M., Battista, L., & Melnyk, B. (2018). The Ohio State University's strategic approach to improving total population health. *American Journal of Health Promotion, 32*(8), 1823-1826. doi:10.1177/0890117118804149e

Anderson, E. S., Wojcik, J. R., Winett, R. A., & Williams, D. M. (2006). Social-cognitive determinants of physical activity: the influence of social support, self-efficacy, outcome expectations, and self-regulation among participants in a church-based health promotion study. *Health Psychology*, *25*(4), 510-520. doi:10.1037/0278-6133.25.4.510

Anderson-Bill, E. S., Winett, R. A., & Wojcik, J. R. (2011). Social cognitive determinants of nutrition and physical activity among web-health users enrolling in an online intervention: The influence of social support, self-efficacy, outcomes expectations, and self-regulation. *Journal of Medical Internet Research*, *13*(1), e28. doi:10.2196/jmir.1551

Ayotte, B. J., Margrett, J. A., & Hicks-Patrick, J. (2010). Physical activity in middle-aged and young-old adults: the roles of self-efficacy, barriers, outcome expectancies, self-regulatory behaviors and social support. *Journal of Health Psychology*, *15*(2), 173-185. doi:10.1177/1359105309342283

Ball, J. W., Bice, M. R., & Maljak, K. A. (2017). Exploring the relationship between self-determination theory, adults' barriers to exercise, and physical activity. *Health Educator*, *49*(1), 19-37.

Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1986). *Social foundations of thought and action*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York, NY: W. H. Freeman and Company.

Bauman, A. E., Reis, R. S., Sallis, J. F., Wells, J. C., Loos, R. J., Martin, B. W., & Lancet Physical Activity Series Working Group. (2012). Correlates of physical activity: why are some people physically active and others not? *The Lancet*, *380*(9838), 258-271. doi:10.1016/S0140-6736(12)60735-1

Biron, C., Brun, J. P., & Ivers, H. (2008). Extent and sources of occupational stress in university staff. *Work*, *30*(4), 511-522.

Bolger, N., Davis, A., & Rafaeli, E. (2003). Diary methods: Capturing life as it is lived. *Annual Review of Psychology, 54*, 579-616. doi:10.1146/annurev.psych.54.101601.145030

Booth, M. L., Bauman, A., Owen, N., & Gore, C. J. (1997). Physical activity preferences, preferred sources of assistance, and perceived barriers to increased activity among physically inactive Australians. *Preventive Medicine, 26*(1), 131-137. doi:10.1186/s12877-017-0687-x

Carlson, D. S., Grzywacz, J. G., & Michele Kacmar, K. (2010). The relationship of schedule flexibility and outcomes via the work-family interface. *Journal of Managerial Psychology*, *25*(4), 330-355. doi:10.1108/02683941011035278

Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public Health Reports*, *100*(2), 126-131.

Centers for Disease Control and Prevention (2018a). *Physical activity: Why it matters.* Retrieved from https://www.cdc.gov/physicalactivity/about-physical-activity/why-it-matters.html

Centers for Disease Control and Prevention (2018b). *2008 Physical Activity Guidelines for Americans: Trends in Meeting the 2008 Physical Activity Guidelines, 2008 – 2017.* Retrieved from https://www.cdc.gov/physicalactivity/downloads/trends-in-the-prevalence-of-physical-activity-508.pdf

Cerin, E., Leslie, E., Sugiyama, T., & Owen, N. (2010). Perceived barriers to leisure-time physical activity in adults: an ecological perspective. *Journal of Physical Activity and Health*, *7*(4), 451-459. doi:10.1123/jpah.7.4.451

Church, T. S., Thomas, D. M., Tudor-Locke, C., Katzmarzyk, P. T., Earnest, C. P., Rodarte, R. Q., ... & Bouchard, C. (2011). Trends over 5 decades in US occupation-related physical activity and their associations with obesity. *PloS one*, *6*(5), e19657. doi:10.1371/journal.pone.0019657

Cramp, A. G., & Bray, S. R. (2011). Understanding exercise self-efficacy and barriers to leisure-time physical activity among postnatal women. *Maternal and Child Health Journal*, *15*(5), 642-651. doi:10.1007/s10995-010-0617-4

Daniali, S. S., Darani, F. M., Eslami, A. A., & Mazaheri, M. (2017). Relationship between self-efficacy and physical activity, medication adherence in chronic disease patients. *Advanced Biomedical Research*, *6*, 63. doi:10.4103/2277-9175.190997

Dinç, Z. F. (2017). An investigation of the factors hindering adults' participation in physical activity. *Journal of Education and Training Studies, 5*(5), 64-71. doi:10.11114/jets.v5i13.2907

Dunstan, D. W., Howard, B., Healy, G. N., & Owen, N. (2012). Too much sitting–a health hazard. *Diabetes Research and Clinical Practice*, *97*(3), 368-376. doi:10.1016/j.diabres.2012.05.020

Florindo, A. A., Mielke, G. I., de Oliveira Gomes, G. A., Ramos, L. R., Bracco, M. M., Parra, D. C., ... & Hallal, P. C. (2013). Physical activity counseling in primary health care in Brazil: a national study on prevalence and associated factors. *BMC Public Health*, *13*(1), 794. doi:10.1186/1471-2458-13-794

Fountaine, C. J., Piacentini, M., & Liguori, G. A. (2014). Occupational sitting and physical activity among university employees. *International Journal of Exercise Science*, *7*(4), 295-301.

Gassman-Pines, A., & Goldstein, R. (2017). Work-family policies. In E. Votruba-Drzal, & E. Dearing (Eds.), *The Wiley handbook of early childhood development program, practices, and policies* (pp. 469-486). West Sussex, UK: Wiley & Sons.

Godin, G., & Shephard, R. J. (1985). A simple method to assess exercise behavior in the community. *Canadian Journal of Applied Sport Sciences*, *10*(3), 141-146. doi:10.12691/jpar-2-2-6

Granger, C. L., McDonald, C. F., Parry, S. M., Oliveira, C. C., & Denehy, L. (2013). Functional capacity, physical activity and muscle strength assessment of individuals with non-small cell lung cancer: a systematic review of instruments and their measurement properties. *BMC Cancer*, *13*(1), 135. doi:10.1186/1471-2407-13-135

Hilbe, J. M. (2011). *Negative binomial regression*. Cambridge, MA: University Press.

Hoare, E., Stavreski, B., Jennings, G. L., & Kingwell, B. A. (2017). Exploring motivation and barriers to physical activity among active and inactive Australian adults. *Sports*, *5*(3), 47-55. doi:10.3390/sports5030047

Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist*, *44*, 513-524. doi:10.1037/0003-066X.44.3.513

Hobfoll, S. E. (2001). The influence of culture, community, and the nested-self in the stress process: advancing conservation of resources theory. *Applied Psychology*, *50*, 337-421. doi:10.1111/1464-0597.00062

Horton, S. (2006). High aspirations: differences in employee satisfaction between university faculty and staff. *Applied Research in Quality of Life*, *1*(3-4), 315-322. doi:10.1007/s11482-007-9023-5

Iida, M., Shrout, P. E., Laurenceau, J., & Bolger, N. (2012). Using diary methods in psychological research. In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds.), *APA handbook of research methods in psychology, vol 1: Foundations, planning, measures, and psychometrics* (pp. 277-305). Washington, DC: American Psychological Association.

Jans, M. P., Proper, K. I., & Hildebrandt, V. H. (2007). Sedentary behavior in Dutch workers: differences between occupations and business sectors. *American Journal of Preventive Medicine*, *33*(6), 450-454. doi:10.1016/j.amepre.2007.07.033

Jones, F., O'connor, D. B., Conner, M., McMillan, B., & Ferguson, E. (2007). Impact of daily mood, work hours, and iso-strain variables on self-reported health behaviors. *Journal of Applied Psychology*, *92*(6), 1731-1740. doi:10.1037/0021-9010.92.6.1731

Joseph, R. P., Ainsworth, B. E., Keller, C., & Dodgson, J. E. (2015). Barriers to physical activity among African American women: an integrative review of the literature. *Women and Health*, *55*(6), 679-699. doi:10.1080/03630242.2015.1039184

Justine, M., Azizan, A., Hassan, V., Salleh, Z., & Manaf, H. (2013). Barriers to participation in physical activity and exercise among middle-aged and elderly individuals. *Singapore Medical Journal*, *54*(10), 581-586. doi:10.11622/smedj.2013203

Karusisi, N., Bean, K., Oppert, J. M., Pannier, B., & Chaix, B. (2012). Multiple dimensions of residential environments, neighborhood experiences, and jogging behavior in the RECORD Study. *Preventive Medicine*, *55*(1), 50-55. doi:10.1016/j.ypmed.2012.04.018

Kelly, E. L., & Kalev, A. (2006). Managing flexible work arrangements in US organizations: Formalized discretion or 'a right to ask'. *Socio-Economic Review*, *4*(3), 379-416. doi:10.1093/ser/mwl001

Knittle, K. P., De Gucht, V., Hurkmans, E. J., Vlieland, T. P. V., Peeters, A. J., Ronday, H. K., & Maes, S. (2011). Effect of self-efficacy and physical activity goal achievement on arthritis pain and quality of life in patients with rheumatoid arthritis. *Arthritis Care and Research*, *63*(11), 1613-1619. doi:10.1002/acr.20587

Koeneman, M. A., Verheijden, M. W., Chinapaw, M. J., & Hopman-Rock, M. (2011). Determinants of physical activity and exercise in healthy older adults: a systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, *8*(1), 142-154. doi:10.1186/1479-5868-8-142

Kouvonen, A., Kivimäki, M., Väänänen, A., Heponiemi, T., Elovainio, M., Ala-Mursula, L., ... & Vahtera, J. (2007). Job strain and adverse health behaviors: the Finnish Public Sector Study. *Journal of Occupational and Environmental Medicine*, *49*(1), 68-74. doi:10.1097/JOM.0b013e31802db54a

Kroll, T., Kratz, A., Kehn, M., Jensen, M. P., Groah, S., Ljungberg, I. H., ... & Bombardier, C. (2012). Perceived exercise self-efficacy as a predictor of exercise behavior in individuals aging with spinal cord injury. *American Journal of Physical Medicine and Rehabilitation*, *91*(8), 640-651. doi:10.1097/PHM.0b013e31825a12cd

Larkin, L., Gallagher, S., Fraser, A. D., & Kennedy, N. (2016). Relationship between self-efficacy, beliefs, and physical activity in inflammatory arthritis. *Hong Kong Physiotherapy Journal*, *34*, 33-40. doi:10.1016/j.hkpj.2015.10.001

Leicht, A. S., Sealey, R. M., & Devine, S. (2013). Relationship between employment category and gender on quality of life, physical activity and their barriers and motivators, for full-time university staff. *International Journal of Workplace Health Management*, *6*(3), 160-173. doi:10.1108/IJWHM-04-2012-0008

Mailey, E. L., Huberty, J., Dinkel, D., & McAuley, E. (2014). Physical activity barriers and facilitators among working mothers and fathers. *BMC Public Health*, *14*(1), 657-665. doi:10.1111/ajpy.12103

Major, D. A., Virive, J. M., & Joice, W. (2008). Telework as a dependent care solution: Examining current practice to improve telework management strategies. *The Psychologist-Manager Journal, 11*, 65–91. doi:10.1080/10887150801967134

Marcus, B. H., Selby, V. C., Niaura, R. S., & Rossi, J. S. (1992). Self-efficacy and the stages of exercise behavior change. *Research Quarterly for Exercise and Sport*, *63*(1), 60-66.

Marcus, B. H., & Owen, N. (1992). Motivational readiness, self-efficacy and decision-making for exercise. *Journal of Applied Social Psychology*, *22*(1), 3-16. doi:10.1080/02701367.1992.10607557

Mark, G., & Smith, A. P. (2012). Effects of occupational stress, job characteristics, coping, and attributional style on the mental health and job satisfaction of university employees. *Anxiety, Stress and Coping*, *25*(1), 63-78. doi:10.1080/10615806.2010.548088

McAuley, E., & Blissmer, B. (2000). Self-efficacy determinants and consequences of physical activity. *Exercise Sport Science Review*, *28*(2), 85-88.

McNeill, L. H., Kreuter, M. W., & Subramanian, S. V. (2006). Social environment and physical activity: a review of concepts and evidence. *Social Science and Medicine*, *63*(4), 1011-1022. doi:10.1016/j.socscimed.2006.03.012

Mendoza-Vasconez, A. S., Marquez, B., Benitez, T. J., & Marcus, B. H. (2018). Psychometrics of the self-efficacy for physical activity scale among a Latina women sample. *BMC Public Health*, *18*(1), 1097. doi:10.1186/s12889-018-5998-0

Milkie, M. A., Mattingly, M. J., Nomaguchi, K. M., Bianchi, S. M., & Robinson, J. P. (2004). The time squeeze: Parental statuses and feelings about time with children. *Journal of Marriage and Family*, *66*(3), 739-761. doi:10.1111/j.0022-2445.2004.00050.x

Miller, D. J., Freedson, P. S., & Kline, G. M. (1994). Comparison of activity levels using the Caltrac accelerometer and five questionnaires. *Medicine and Science in Sports and Exercise, 26*(3), 376-382. doi:10.1249/00005768-199403000-00016

Moen, P., Kelly, E. L., Tranby, E., & Huang, Q. (2011). Changing work, changing health: Can real work-time flexibility promote health behaviors and well-being? *Journal of Health and Social Behavior, 52,* 404-429. doi:10.1177/0022146511418979.

Motl, R. W., McAuley, E., & DiStefano, C. (2005). Is social desirability associated with self-reported physical activity? *Preventive Medicine, 40*(6), 735-739. doi:10.1016/j.ypmed.2004.09.016

Mullahy, J., & Robert, S. A. (2008). *No time to lose? Time constraints and physical activity* (No. w14513). National Bureau of Economic Research.

Nägel, I. J., Sonnentag, S., & Kühnel, J. (2015). Motives matter: A diary study on the relationship between job stressors and exercise after work. *International Journal of Stress Management, 22*, 346-371. doi:10.1037/a0039115

Netemeyer, R. G., Boles, J. S., & McMurrian, R. (1996). Development and validation of work-family conflict and family-work conflict scales. *Journal of Applied Psychology, 81*(4), 400–410. doi:10.1037/0021-9010.81.4.400

Nomaguchi, K. M., & Bianchi, S. M. (2004). Exercise time: Gender differences in the effects of marriage, parenthood, and employment. *Journal of Marriage and Family*, *66*(2), 413-430. doi:10.1111/j.1741-3737.2004.00029.x

Office of Disease Prevention and Health Promotion, US Department of Health and Human Services. *Healthy People 2020: Topics & Objectives—Physical Activity.* Retrieved from https://www.healthypeople.gov/2020/topics-objectives/topic/physical-activity

Pan, S. Y., Cameron, C., DesMeules, M., Morrison, H., Craig, C. L., & Jiang, X. (2009). Individual, social, environmental, and physical environmental correlates with physical activity among Canadians: A cross-sectional study. *BMC Public Health*, *9*(1), 21-33. doi:10.1186/1471-2458-9-21

Quick, J. C. E., & Tetrick, L. E. (2011). *Handbook of occupational health psychology*. Washington, DC: American Psychological Association.

Rabe-Hesketh, S., & Skrondal, A. (2008). *Multilevel and longitudinal modeling using Stata* (2nd ed.), College Station, TX: Stata Press.

Rhodes, R. E., Naylor, P. J., & McKay, H. A. (2010). Pilot study of a family physical activity planning intervention among parents and their children. *Journal of behavioral Medicine*, *33*(2), 91-100. doi:10.1007/s10865-009-9237-0

Ross, A. M., & Melzer, T. (2016). Beliefs as barriers to healthy eating and physical activity. *Australian Journal of Psychology*, *68*(4), 251-260. doi:10.1111/ajpy.12103.

Salmon, J., Owen, N., Crawford, D., Bauman, A., & Sallis, J. F. (2003). Physical activity and sedentary behavior: a population-based study of barriers, enjoyment, and preference. *Health Psychology*, *22*(2), 178-188. doi:10.1037/0278-6133.22.2.178

Sas-Nowosielski, K., Nowicka, M., & Kowalczyk, A. (2017). Age-related differences in motives for and barriers to exercise among women exercising in fitness centers. *The New Educational Review, 49*, 30-39. doi:10.15804/tner.2017.49.3.02

Sawyer, A., Ucci, M., Jones, R., Smith, L., & Fisher, A. (2018). Supportive environments for physical activity in deprived communities in the United Kingdom: A qualitative study using photo elicitation. *Social Science and Medicine*, *197*, 49-58. doi:10.1016/j.socscimed.2017.11.048

Slootmaker, S. M., Schuit, A. J., Chinapaw, M. J., Seidell, J. C., & Van Mechelen, W. (2009). Disagreement in physical activity assessed by accelerometer and self-report in subgroups of age, gender, education and weight status. *International Journal of Behavioral Nutrition and Physical Activity, 6*(1), 17-26. doi:10.1186/1479-5868-6-17

Taris, T. W., Ybema, J. F., Beckers, D. G., Verheijden, M. W., Geurts, S. A., & Kompier, M. A. (2011). Investigating the associations among overtime work, health behaviors, and health: a longitudinal study among full-time employees. *International Journal of Behavioral Medicine*, *18*(4), 352-360. doi:10.1007/s12529-010-9103-z

Trost, S. G., Owen, N., Bauman, A. E., Sallis, J. F., & Brown, W. (2002). Correlates of adults' participation in physical activity: Review and update. *Medicine and Science in Sports and Exercise*, *34*(12), 1996-2001. doi:10.1097/00005768-200212000-00020

Tudor-Locke, C., Leonardi, C., Johnson, W. D., & Katzmarzyk, P. T. (2011). Time spent in physical activity and sedentary behaviors on the working day: The American time use survey. *Journal of Occupational and Environmental Medicine*, *53*(12), 1382-1387. doi:10.1097/JOM.0b013e31823c1402.

Tytherleigh, M. Y., Jacobs, P. A., Webb, C., Ricketts, C., & Cooper, C. (2007). Gender, health and stress in English university staff—Exposure or vulnerability? *Applied Psychology*, *56*(2), 267-287. doi:10.1111/j.1464-0597.2006.00254.x

Van Dyck, D., Cerin, E., De Bourdeaudhuij, I., Hinckson, E., Reis, R. S., Davey, R., ... & Sallis, J. F. (2015). International study of objectively measured physical activity and sedentary time with body mass index and obesity: IPEN adult study. *International Journal of Obesity*, *39*(2), 199-207. doi:10.1038/ijo.2014.115

Ware, J. E., & Sherbourne, C. D. (1992). The MOS 36-item short-form health survey (SF-36): I. Conceptual framework and item selection. *Medical Care*, *30*(6), 473-483. doi: 10.197/00005650-19920600-00002

Wieneke, K. C., Clark, M. M., Sifuentes, L. E., Egginton, J. S., Lopez-Jimenez, F., Jenkins, S. M., ... & Olsen, K. D. (2016). Development and impact of a worksite wellness champions program. *American Journal of Health Behavior*, *40*(2), 215-220. doi:10.5993/AJHB.40.2.6

Article 2

Title: Influences of Daily Physical Activity: An Investigation of Flexible Work Arrangements, Burnout, Stress, and Work-to-Family Conflict Among University Staff

Abstract

Research examining the potential benefits of flexible work arrangements mainly focuses on work or family outcomes. Health behaviors receive little attention. Guided by Conservation of Resources (COR) theory, our daily diary study had three aims. The first aim was to examine how levels of work stress and work-to-family conflict differ between flexible workdays and traditional (i.e. non-flexible) workdays. The second aim was to explore how psychological work factors (i.e. job burnout, work stress, work-to-family conflict) influenced daily levels of physical activity among university staff. The third aim was to examine if using a flexible work arrangement (telework, flextime) moderated the link between these work factors and daily physical activity. University staff employees who worked full-time, currently used a flexible work arrangement, lived with at least one family member, and were not considered faculty were eligible to participate. Data were collected over the course of one work week from 61 participants, resulting in 281 diary days. Data were analyzed with multilevel negative binomial models. On flextime days, university staff spent 58% fewer minutes on physical activity compared to non-flexible workdays. Job burnout, daily work stress, and daily work-to-family conflict did not significantly predict daily physical activity. However, the use of a flextime arrangement did moderate the association between job burnout and physical activity. Employees with high levels of burnout were more physically active on flextime days compared to non-flexible days. Theoretical and practical implications for worksite wellness programs are discussed.

Keywords: flexible work arrangements, physical activity, daily diary, burnout, university staff

Influences of Daily Physical Activity: An Investigation of Flexible Work Arrangements, Burnout, Stress, and Work-to-Family Conflict Among University Staff

Introduction

Engaging in frequent physical activity can improve health and quality of life (Centers for Disease Control and Prevention (CDC), 2018a). Physical activity is associated with a lower risk of obesity, type 2 diabetes, cardiovascular disease, cancer, high blood pressure, falls, and depression (US Department of Health and Human Services, 2018). Physical activity is also associated with lower levels of premature mortality (Carlson, Adams, Yang, & Fulton, 2018). Yet, in 2017, the CDC reported that 25.9% of the population 18 years and older reported no leisure-time physical activity (CDC, 2018b). In addition, 45.9% of the adult population was not meeting the minimum aerobic physical activity guidelines of at least 150 minutes of moderate intensity or 75 minutes of vigorous-intensity physical activity per week (CDC, 2018b).

HealthyPeople2020, led by the Department of Health and Human Services, included physical activity in their national agenda (Office of Disease Prevention and Health Promotion, US Department of Health and Human Services). HealthyPeople2020 provides science-based objectives for improving health in the United States through the creation of a national agenda. Physical activity, combined with nutrition and obesity, was named one of HealthyPeople2020's leading health indicators. Leading health indicators are selected based on what the advisory committee, comprised of many stakeholders, consider as a high-priority health issue based on empirical evidence (U.S. Department of Health and Human Services).

Research shows that levels of physical activity have decreased in the United States since 1965 (Ng & Popkin, 2012). One partial reasoning for this decrease is the change in the work environment (Ng & Popkin, 2012). Prior to 1965, approximately one half of jobs required moderate-intensity physical activity; however, now in the United States, the percentage of jobs

requiring moderate-intensity physical activity decreased to 20% (Church et al., 2011). Projections for 2030 suggest that physical activity at work will continue to decrease (Ng & Popkin, 2012). Many occupations and jobs require workers to sit for most of their workday (Church et al., 2011; Jans, Proper, & Hildebrandt, 2007). This sedentary behavior is related to many adverse health outcomes and premature mortality (Dunstan, Howard, Healy, & Owen, 2012). In a meta-analytic review of correlates and determinants of physical activity, Bauman and colleagues (2012) called for more studies researching subpopulations at risk for low levels of physical activity.

One population that demonstrates high levels of sedentary behavior during the workday is university employees. Not only do these individuals sit for approximately 75% of their work day, they also display higher levels of anxiety, depression, and stress-related illness compared to the general population (Fountaine, Piacentini, & Liguori, 2014; Mark & Smith, 2012). However, many studies examining health and well-being of university employees either: (1) only sample faculty (e.g., Shin & Jung, 2013), (2) examine outcomes without separating faculty and non-faculty (referred to as staff for the remainder of the paper) in analyses (e.g., Mark & Smith, 2012), (3) do not describe what occupations (e.g., faculty, staff) are included in their university sample (e.g., Adekola, 2010), or (4) only focus on identifying differences between the groups of faculty and non-faculty (e.g., Cooper & Barton, 2016).

Studies examining only faculty provide information about the variation among the faculty population. Studies that do not differentiate between faculty and staff in analyses are problematic because the nature of faculty and staff occupations are vastly different, specifically regarding responsibilities, supervision, and schedule control (Davis, 1996). Studies that do not describe their university sample as faculty only, staff only, or both are problematic for generalization

purposes. Studies examining differences between faculty and staff provide useful information for between group differences; however, the current research about university employees fails to capture the variation among the university staff population.

In studies that do compare faculty and staff, findings suggest staff have their own unique occupational stressors in the work environment when compared to faculty. In the United Kingdom, staff reported higher levels of stress related to relationships at work, job security, resources, pay and benefits, and lack of job control compared to faculty (Tytherleigh, Webb, Cooper, & Ricketts, 2007). These results were supported among an American sample. Faculty reported more opportunities for promotion, more job control, support between work and family, and respect from students (Horton, 2006). In a cross-sectional study examining the health of South African university support staff, Rothmann and Essenko (2007) found that job demands and lack of job resources were related to exhaustion. This exhaustion, in turn, was related to worse health problems. Thus, staff at universities are at-risk for ill health based on factors in the work environment, as well as the sedentary nature of the job.

When examining physical activity levels among staff, Fountaine and colleagues (2014) differentiated between faculty and staff. Faculty reported engaging in leisure time physical activity more days per week than staff. Similarly, in a sample of university employees in a metropolitan university, fewer staff met the physical activity guidelines compared to faculty (Leininger, Adams, & DeBelisio, 2015) When specifically examining types of physical activity (i.e., low, moderate, high), staff reported less low- and moderate-intensity physical activity but more high-intensity physical activity; however, these differences were not statistically different (Cooper & Barton, 2016). Preliminary evidence from these studies suggest that university staff is

a population that may benefit from workplace wellness programs and warrants further investigation to identify the needs of the population.

Physical Activity

Physical activity is defined as "any bodily movement produced by skeletal muscles that results in energy expenditure" (Caspersen, Powell, & Christenson, 1985, p. 126). Exercise, however, is a subcategory of physical activity. Although many times these terms are used interchangeably (Caspersen et al., 1985), exercise technically refers to physical activity that is planned or structured with the objective to improve or maintain physical fitness. In the following review of the literature, we used the terminology used by the scholars in their studies. However, when referencing our current study, we use the umbrella term of physical activity as we were interested in the time spent on physical activities that were both structured and unstructured.

Work factors. Employed individuals participate in more physical activity than non-employed individuals (Kwak, Berrigan, Domelen, Sjöström, & Hagströmer, 2016), and the amount of time spent at work is associated with less time spent on physical activity (Kirk & Rhodes, 2011; Nomaguchi & Bianchi, 2004). Individuals with sedentary jobs also spend less time on physical activity outside of work compared with individuals who have active jobs (Kwak et al., 2016). In addition, in their systematic review, Kirk and Rhodes (2011) found that individuals with a higher-status occupation had higher levels of physical activity compared to individuals with lower-status occupations. In their review, they made a call for researchers to examine how psychological work demands (i.e. work stress) are related to levels of physical activity, as psychological factors from work negatively influence physical and mental health. Three psychological factors of particular interest based on their connection to physical and mental health are work stress, job burnout, and work-to-family conflict.

Work stress. Ganster and Rosen (2013) defined work stress as the "process by which workplace psychological experiences and demands (stressors) produce both short-term (strains) and long-term changes in mental and physical health." (p. 1088). In their multidisciplinary review, they found consistent evidence supporting the link between higher levels of work stress and poorer physical and mental health (Ganster & Rosen, 2013).

There is evidence that engaging in physical activity can buffer the link between stressors in the workplace and health outcomes. For example, in a cross-sectional study of registered nurses, engaging in physical activity moderated the relationship between stress and depression (Sliter, Sinclair, Cheung, & McFadden, 2014). Work stress was operationalized as patient stressors, staff demands, and workload. Findings suggested the link between patient stressors and staff demands on depression was weaker for nurses who engaged in higher levels of physical activity compared to nurses with lower levels of physical activity.

Studies also examine the direct effect of work stress on physical activity. In these studies, work stress is often measured by job strain, that is, the interaction of job demands and job control. The job-demands control model (Karasek, 1979) posits that jobs with high demands and low control are stressful. In a latent profile analysis of cross-sectional data from Swedish healthcare workers and social insurance officers, participants classified as high stress, based on job strain, reported the lowest levels of physical activity (Gerber, Jonsdottir, Lindwall, & Ahlborg, 2014). Cross-sectional findings from a larger European study found that the odds of physical inactivity for employees with high strain jobs were 26% higher than employees with low-strain jobs (Fransson et al., 2012). When physically active participants were examined over time, the odds of becoming physically inactive were 21% higher for high strain jobs, suggesting that work stress overtime leads to an increased risk of physical inactivity (Fransson et al., 2012).

Similarly, in the London Whitehall II study, work stress, also conceptualized as job strain, at Time 1 and Time 2 was negatively associated with levels of physical activity (Chandola et al., 2008). In a daily diary study, job demands and control were measured at one time point and affect and work hours were measured daily (Jones, O'Connor, Conner, McMillan, & Ferguson, 2007). Daily affect and work hours significantly predicted levels of physical activity, but demands and control were not significant (Jones et al., 2007), suggesting that aggregate levels of work stress may not adequately predict daily physical activity.

Measuring work stress via job strain or demands provides an overall picture of the employee's stress level of the job. However, job strain measures do not capture daily stressful events (i.e., challenges, hassles) that might occur at work, such as a disagreement with someone at work. These daily stressful events occurring in the individual's environment have immediate effects on the individual's emotional and physical functioning (Almeida, 2005; Almeida, Neupert, Banks, & Seriod, 2005; Stawski, Sliwinski, Almeida, & Smith, 2008). Daily work stressors create an increase in arousal that specific day compared to chronic stressful events at work that create prolonged arousal overtime (Almeida, 2005; Almeida et al., 2005). Measuring daily stressors provides information about the individual's subjective experience of stressors with a more precise measurement of time, as well as how these stressors influence daily functioning (Almeida, 2005).

In addition, measuring stress at the daily-level also allows researchers to capture how individuals vary in their perceptions of work stress from day-to-day, that is within-person variability, and to examine how people within a similar occupation vary in their reported levels of stress, that is between-person variability (Almeida, 2005). In a daily diary study over the course of one work week, Nägel, Sonnentag, and Kühnel (2015) measured work stress through

daily situational constraints (e.g., working with outdated/incomplete material). Their participants were recruited from locations that individuals typically engage in exercise. Little information is provided regarding other work characteristics of their sample. They found daily work stress did not predict the number of minutes employees were physically active after work (Nägel et al., 2015). However, there are limited studies examining the specific connection between daily work stress from stressors in relation to physical activity,

Job burnout. Job burnout is a prolonged response of chronic exposure to work stress (Maslach & Jackson, 1981; Maslach, Schaufeli, & Leiter, 2001). The primary indicator of job burnout is emotional exhaustion. Two other aspects of job burnout are cynicism and professional inefficacy (Maslach et al., 2001). Job burnout is important to examine in studies related to resources as burnout can deplete resources, more specifically, individuals who have higher levels of burnout are depleted of their physical and cognitive resources to cope with their work demands, as well as demands outside of work (i.e. family) (Bakker & Costa, 2014; Bakker & Demerouti, 2007; Demerouti, Mostert, & Bakker, 2010). Therefore, even though job burnout is a chronic state, levels of burnout can influence daily functioning through resources.

In the cross-sectional research on job burnout and physical activity, studies consistently find a negatively relationship between burnout and physical activity. More specifically, as levels of burnout increase, levels of physical activity and exercise decrease (e.g., Ahola, Pulkki-Råback, Kouvonen, Rossi, Aromaa, & Lönnqvist, 2012; Moustou, Panagopoulou, Montgomery, & Benos, 2010; Sane, Devin, Jafari, & Zohoorian, 2012). In terms of physical activity guidelines, individuals who met physical activity guidelines were less likely to be burned out than individuals who did not meet these guidelines (Olson, Odo, Duran, Pereire, & Mandel, 2014). However, these cross-sectional studies cannot determine causality.

Longitudinal studies suggest that participating in regular physical activity can decrease levels of job burnout. Toker and Biron (2012) collected data across three time points and found an increase in job burnout for employees who did not actively engage in physical activity but not for employees who were engaging in high levels of physical activity. In a Swedish cohort study, Jonsdottir and colleagues (2010) found that at baseline, individuals who engaged in physical activity had lower levels of job burnout. Two years later, they found that the risk of burnout was significantly lower for those individuals who reported engaging in physical activity at baseline, suggesting that engaging in physical activity lowered the risk of burnout.

There are also interventions that examine burnout and physical activity due to the high prevalence of burnout in the workplace (Bretland & Thorsteinsson, 2015). In a four-week randomized control trial, 49 inactive employees were assigned to either cardiovascular exercise, resistance exercise, or control (no exercise) group (Bretland & Thorsteinsson, 2015). Both exercise groups reported larger decreases in burnout compared to the control group. In a 12-week training program, specifically for employees with high burnout, Gerber and colleagues (2013) found increased exercise reduced symptoms of burnout.

There are studies that examine how levels of job burnout affect an individual's daily life, but few studies specifically focus on burnout and daily physical activity. Nägel and Sonnentag (2013) examined daily levels of exercise, personal resources (defined as positive states), and emotional exhaustion, an indicator of job burnout, over five consecutive working days. They found that exercise was related to an increase in personal resources the next day. In turn, these personal resources were related to lower emotional exhaustion after work. In another daily diary study, Oerlemans and Bakker (2014) found that time spent on physical activities was positively related to daily recovery (i.e., recovery of resources) for employees of all levels of burnout.

Daily diary research demonstrates the importance of physical activity in relation to daily resource gain for all individuals. Longitudinal research shows how these resources from engaging in physical activity accrue overtime by lowering the risk or presence of job burnout; thus, demonstrating the importance of physical activity in relation to job burnout.

Work-to-family conflict. Work-to-family conflict is a type of inter-role conflict that occurs when demands in the work role interfere with fulfilling demands in the family role (Greenhaus & Beutell, 1985). Inter-role conflict also exists in the opposite direction of family interfering with work (i.e. family-to-work conflict); however, for the purposes of our study examining psychological work factors, our focus was work-to-family conflict.

Antecedents of work-to-family conflict include, high job demands, high levels of work stress, high work hours, high job involvement, and low supervisor support (Amstad, Meier, Fasel, Elfering, & Semmer, 2011; Bianchi & Milkie, 2010). The link between work-to-family conflict and health and well-being is well documented in the literature (Amstad et al., 2011; Greenhaus, Allen, & Spector, 2006). However, much of the work-to-family conflict and health research focuses solely on health outcomes (e.g., mental and physical health), but does not examine the processes underlying this connection between work-family-conflict and health. In other words, health behaviors, with the exception of alcohol use, are rarely studied in work-family conflict research.

Of the few studies that have examined work-to-family conflict and physical activity there are inconclusive findings. In a nationally representative sample, Grzywacz and Marks (2001) found that individuals engaged in more physical activity when they felt little interference from work on their family role. Similarly, Caudroit and colleagues (2011) found a negative correlation between physical activity and work interfering with family amongst a sample of teachers in

France. However, Allen and Armstrong (2006) did not find a link between work-to-family conflict and physical activity in a study of employees from a variety of occupations.

In sum, there is limited research exploring the link between work-to-family conflict and physical activity. The few studies are cross-sectional. Research suggests that work-to-family conflict and the consequences of work-to-family conflict fluctuate from day to day (Greenhaus et al., 2006; Ilies, Schwind, Wagner, Johnson, DeRue, & Ilgen, 2007); therefore, research studies would benefit from utilizing a daily diary design to examine how work-to-family conflict is associated with physical activity. Currently, there are no daily diary studies examining the influence of work-to-family conflict on physical activity. The current daily diary studies studying work-to-family conflict and health behaviors are limited to alcohol use (e.g., Wang, Liu, Zhan, & Shi, 2010).

Flexible work arrangements. Flexibility policies can help provide control of work hours and schedules (Kelly & Kalev 2006). Flexible work arrangements, broadly defined, allow flexibility "where" work is completed or "when" work is completed (Allen, Johnson, Kiburz, & Shockley, 2013). Flextime and telework are two types of flexibility policies in the workplace and the focus of our study. Flextime arrangements vary, but the common theme is that individuals regularly work outside of the typical work schedule, upon agreement with their supervisor. Usually, the work schedule is set up such that it can vary flexibly, though sometimes flextime can mean that workers have a regular work schedule that falls slightly outside of a typical 8am – 5 pm schedule (e.g., starting the work day at 7am and ending at 4pm, for example). A telework arrangement occurs when the employee works remotely and is not physically in the office (Kelly & Kalev, 2006).

Flexible work arrangements are proposed as a tool to prevent work-family conflict (Allen et al., 2013); however, findings are inconsistent if these arrangements assist in preventing work-family conflict (e.g., Baltes, Briggs, Huff, & Wright, 1999; Byron, 2005). Allen and Shockley (2009) suggest these inconsistent findings are based on the variability in types and use of flexible work arrangements. They suggest that flexibility be viewed as a valued resource in the workplace (Allen et al., 2013). The majority of research on flexible work arrangements focus on work and family-related outcomes, such as job performance (Gajendran & Harrison, 2007), work exhaustion, (Sardeshmukh, Sharma, & Golden, 2012), work stress (Gajendran & Harrison, 2007), work motivation (Barney & Elias, 2010), job satisfaction (McNall, Nicklin, & Masuda, 2010), turnover (McNall et al., 2010), work-family conflict (Russell, O'Connell, & McGinnity, 2009), and work-life balance (Morganson, Major, Oborn, Verive, & Heelan, 2009).

However, there are a few studies that suggest a link between flexibility and health behaviors. Moen and her colleagues (2011) suggest that flexibility can facilitate positive health behaviors, such as getting more sleep, less likelihood of working when sick and subsequently infecting others, and more time for exercise (Moen, Kelly, Tranby, & Huang, 2011). In their study, exercise was measured using the average number of days per week the individuals were physically active over the past four weeks and flexible work arrangements were not measured directly, only perceptions of schedule control were reported. Similarly, Grzywacz, Casey, and Jones (2007) found that perceived flexibility was related to increased physical activity in a sample of pharmaceutical company employees. Workplace flexibility was measured as an individual's perception of their flexibility at work to meet work and family demands. In a cross-sectional study using objective measures of flexible work, employees who teleworked reported

less physical inactivity compared to employees who did not telework (Henke, Benevent, Schulte, Rinehart, Crighton, & Corocran, 2015).

In sum, most of the current research investigating the link between flexibility and physical activity is limited to perceptions of flexibility but not the actual use of the flexible work arrangement. In addition, the majority of these studies are cross-sectional and do not take in to account the day-to-day fluctuations in the use of a flexible work arrangement. In other words, these studies to not measure the outcome on workdays a flexible work arrangement is used or outcomes on workdays a flexible work arrangement is not used. Thus, we implemented a daily diary design to capture these daily fluctuations.

Daily Diary Designs

Daily diary designs are a sophisticated study design that can capture daily variation of behaviors in a natural context (Almeida, 2005). These methods involve intensive, repeated self-reports, in which participants report on their daily lives, specifically about events, experiences, and behavior (Bolger, Davis, & Rafaeli, 2003; Iida, Shrout, Laurenceau, & Bolger, 2012). Strengths of a daily diary include ecological validity, minimization of recall bias, and investigation of daily fluctuations of experiences and behavior.

The majority of studies previously mentioned are cross-sectional or longitudinal with data collection occurring every few months or years, which can lead to methodological biases regarding validity. The strength of daily diary designs is that this method captures data with a more precise measurement of time; thus, is representative of real life, otherwise known as ecological validity (Reis, 2012). Ecological validity is essential when the research is descriptive (Conner & Lehman, 2012). In addition, diary studies minimize recall bias by collecting data daily (Reis, 2012). Collection of data each day only requires participants to recall information for

that day, not from an event that has occurred long ago which may not accurately capture their current perceptions, behaviors, or feelings. Lastly, daily diaries provide information about within-person variability (Almeida, 2005). This variability is imperative to consider with work-life research because work stressors and conditions, as well as family demands, may change daily (Ohly, Sonnentag, Niessen, & Zapf, 2010). In addition, this within-person approach allows researchers to rule out confounding variables that are stable over time (Almeida, 2005; Reis & Gable, 2000).

Theoretical Framework

Guided by the Conservation of Resources theory (COR; Hobfoll, 1989, 2001, 2011), we sought to examine psychological work factors that may impact an individual's resources to subsequently invest in physical activity each day over the course of one work week. COR theory provides a framework for examining the stress process through the interaction of the person and their environment (e.g., work) through the management of their resources. Resources refer to objects, conditions, personal characteristics, and energies that are perceived as valuable by the individual and contribute positively to their well-being (Hobfoll, 1989, 2001). The central tenet of COR theory is that individuals seek to acquire, protect, and maintain these resources (Hobfoll, 1989, 2001). In a cross-sectional study of middle-aged women, women who engaged in more physical activity experienced less resource loss than women who engaged in less physical activity (Rotem, Epstein, & Ehrenfeld, 2009). Physical activity can also buffer the stress-depression relationship for example (Sliter et al., 2014). Thus, physical activity appears to be an effective strategy to protect or maintain resources.

However, stress arises when there is a lack of resources, potential loss of resources, or an actual loss of resources. Resource loss spirals occur when individuals lack resources to deal with

stressful events, which causes them to lose more resources (Hobfoll, 1989). For example, employees who do not have the resources (e.g., job flexibility) to assist in balancing their work and personal life may then lose resources they perceive as valuable, such as time with family or their personal health (Amstad et al., 2011; Michel, Kotrba, Mitchelson, Clark, & Baltes, 2011). To extend knowledge regarding resource loss, we explored how daily loss of resources from work stress and work-to-family conflict influenced physical activity.

Resource loss makes it difficult to invest in other resources. People who lack resources are more vulnerable to resource loss and future loss because they have little to invest (Hobfoll, 2001). As previously mentioned, engaging in physical activity decreases burnout over time (Jonsdottir, Rödjer, Hadzibajramovic, Börjesson, & Ahlborg, 2010; Tiker & Biron, 2012); however, individuals who experience high burnout may have little resources to invest in physical activity to counteract the continuous resource loss, perpetuating the high burnout. This resource loss spiral makes a person vulnerable to chronic stress and subsequent adverse health outcomes (Juster, McEwen, & Lupien, 2010). To extend our knowledge of COR theory, we sought to examine how job burnout influences daily resource investment (or lack of) in physical activity.

On the other hand, individuals who have an abundance of resources are more likely to have resource gains in the future from the ability to continuously invest their resources (Hobfoll, 2001). In other words, these resources can accrue over time, known as resource gain spiral. In an evaluation of a holistic wellness program for clergy, Kim and colleagues (2015) followed up with participants six months and one year after the program ended. They found that wellness self-efficacy developed from the program led to a resource gain spiral, more specifically a gain in cognitive, physical, and emotional resources, as well as career satisfaction over the course of the year. In addition, as previously mentioned, Nägel and Sonnentag (2004) found that exercise

after work and a longer sleep duration of sleep that night was related to positive resources the next day, which in turn resulted in lower emotional exhaustion. These employees accrued resources, such as good health from the positive health behaviors, as well as personal resources, such as optimism and resilience. From these examples, we see how resource gain spirals can occur over a long period of time or only within a few days. Cross-sectional studies would fail to capture this temporal dynamic; thus, for our current study we utilized a daily diary design.

In addition, more recently, Hobfoll (2011) proposed the concept of resource caravan passageways. Resource caravan passageways are environmental conditions that either support and protect resources or deplete and obstruct resources of individuals, families, and communities (Hobfoll, 2011). For example, Treiber and Davis (2012) found that a supportive work environment (i.e. workplace family support structures) was linked to less exhaustion at work and to better health outcomes in a nationally representative sample of full-time employees from the United States. Similarly, among a sample of managers from five Western countries, in family supportive work environments, managers experienced less work-family conflict, which over time led to higher levels of job, family, and life satisfaction (Lapierre et al., 2008). In other words, work environments are acting as caravan passageways that are supporting and protecting the individual's resources, which are then aggregating to produce better health outcomes.

However, individuals in environmental conditions that make them vulnerable to resource depletion or obstruction may be at risk for resource loss spirals (Hobfoll, 2011). For example, individuals who work in an environment that they do not perceive as supportive may experience more work-to-family conflict (Kossek, Pichler, Bodner, & Hammer, 2011). Over time, this work-to-conflict can deplete resources and lead to poor health (Amstad et al., 2011). In sum, the work environment can act as a vehicle for resource spirals. To advance our knowledge about resource

caravan passageways, we sought to examine if telework or flextime provided the daily environmental conditions necessary for resource gain and subsequent resource investment in physical activity.

The Present Study

To date, few studies have examined the daily use of flexible work arrangements in relation to health behaviors. As worksites continue to adopt these arrangements, it is important to better understand what resources these flexible work arrangements can offer for employees beyond work-family balance; therefore, we examined how these arrangements influenced minutes spent on physical activity. We use the term umbrella term of physical activity in our study, as we were interested in the time spent in both structured (e.g., exercise such as running) and unstructured (e.g., physical activity such light walking) activities. Flexible work arrangements can provide individuals a greater control over their time, so we explored the amount of time (i.e. minutes) individuals invested in physical activity each day while using flexible work schedules.

In addition, the majority of research regarding flexible work arrangements is cross-sectional. We used a daily diary design to expand upon the understanding of resources, specifically the fluctuation in resources from day-to-day when a flexible work arrangement was used and when the arrangement was not used. We were specifically interested in examining the use of these flexible work arrangements in university staff employees to better understand their daily work experiences and health behavior, as previous research fails to distinguish them from faculty. This gap within the literature led to our first research question:

Research Question 1: What levels of daily work stress, daily work-to-family conflict, and daily minutes of physical activity do university staff employees exhibit on flexible workdays compared to non-flexible workdays?

We also examined job burnout, work stress, and work-to-family conflict in relation to daily levels of physical activity, as literature suggests these work factors could deplete an employees' resources. We explored if flexible work arrangements could possibly act as a resource to mitigate these effects. To extend knowledge regarding resources in the work-health literature, our second and third research questions were:

Research Question 2: How does daily work stress, daily work-to-family conflict, levels of job burnout, flexible work schedules influence daily levels of physical activity?

Research Question 3: Does the use of a flexible work arrangement influence the association between work factors and minutes of physical activity?

Method

Participants and Procedure

Participants in this study (N = 61) were recruited from a large southeastern university in the United States after receiving approval the university's Human Subjects Institutional Review Board. Individuals that were (a) full-time, (b) university staff members that used a flexible work arrangement, defined by the university's wellness department, and (c) lived with at least one family member were eligible to participate. Exclusion criteria included individuals that were considered faculty (i.e. teaching and research faculty, administrative and professional faculty, special research faculty, adjust teaching faculty), worked part-time, lived alone, or showed interest in a flexible work arrangement but were not currently using one. Participants were recruited through a Staff Senate Listserv and a health and wellness department Listserv at the

university. In addition, trained graduate assistants went to department buildings and offices at the university to hand out recruitment flyers for the study.

If university staff were interested, they contacted the lead graduate student on the project via e-mail. A more detailed description of the study was sent to the participant along with eligibility criteria questions. Participants self-reported if they were eligible for the study. If eligible, participants were sent an e-mail with an identification number assigned by a graduate research assistant and a Qualtrics link to an initial survey, which included questions about work, family, and health. At the end of the initial survey, participants selected a work week they would be using their flexible arrangement to complete the daily diaries. Participants started the first daily survey on the first day of their workweek. The daily survey included questions regarding health behaviors, work experiences, and feelings at the end of the day. Participants completed these surveys between 4:30pm and 10:00pm. Participants received a link each day at 4:30pm via Qualtrics to complete these surveys. The surveys could be completed on any device that had internet access. At the end of the study, participants received an amazon.com e-gift card for up to $50.00 for participating ($15 for the initial survey and $5 per daily survey completed). Of the 71 individuals that reached out to the lead graduate student on the project, 64 were eligible to participate, 62 agreed to participate, and 61 employees provided usable data. The entire data collection process took place from February 2018 to July 2018.

Measures

Demographic factors. Information regarding gender, race, ethnicity, education level, household income, marital status, children, and individuals currently living in the household were collected in the initial survey.

Flexible work arrangement type and reason. In the initial survey, participants were asked, "What flexible work arrangement are you using at your current job? (check all that apply)" with response options: *telework* and *flextime*. These are currently the only two types available through the university. Participants were also asked if this flexibility was documented through the university. Lastly, participants were asked the open-ended question, "Why do you use work flexibility at your current job?" Participants responses were thematically coded, with some responses having multiple codes. Categories were then developed from these codes.

Emotional job burnout. In the daily survey, participants were asked to respond to five items from the emotional exhaustion subscale developed by Maslach and Jackson (1981). These items were adjusted for day-to-day measurement similar to other daily studies (i.e. Derks, van Mierlo, & Schmitz, 2014). Cronbach's alpha in their study ranged from .74 to .88. Example items were, "Today, I felt frustrated by my job," "Today, I felt burned out from my work," and "Today, I felt emotionally drained from my work." Response options ranged from 1 = *totally disagree* to 5 = *totally agree.* To create an aggregate job burnout score for each participant, each item was averaged for all daily diaries with possible scores from 1 to 5. The scores for each item were then summed, with higher scores indicating higher levels of job burnout (Possible range = 5 to 25). Chronbach's alpha for this scale for our study was .89. Confirmatory factor analysis revealed all five burnout items had significant factor loadings for the construct of burnout ($p <$ .001) and fit indices indicated a good model fit (SRMR = .02, and CFI = 0.96).

Daily flexible work arrangement use. In the daily survey, participants were asked, "Did you use a flexible work option at your job today?" If participants responded '*yes*', they were asked "What kind of work flexibility did you use today?" with options *telework* or *flextime.*

Daily work-to-family conflict (WFC). The work-to-family conflict subscale developed by Netemeyer, Boles, and McMurrian (1996) and adapted by the Work, Family, and Health Study (WFHS; Bray et al., 2013 & King et al. 2013) was used to measure daily work-to-family conflict in the daily diary. Almeida and colleagues (2016) reported adequate reliability for this scale in the WFHS study, more specifically between-person reliability was .85 and within-person reliability was .76. Participants responded to five items each day. Example items were: "Since this time yesterday, how much did the demands of your work interfere with your family time?" "Since this time yesterday, how much did your time spent at work make it difficult to fulfill your family responsibilities?" and "Since this time yesterday, how much did things you wanted to do at home not get done because of the demands your job put on you?" Response options ranged from 1 = *not at all* to 4 = *a lot*. Items were averaged; thus, possible scores ranged from 1 to 4. Higher scores indicated greater daily work-to-family conflict. Cronbach's alpha for our study ranged from .89 to .98 for daily work-to-family conflict. Multilevel confirmatory factor analysis revealed all five items of WFC had significant factor loadings ($p < .001$) for the construct of WFC and fit indices indicated good model fit (SRMR-within = .02, SRMR-between = .02 and CFI = 0.99). The omega value was .85, which indicated good within-person reliability.

Daily work stress. In the daily diary, participants were asked questions about four possible job stressors adapted by the WFHS (Bray et al., 2013; King et al. 2013) from the Daily Inventory of Stressful Events (DISE; Almeida, Wethington, & Kessler, 2002). Participants were asked, "Since, yesterday did you have an argument or disagreement with anyone at work since this time yesterday?" "Since yesterday, did anything happen at work that you could have argued about but you decided to let pass in order to avoid a disagreement?" "Since yesterday, did you have demands placed on you at your job that were stressful (such as facing a deadline like a

release date, being on call, or too many conflicting meetings)?" and "Other than what you already mentioned, since this time yesterday, did anything else happen at your job that was stressful?" If participants responded '*no*', for a stressor, they were not asked any follow-up questions for that stressor. If participants responded '*yes'* to a stressor, they responded to the follow-up question, "How stressful was this for you?" Response options ranged from 1 = *not at all stressful* to 4 = *very stressful.* Items were summed to create a total score. Possible scores ranged from 0 to 16. Higher scores indicated greater daily work stress.

Control Variables. Demographic variables were tested as a set of control variables in the model; however, each demographic factor was not significantly associated with physical activity; thus, not included in the analyses. At the person-level, we controlled for self-reported health. Participants were asked, "In general, would you say your health is?" with response options 1 = *poor* to *5 = excellent*, with higher scores representing better health (Ware & Sherbourne, 1992). At the daily-level, we controlled for work hours. Each day, participants reported how many hours they worked each day.

Daily minutes of physical activity. The Godin Leisure-Time Exercise Questionnaire (GLTEQ; Godin & Shepard, 1985) was used to measure daily physical activity. Test-retest reliability for this measure was estimated between .74 and .80 (Godin & Shepard, 1985). Participants were asked, "Did you engage in physical activity since this time yesterday?" on each daily survey. If participants responded '*no'*, they were not asked any follow up questions. If participants responded '*yes'*, participants were asked to report number of minutes they spent in strenuous, moderate, mild exercise. Minutes were summed for each day for the total number of minutes engaging in physical activity.

Statistical Analysis

For the descriptive statistics, frequency statistics and measures of central tendency were reported. For the first research question, a one-way between subjects ANOVA were analyzed with daily work stress, daily work-to-family conflict, and daily minutes of physical activity as the dependent variables and the type of workday as the independent variable (i.e., telework, flextime, non-flexible workday). To answer the second and third research question, we used a multilevel modeling approach to address the nested structure of the data (days within individuals). Multilevel models account for the shared variance between observations.

The dependent variable, minutes of physical activity, was positively skewed with overdispersion. A logarithmic transformation of this variable did not stabilize the variance, and interpreting a multilevel model with a log-transformed dependent variable would be difficult. An alternative to transforming a non-normally distributed dependent variable for multilevel linear models are multilevel Poisson or negative binomial models. These alternate generalized linear models are specifically used to fit multilevel models with count dependent variables, such as minutes of physical activity. Poisson distributions assume the variance and mean are equal, while negative binomial models allow for the variance to be larger from the mean. Because of the overdispersion in the dependent variable, multilevel negative binomial models were found to be most appropriate for the study (STATA XTNBREG; Rabe-Hesketh & Skrondal, 2008).

Prior to estimating a multilevel model with predictors, an unconditional model (Intercept-only Model; Model 1) was run to provide information about the variance of physical activity between and within individuals. This empty model (i.e. no predictors) was helpful for preliminary information about how much variation in the outcome (i.e. physical activity) lies within and between persons (Raudenbush & Bryk, 2002) and whether a multilevel model is warranted. Model 1 demonstrated significant variability; therefore, a two-level negative binomial

model was estimated. Level-1 (day-level) time-varying predictors included: daily use of a flexible work arrangement, daily work-to-family conflict, daily job stress, and daily work hours. Continuous level-1 predictors were group mean centered. Level-2 (person-level) time-invariant predictors included: self-reported health and job burnout. Level-2 predictors were not centered.

Next, to estimate the main effects (Model 2), a conditional random-intercept model was analyzed. Model 2 allows covariates to be added in the model. In this model, the level of physical activity is allowed to vary over days after controlling for covariates and slopes are assumed to be fixed (Rabe-Hesketh & Skrondal, 2008). Coefficients in multilevel negative binomial models can be interpreted as the logarithm (called log from hereon) of expected counts (Hilbe, 2011), that is, the log of expected minutes of physical activity per day for this study. Model coefficients were exponentiated to obtain the Incidence Rate Ratios (IRR; Hilbe, 2011), interpreted as the rate of physical activity per day. To calculate the percentage of these rates, the IRRs were subtracted from 1 (i.e. 1 - IRR; Hilbe, 2011).

In Model 3, interaction effects were entered in to the model. The following interactions were tested: work stress x telework, work stress x flextime, work-to-family conflict x telework, work-to-family conflict x flextime, job burnout x telework, and job burnout x flextime. Only interaction effects that were significant ($p < .05$) were kept in the model and reported. For the ease of interpretation, the significant interaction was graphically represented. More specifically, for job burnout, we displayed average minutes of physical activity for individuals with no reported job burnout, the sample mean level of job burnout (labeled as average burnout), and job burnout two standard deviations above the mean (labeled as high burnout).

Results

Descriptive Statistics

From the 61 employees, data were collected on workdays resulting in 281 diary days. The number of diary days completed ranged from 2 to 7 (M = 4.6; Mdn = 5). A description of the sample can found be in Table 10. As shown, the majority of participants were White, female, and married/partnered. The average age was 41.4 years (SD = 41.4; range: 20 to 62). Seventy-two percent (n = 44) of the participants had children. Most participants lived with their spouse and children (n = 32, 52.5%), followed by their spouse only (n = 21, 34.4%), children only (n = 5; 8.2%), and other living situations (n = 3, 4.8%). The average score for self-reported health was 3.38 (SD = 0.90). Employees worked, on average, 7.44 hours (SD = 2.13) per day. The majority of the sample reported using flextime (n = 35, 57.4%) as their flexible work arrangement at their job. Participants reported using flexible work arrangements for a number of reasons. The top five reasons reported were to accommodate children (n = 23; 37.7%), to promote balance between work and family/life (n = 13; 21.3%), to avoid the commute/traffic (n = 9; 14.8%), for personal health reasons (n = 8; 13.1%), to work without interruptions (n = 8; 13.1%), and to complete duties at the job require flexibility (n = 8; 13.1%).

Table 10

Socio-demographic Descriptive Statistics of the Sample

Variables	Participants	
	N	Percent
Gender (female)	54	88.5
Race		
White	55	90.2
Asian	5	8.2
More than one race	1	1.6
Ethnicity (Not Hispanic/Latina/o)	58	95.1
Education		
High School	7	11.7
Associate's Degree	8	13.3
Some College	1	1.7
Bachelor's Degree	28	46.7
Graduate or Professional School	16	26.7
Household Income		
Less than $40,000	1	1.7
$40,001 to $70,000	13	22.1
$70,001 to $100,000	23	39.0
$100,001 to $140,000	13	22.1
$140,001 or greater	9	15.3
Marital Status		
Single/never married	3	4.9
Married/partnered	53	86.9
Divorced/separated	5	8.2
Flexible Work Arrangement		
Flextime	35	57.4
Telework	12	19.7
Flextime and Telework	14	23.0

Over the course of the study, participants used flextime on 56.2% (n = 158) of the diary days and telework 19.6% (n = 55) of the diary days. No flexible work arrangement (referred to as a non-flexible workday from here forward) was used on 24.2% (n = 68) of the diary days. As for physical activity, of the 61 participants, 51 (83.6%) were physically active at least one of the diary days. More specifically, of the 281 study days, participants engaged in physical activity on 139 diary days (49.47%) and reported an average of 58.17 minutes (SD = 45.55; Mdn = 45; range: 15 to 380) of daily physical activity. The average level of job burnout reported by

participants was 9.36 (*SD* = 3.92; range: 5 to 21.25). The average level of daily work stress was 1.44 (*SD* = 2.21; range: 0 to 13). The average level of daily work-to-family conflict was 1.51 (*SD* = 0.73; range: 1 to 4).

RQ1: Daily Stress, WFC, and Physical Activity on Flexible and Non-Flexible Workdays

Average scores of daily work stress and work-to-family conflict, as well as average number of minutes spent engaging in physical activity, on flexible and non-flexible workdays are displayed in Table 11. Work-to-family conflict scores were not significantly different across the three types of workdays ($p = 0.12$). Average levels of work stress were statistically different based on the type of workday [$F(2, 278) = 3.00$, $p = .05$]. Post hoc comparisons, using the Bonferroni test, indicated that work stress on telework days was significant lower than work stress reported on non-flexible workdays ($p = 0.045$). Work stress on flextime days was not significantly different than telework or non-flexible workdays, $p = 0.36$ and $p = 0.50$, respectively.

Table 11

Daily Work Stress, Work-to-Family Conflict, and Minutes of Physical Activity on Flexible and Non-Flexible Workdays

	Non-Flexible Workday		Telework Day		Flextime Day		
Daily Variables	M	*SD*	M	*SD*	M	SD	*p*
Work Stress	1.88	2.57	0.91	1.68	1.44	2.17	0.05
Work-to-Family Conflict	1.66	0.85	1.43	0.77	1.46	0.65	0.12
Physical Activity (in minutes)	39.26	50.54	47.85	58.79	19.51	39.57	< .001

In addition, there were significant mean differences in daily physical activity based on the type of workday [$F(2, 278) = 9.38$, $p < .001$]. Post hoc comparisons, using the Bonferroni test, indicated that the average reported minutes of daily physical activity on telework and non-flexible workdays was significantly higher than flextime days, $p < .001$ and $p = .01$, respectively.

However, average levels of physical activity on telework and non-flexible workdays were not significantly different, $p = 0.93$.

RQ2 and RQ3: Flexible Work Arrangements, Burnout, Stress, and Work-to-Family Conflict on Physical Activity

Estimates and incidence rate ratios (IRR) from the multilevel negative binomial models are presented in Table 12. Telework was not significantly related to daily minutes of physical activity (β = -.01, p = .99, 95% CI [-.44, .44]). Using flextime was significantly associated with minutes of physical activity (β = -.86, p = .00, 95% CI [-1.25, -.46]). The difference in log of expected minutes of physical activity is expected to be 0.86 log-minutes lower on flextime days compared to non-flexible workdays, with all other variables held constant. In other words, employees spent 58% (1 - IRR) fewer minutes on physical activity on flextime days compared to non-flexible workdays.

Table 12

Daily Physical Activity Predicted by Work Stress, Work-to-Family Conflict, Job Burnout and Flexible Work Arrangements

	Estimate	*SE*	IRR
Main Effects			
Daily Level			
Telework	-.01	.22	1.00
Flextime	-.86**	.20	.42
Work Stress	-.18	.12	.84
Work-to-Family Conflict	.17	.18	1.18
Work Hours	-.08	.05	.93
Person Level			
Job Burnout	.01	.03	1.01
Self-reported health	.69***	.11	2.00
Intercept	-3.83	.52	-
Interaction Effects			
Burnout x Telework	.05	.07	1.05
Burnout x Flextime	.15*	.06	1.17

*$p < .05$; ** $p < .01$; *** $p < .001$

Daily work stress (β = -.18, *p* = .14, 95% CI [-.42, .06]) and daily work-to-family conflict (β = .17, *p* = .44, 95% CI [-.19, .52]) were not significantly related to daily minutes of physical activity. The main effect of job burnout was not significantly related to physical activity (β = .01, *p* = .70, 95% CI [-.04, .06]); however, when interaction effects were tested to examine if using a daily flexible work arrangement moderated the association between job burnout and physical activity, the interaction effect with flextime on minutes of physical activity was significant (β = .15, *p* = .01, 95% CI [.03, .28]). Teleworking did not moderate the association between job burnout and physical activity (β = .05 *p* = .50, 95% CI [-.09, .19]).

This interaction effect between average levels of job burnout and flextime is displayed in Figure 4. On flextime days, participants with no reported job burnout participated in 77% (95% CI [58%, 87%]) fewer minutes of physical activity compared to non-flexible workdays. On flextime days, participants with average levels of job burnout participated in 54% (95% CI [31%, 69%]) fewer minutes compared to non-flexible workdays. Participants with high levels of job burnout, however, participated in 54% (95% CI [50%, 373%]) more minutes of physical activity on flextime days compared to non-flexible workdays.

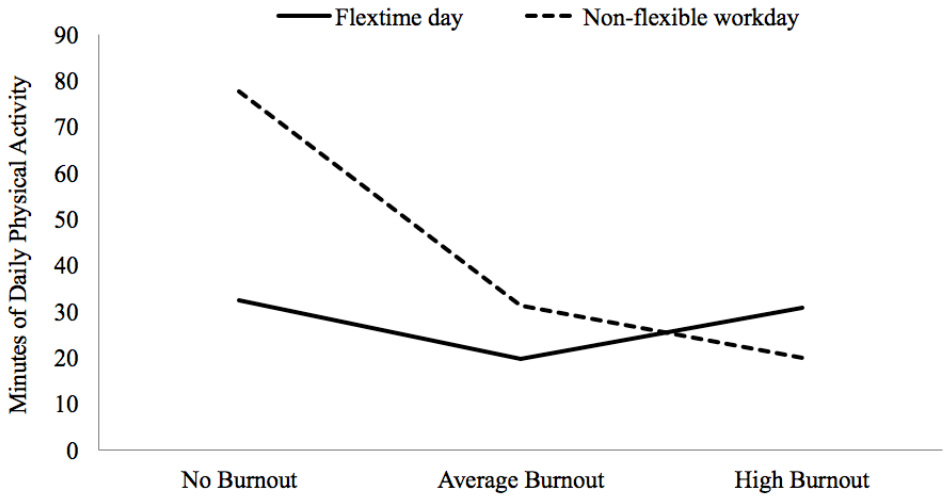


Figure 4. Average minutes of daily physical activity for individuals with no, average, and high levels of job burnout for flextime and non-flexible workdays.

Discussion

The goal of this daily diary study was to explore how work factors influenced daily levels of physical activity in a sample of university staff employees using flexible work arrangements. Guided by COR theory, we were interested in examining daily levels of work stress and work-to-family conflict in university staff, as well as if these daily factors were associated with daily minutes of physical activity. We also investigated whether job burnout was associated with physical activity. Lastly, we were interested to see if using a flexible work arrangement, either telework or flextime, was associated with daily minutes of physical activity, and if these flexible work arrangements buffered the association between burnout and physical activity.

When examining average minutes of daily physical activity on flexible and non-flexible workdays, we found that individuals reported the highest levels of physical activity on days in which they teleworked compared to days in which they did not use a flexible work arrangement, although this effect was not significant in the multilevel model. However, it is still important to acknowledge that minutes of physical activity were the highest on telework days, as this flexible arrangement may be a possible way to increase levels of physical activity in our current sedentary workforce (Church et al., 2011; Jans et al., 2007). A possibility for the higher levels of physical activity occurring on telework days is because of the environment.

According to COR, supportive environments can create opportunities for resource gain (Hobfoll, 1989, 2001). Individuals may arrange their physical activity schedule around their telework schedule based on the resources they know are available to them when working remotely. For example, when teleworking, individuals may schedule physical activity during their lunch break, when they normally would not in the work office. When these individuals are working from home, they would likely have quick access to showers for example, as other

studies have found that lack of showers in the workplace is a barrier to physical activity during lunch (Mailey et al., 2014). Individuals may also have quicker access to a physical environment suitable for physical activity while at home, such as trails, sidewalks, or exercise equipment at home. These findings demonstrate the importance of understanding resources within the environment (e.g., home, work), as these environments provide different resources that may hinder or enhance physical activity.

Considering time as a resource, from a COR theoretical perspective, makes an important contribution as time may be factored into many of decisions made by people. Time may be protected on days in which individuals telework from home by not having to travel to and from the office. Time is an energy resource that provides access to other resources (Hobfoll, 1989). It is possible that on days an individual teleworks, they use this extra time to invest in other resources (e.g., physical energy) to engage in physical activity. Thus, it is possible that on telework days, individuals experience resource gains from the time saved from the commute, as well as the environment in which they are working.

However, unlike telework days, we found that employees reported the least amount of physical activity on flextime days. This effect was significant in the multilevel model. In the multilevel models, university staff reported engaging in 77% fewer minutes on flextime days compared to non-flexible workdays. One possible reason for this may be that individuals are using flextime days for other purposes that are not compatible with physical activity. Accommodating children was the top reason reported by our sample for using a flexible work schedule, so it is possible that individuals shift the times of their workday to invest in other resources they value, such as their relationship with children, or to protect other resources, such as money, that would otherwise be used for childcare if there was no flextime arrangement. In

addition, participants may plan to be physically active on non-flextime days since demands outside of work on flextime days may be higher. In other words, the within-person approach of our study design might suggest that the use of flextime days does not necessarily mean that flextime work arrangements detract from physical activity, but that university staff may instead be more physically active on non-flextime days because they know of the demands they will encounter on flextime days and have lower levels of physical activity.

Although previous research has found a negative relationship between job burnout and levels of physical activity (e.g., Ahola et al., 2012); burnout was not significant in the multilevel model. However, the interaction between job burnout and daily use of flextime was significant. Overall, individuals who reported no job burnout, as shown in Figure 4, engaged in the most physical activity. Their levels of physical activity were higher on non-flexible workdays compared to flextime days. However, the opposite was true on flextime days for individuals reporting high levels of job burnout. Although individuals with high burnout spent the least amount of time each day engaging in physical activity overall, they participated in more physical activity on flextime days compared to non-flexible workdays. This is important as past research using longitudinal designs or randomized control trials suggests that if individuals increase their levels of physical activity, subsequent burnout significantly decreases (Bretland & Thorsteinsson, 2015; Lindwall et al., 2014). Therefore, it is crucial to find ways to increase physical activity among individuals experiencing high levels of job burnout to prevent resource loss spirals, conceptualized by COR theory (Hobfoll, 1989), as high job burnout can deplete many other resources (Schaufeli, Leiter, & Maslach, 2008). It appears that flextime days act as resource caravan passageways by providing the environmental conditions for the highly burned out individuals to invest resources into physical activity, compared to non-flexible days,

demonstrating the importance of flextime days for this group of employees. In sum, a flextime schedule may be a more valuable resource for an individual experiencing high levels of burnout compared to those experiencing low levels of burnout.

We also found that university staff members reported low levels of daily work stress overall. More specifically, reports of work stress were the lowest on flexible work days, with the lowest levels of stress reported on telework days. Similar research found that employees reported less stress from teleworking and using flextime (Arvola & Kristjuhan, 2015; Russell et al., 2009). In the language of COR (Hobfoll, 2011), these flexible work arrangements are acting as resource caravan passageways that help employees protect their other resources, possibly by providing the opportunity for a relaxed office environment and a place for employees to invest time and energy in to work without being constantly interrupted, preventing these employees from losing resources for example (e.g., Baard & Thomas, 2010; Martin & MacDonnell, 2012).

Our sample of employees using flexible work arrangements reported low levels of daily work-to-family conflict overall on both non-flexible and flexible workdays. These low levels may be because flexible work arrangements are used as a tool to prevent conflicts between work and family life. One of the main reasons that this sample reported using flexible work arrangements was to accommodate their children or to achieve work-family balance. It stands to reason that because these flexible work arrangements are used to accommodate family, the individuals do not feel that their work is interfering with their family even on days they do not use the arrangement because of their perceived schedule control during the week.

Implications

COR theory proposes that individuals seek to acquire, maintain, and protect their resources, which include objects, conditions, personal characteristics, and energies (Hobfoll,

1989). Due to the changing nature of day to day life, we used a daily diary design to capture how work factors in a sample of university staff are associated with changes in a person's physical activity day to day. The results of our study further expand the research on types and utility of resources, demonstrating that a flexible work arrangement can act as a resource caravan passageway by providing the environmental conditions necessary for employees to access other resources, such as time by not commuting to work, but also protecting resources, such as money for shifting times of the workday to provide care for children. In addition, for those individuals experiencing high levels of burnout, flexible work arrangements helped them invest their energy resources into physical activity. Engaging in physical activity is extremely beneficial for those experience high levels of burnout. If these burned-out employees can increase their levels of physical activity, over time, their levels of burnout may decrease, which would lead to numerous positive outcomes (i.e. more resources). As COR theory suggests, flexible work may beget the resources necessary to invest in physical activity which can be used to manage life stresses, that is, a resource gain spiral. Our sophisticated daily diary design provided a unique avenue into investigating COR theory that can be used in other studies examining flexible work arrangements and well-being.

It is important that research examining occupational factors considers flexible work arrangements at the daily level. In our study, flexible work arrangements were not used every day and individuals did not engage in physical activity every day either. The daily diary design allowed us to capture these daily fluctuations. Based on the results, we see that all flexible work arrangements do not have the same outcome; therefore, different types of flexible work arrangements should not be grouped together in future research. Each flexible work arrangement occurs in a different environment (i.e. one away from the physical office and the other physically

in the office) and individual's resources vary based on the context, so researchers need to examine the variability between the types of flexible work arrangements but also the variability within. By doing so, we further the understanding of various outcomes of using flexible work arrangements, and we can more appropriately develop and evaluate policies related to these arrangements (Allen et al., 2013).

Similarly, workplace programs focusing on physical activity should include content relevant for each type of flexible work arrangement. Based on our findings, individuals who predominately telework may have different needs for a program than those who use flextime. Given that circumstances associated with employees wanting flexible work arrangements can be diverse, a needs assessment is warranted before any wellness program is instituted. Employers should also take notice of employees who display symptoms of high burnout and refer these employees to wellness programs focused on physical activity. A program that targets such employees and provides resources to them could be beneficial to the employee (Awa, Plaumann, & Walter, 2010). Referrals would also be beneficial to the employer from a business perspective, as employees experiencing high levels of burnout have lower job performance and have higher rates of absenteeism (Demerouti, Le Blanc, Bakker, Schaufeli, & Hox, 2009). It is therefore important for employers to encourage or provide opportunities, such as time for physical activity, so their employees can recover from burnout (Bretland & Thorsteinsson, 2015).

In addition, flexible work arrangements are promoted as arrangements that can improve the employees balance between work and their personal lives (Allen et al., 2013). However, employers and supervisors should not assume that the use of flexible work arrangements will automatically generate positive health behaviors and a work-life balance. Even with a flexible work arrangement in place, employers and supervisors need to continuously provide support and

encouragement to employees to develop a culture of health in the workplace. Incorporating wellness champions into the workplace would be beneficial to attempt to increase levels of physical activity. Wellness champions are individuals who volunteer within the workplace to provide opportunities for employees to engage in positive health behaviors (Amaya, Battista, & Melnyk, 2018; Wieneke et al., 2016). Wellness champions also provide encouragement and support for healthy behaviors. Incorporating these champions into the worksite is a cost-effective way to foster a culture around healthy behaviors in the workplace. Champions for employees with flexible work arrangements should be familiar with the needs of this population or be an employee that uses a flexible work arrangement, such as flextime. A well-instituted wellness champion program is beneficial to employers as healthy workers are more productive and have lower rates of absenteeism and turnover (Baicker, Cutler, & Song, 2010; Goetzel et al., 2014; Odle-Dusseau, Britt, & Greene-Shortridge, 2012).

Limitations/Future Research

This study is not without limitations. First, our sample size was small and limited to one university in Southwest Virginia; thus, we cannot generalize to all university staff members using flexible work arrangements. Before conclusions can be drawn about flexible work arrangements, studies should collect data from multiple universities and worksites throughout the United States with flexible work arrangements available for their staff. Universities and worksites with different physical and social environments (e.g., urban versus rural, private versus public) may have different resources available that influence work factors and physical activity. Future studies should also consider including a comparison group of university staff not using flexible work arrangements to directly compare the benefits of flexible work arrangement on time spent on physical activity. Future studies should consider the importance of obtaining a

comparison group that is similar to the flexible work arrangement sample in regard to their job and family demands. In addition, the majority of our sample used a flextime arrangement, not telework. Future studies should sample more individuals who engage in telework, as teleworking appears to be beneficial for physical activity, but we may not have had enough employees using telework to fully capture this relationship. Gathering data from a comparison group of employees with no flexible work arrangements would also add the understanding of how flexible work arrangements are related to physical activity, amongst other outcomes.

While the design of this daily diary study has many strengths (e.g., minimal recall bias), our data were only collected over the course of one work week. Job demands (e.g., deadlines) and family demands (e.g., a sick child at home) may vary week to week, so we may not have captured a week in which our sample felt stress or conflict between work and family. Future studies should collect data over the course of multiple workweeks to get a more accurate snapshot of the individuals' lives. Future studies should also use objective measures (e.g., accelerometers) of physical activity, as a limitation of our study was physical activity was self-reported. This self-report is a limitation because responses are based on individual's subjective experience of physical activity. Future research should also examine if the employees' intention was to be physically active each day. Findings may have been more robust if we knew their intention to engage in physical activity each day. In addition to more objective measures for physical activity, future studies should also examine the use of off-job time use, specifically what activities individuals participate in that day (e.g., housework, running errands), as well as other health behaviors, such as sleep or fruit and vegetable consumption. By doing so, this will provide a clearer picture of how the individuals spent their time throughout the day. It could possibly be that individuals prioritize other activities, such as housework, eating dinner with family or sleep,

to maintain or protect their resources, so it is important to examine detailed off-job time use to gain a deeper understanding of resources.

Conclusion

Our study is one of the first to examine levels of physical activity in a sample of university staff members using flexible work arrangements in a daily context. Study designs, such as daily diaries, should be used to capture the within-person variation of flexible arrangement work use, as well as how daily use of flexible work arrangements influences various outcomes (e.g., health behaviors). The investigation of daily factors that can inhibit or enhance positive behaviors, such as physical activity, are critical to enhance workers' well-being and to inform employee wellness programs. In addition, as more employees start to utilize flexible work arrangements, it is important to study how these arrangements influence employee's personal lives and health behaviors, that is, how these arrangements act as resource caravan passageways for different groups of workers.

References

Adekola, B. (2010). Gender differences in the experience of work burnout among university staff. *African Journal of Business Management*, *4*(6), 886-889.

Ahola, K., Pulkki-Råback, L., Kouvonen, A., Rossi, H., Aromaa, A., & Lönnqvist, J. (2012). Burnout and behavior-related health risk factors: results from the population-based Finnish health 2000 study. *Journal of Occupational and Environmental Medicine*, *54*(1), 17-22. doi:10.1097/JOM.0b013e31823ea9d9

Allen, T. D., & Armstrong, J. (2006). Further examination of the link between work-family conflict and physical health: The role of health-related behaviors. *American Behavioral Scientist*, *49*(9), 1204-1221. doi:10.1177/0002764206286386

Allen, T. D., Johnson, R. C., Kiburz, K. M., & Shockley, K. M. (2013). Work–family conflict and flexible work arrangements: Deconstructing flexibility. *Personnel Psychology*, *66*(2), 345-376. doi:10.1111/peps.12012

Allen, T. D., & Shockley, K. (2009). Flexible work arrangements: Help or hype. In D. R. Crane & E. J. Hill (Eds.), *Handbook of families and work: Interdisciplinary perspectives*, (pp. 265-284). Lanham, MD: University Press of America.

Almeida, D. M. (2005). Resilience and vulnerability to daily stressors assessed via diary methods. *Current Directions in Psychological Science, 14*(2), 62-68. doi:10.1111/j.0963-7214.2005.00336

Almeida, D. M., Davis, K. D., Lee, S., Lawson, K. M., Walter, K. NA., & Moen, P. (2016). Supervisor support buffers daily psychological and physiological reactivity to work-to-family conflict. *Journal of Marriage and Family*, *78*(1), 165-179. doi:10.1111/jomf.12252

Almeida, D. M., Neupert, S. D., Banks, S. R., & Serido, J. (2005). Do daily stress processes account for socioeconomic health disparities? *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *60*(2), S34-S39. doi:10.1093/geronb/60.Special_Issue_2.S34

Almeida, D. M., Wethington, E., & Kessler, R. C. (2002). The daily inventory of stressful events: An interview-based approach for measuring daily stressors. *Assessment*, *9*(1), 41-55. doi:10.1177/1073191102091006

Amaya, M., Battista, L., & Melnyk, B. (2018). The Ohio State University's strategic approach to improving total population health. *American Journal of Health Promotion, 32*(8), 1823-1826. doi:10.1177/0890117118804149e

Amstad, F. T., Meier, L. L., Fasel, U., Elfering, A., & Semmer, N. K. (2011). A meta-analysis of work–family conflict and various outcomes with a special emphasis on cross-domain versus matching-domain relations. *Journal of Occupational Health Psychology*, *16*(2), 151-169. doi:10.1177/0890117118804149e

Arvola, R., & Kristjuhan, Ü. (2015). Workload and health of older academic personnel using telework. *Agronomy Research*, *13*(3), 741-749.

Awa, W. L., Plaumann, M., & Walter, U. (2010). Burnout prevention: A review of intervention programs. *Patient education and counseling*, *78*(2), 184-190. doi:10.1016/j.pec.2009.04.008

Baard, N., & Thomas, A. (2010). Teleworking in South Africa: Employee benefits and challenges. *SA Journal of Human Resource Management*, *8*(1), 1-10. doi:10.4102/sajhrm.v8i1.298

Baicker, K., Cutler, D., & Song, Z. (2010). Workplace wellness programs can generate savings. *Health Affairs*, *29*(2), 304-311. doi:10.1377/hlthaff.2009.0626

Bakker, A. B., & Costa, P. L. (2014). Chronic job burnout and daily functioning: A theoretical analysis. *Burnout Research*, *1*(3), 112-119. doi:10.1016/j.burn.2014.04.003

Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology*, *22*(3), 309-328. doi:10.1108/02683940710733115

Baltes, B. B., Briggs, T. E., Huff, J. W., Wright, J. A., & Neuman, G. A. (1999). Flexible and compressed workweek schedules: A meta-analysis of their effects on work-related criteria. *Journal of Applied Psychology*, *84*(4), 496-513. doi:10.1037/0021-9010.84.4.496

Barney, C. E., & Elias, S. M. (2010). Flex-time as a moderator of the job stress-work motivation relationship: A three nation investigation. *Personnel Review*, *39*(4), 487-502. doi:10.1108/00483481011045434

Bauman, A. E., Reis, R. S., Sallis, J. F., Wells, J. C., Loos, R. J., Martin, B. W., & Lancet Physical Activity Series Working Group. (2012). Correlates of physical activity: why are some people physically active and others not? *The Lancet*, *380*(9838), 258-271. doi:10.1016/S0140-6736(12)60735-1

Bianchi, S. M., & Milkie, M. A. (2010). Work and family research in the first decade of the 21st century. *Journal of Marriage and Family, 72,* 705-725. doi:10.1111/j.1741-3737.2010.00726.x

Bolger, N., Davis, A., & Rafaeli, E. (2003). Diary methods: Capturing life as it is lived. *Annual Review of Psychology, 54*, 579-616. doi:10.1146/annurev.psych.54.101601.145030

Bray, J. W., Kelly, E. L., Hammer, L. B., Almeida D. M., Dearing, J. W., King, R. B., & Buxton, O. M. (2013). An integrative, multilevel, and transdisciplinary research approach to challenges of work, family, and health. RTI Press publication No. MR-0024-1302. Research Triangle Park, NC: RTI Press. Retrieved from http://www.rti.org/rtipress

Bretland, R. J., & Thorsteinsson, E. B. (2015). Reducing workplace burnout: The relative benefits of cardiovascular and resistance exercise. *PeerJ*, *3*, e891. doi:10.7717/peerj.891

Byron, K. (2005). A meta-analytic review of work–family conflict and its antecedents. *Journal of Vocational Behavior*, *67*(2), 169-198. doi:10.1016/j.jvb.2004.08.009

Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public Health Reports*, *100*(2), 126-131.

Caudroit, J., Boiche, J., Stephan, Y., Le Scanff, C., & Trouilloud, D. (2011). Predictors of work/family interference and leisure-time physical activity among teachers: The role of passion towards work. *European Journal of Work and Organizational Psychology*, *20*(3), 326-344. doi:10.1080/13594320903507124

Centers for Disease Control and Prevention (2018a). *Physical activity: Why it matters.* Retrieved from https://www.cdc.gov/physicalactivity/about-physical-activity/why-it-matters.html

Centers for Disease Control and Prevention (2018b). *2008 Physical Activity Guidelines for Americans: Trends in Meeting the 2008 Physical Activity Guidelines, 2008 – 2017.* Retrieved from https://www.cdc.gov/physicalactivity/downloads/trends-in-the-prevalence-of-physical-activity-508.pdf

Chandola, T., Britton, A., Brunner, E., Hemingway, H., Malik, M., Kumari, M., ... & Marmot, M. (2008). Work stress and coronary heart disease: what are the mechanisms? *European Heart Journal*, *29*(5), 640-648. doi:10.1093/eurheartj/ehm584

Church, T. S., Thomas, D. M., Tudor-Locke, C., Katzmarzyk, P. T., Earnest, C. P., Rodarte, R. Q., ... & Bouchard, C. (2011). Trends over 5 decades in US occupation-related physical activity and their associations with obesity. *PloS one*, *6*(5), e19657. doi:10.1371/journal.pone.0019657

Connor, T. S., & Lehman, B. J. (2012). Getting started: Launching a study in daily life. . In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds.), *APA handbook of research methods in psychology, vol 1: Foundations, planning, measures, and psychometrics* (pp. 89-107). Washington, DC: American Psychological Association.

Cooper, K., & Barton, G. C. (2016). An exploration of physical activity and wellbeing in university employees. *Perspectives in Public Health*, *136*(3), 152-160. doi:10.1177/1757913915593103

Davis, A. J. (1996). Employee assistance provision in higher education. *Employee Councelling Today*, *8*(5), 4-12. doi:10.1108/13665629610127735

Demerouti, E., Le Blanc, P. M., Bakker, A. B., Schaufeli, W. B., & Hox, J. (2009). Present but sick: a three-wave study on job demands, presenteeism and burnout. *Career Development International*, *14*(1), 50-68. doi:10.1108/13620430910933574

Demerouti, E., Mostert, K., & Bakker, A. B. (2010). Burnout and work engagement: a thorough investigation of the independency of both constructs. *Journal of Occupational Health Psychology*, *15*(3), 209-222. doi:10.1037/a0019408

Derks, D., van Mierlo, H., & Schmitz, E. B. (2014). A diary study on work-related smartphone use, psychological detachment and exhaustion: Examining the role of the perceived segmentation norm. *Journal of Occupational Health Psychology*, *19*(1), 74-84. doi:10.1037/a0035076

Dunstan, D. W., Howard, B., Healy, G. N., & Owen, N. (2012). Too much sitting–a health hazard. *Diabetes Research and Clinical Practice*, *97*(3), 368-376. doi:10.1016/j.diabres.2012.05.020

Fountaine, C. J., Piacentini, M., & Liguori, G. A. (2014). Occupational sitting and physical activity among university employees. *International Journal of Exercise Science*, *7*(4), 295-301.

Fransson, E. I., Nyberg, S. T., Heikkilä, K., Alfredsson, L., Bacquer, D. D., Batty, G. D., ... & Kittel, F. (2012). Comparison of alternative versions of the job demand-control scales in 17 European cohort studies: The IPD-Work consortium. *BMC Public Health*, *12*(1), 62-70. doi:10.1186/1471-2458-12-62

Gajendran, R. S., & Harrison, D. A. (2007). The good, the bad, and the unknown about telecommuting: Meta-analysis of psychological mediators and individual consequences. *Journal of Applied Psychology*, *92*(6), 1524-1541. doi:10.1037/0021-9010.92.6.1524

Ganster, D. C., & Rosen, C. C. (2013). Work stress and employee health: A multidisciplinary review. *Journal of Management*, *39*(5), 1085-1122. doi:10.1177/0149206313475815

Gerber, M., Jonsdottir, I. H., Lindwall, M., & Ahlborg Jr, G. (2014). Physical activity in employees with differing occupational stress and mental health profiles: A latent profile

analysis. *Psychology of Sport and Exercise*, *15*(6), 649-658. doi:10.1016/j.psychsport.2014.07.012

Godin, G., & Shephard, R. J. (1985). A simple method to assess exercise behavior in the community. *Canadian Journal of Applied Sport Science*, *10*(3), 141-146. doi:10.12691/jpar-2-2-6

Goetzel, R. Z., Henke, R. M., Tabrizi, M., Pelletier, K. R., Loeppke, R., Ballard, D. W., ... & Serxner, S. (2014). Do workplace health promotion (wellness) programs work? *Journal of Occupational and Environmental Medicine*, *56*(9), 927-934. doi:10.1097/JOM.0000000000000276

Greenhaus, J. H., Allen, T. D., & Spector, P. E. (2006). Health consequences of work–family conflict: The dark side of the work–family interface. In P. L. Perrewé & D. C. Canster (Eds.), *Employee health, coping and methodologies* (pp. 61-98). Bingley, UK: Emerald Group Publishing Limited.

Greenhaus, J. H., & Beutell, N. J. (1985). Sources of conflict between work and family roles. *Academy of Management Review*, *10*(1), 76-88. doi:10.5465/amr.1985.4277352

Grzywacz, J. G., Casey, P. R., & Jones, F. A. (2007). The effects of workplace flexibility on health behaviors: A cross-sectional and longitudinal analysis. *Journal of Occupational and Environmental Medicine*, *49*(12), 1302-1309. doi:10.1097/JOM.0b013e31815ae9bc

Grzywacz, J. G., & Marks, N. F. (2001). Social inequalities and exercise during adulthood: toward an ecological perspective. *Journal of Health and Social Behavior*, 202-220. doi:10.2307/3090178

Henke, R. M., Benevent, R., Schulte, P., Rinehart, C., Crighton, K. A., & Corcoran, M. (2016). The effects of telecommuting intensity on employee health. *American Journal of Health Promotion*, *30*(8), 604-612. doi:10.4278/ajhp.141027-QUAN-544

Hilbe, J. M. (2011). *Negative binomial regression*. Cambridge, MA: University Press.

Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist*, *44*, 513-524. doi:10.1037/0003-066X.44.3.513

Hobfoll, S. E. (2001). The influence of culture, community, and the nested-self in the stress process: advancing conservation of resources theory. *Applied Psychology*, *50*, 337-421. doi:10.1111/1464-0597.00062

Hobfoll, S. E. (2011). Conservation of resource caravans and engaged settings. *Journal of Occupational and Organizational Psychology*, *84*(1), 116-122. doi:10.1111/j.2044-8325.2010.02016.x

Iida, M., Shrout, P. E., Laurenceau, J., & Bolger, N. (2012). Using diary methods in psychological research. In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds.), *APA handbook of research methods in psychology, vol 1: Foundations, planning, measures, and psychometrics* (pp. 277-305). Washington, DC: American Psychological Association.

Ilies, R., Schwind, K. M., Wagner, D. T., Johnson, M. D., DeRue, D. S., & Ilgen, D. R. (2007). When can employees have a family life? The effects of daily workload and affect on work-family conflict and social behaviors at home. *Journal of Applied Psychology*, *92*(5), 1368-1379. doi:10.1037/0021-9010.92.5.1368

Jans, M. P., Proper, K. I., & Hildebrandt, V. H. (2007). Sedentary behavior in Dutch workers: differences between occupations and business sectors. *American Journal of Preventive Medicine*, *33*(6), 450-454. doi:10.1016/j.amepre.2007.07.033

Jones, F., O'connor, D. B., Conner, M., McMillan, B., & Ferguson, E. (2007). Impact of daily mood, work hours, and iso-strain variables on self-reported health behaviors. *Journal of Applied Psychology*, *92*(6), 1731-1740. doi:10.1037/0021-9010.92.6.1731

Jonsdottir, I. H., Rödjer, L., Hadzibajramovic, E., Börjesson, M., & Ahlborg Jr, G. (2010). A prospective study of leisure-time physical activity and mental health in Swedish health care workers and social insurance officers. *Preventive Medicine*, *51*(5), 373-377. doi:10.1016/j.ypmed.2010.07.019

Juster, R. P., McEwen, B. S., & Lupien, S. J. (2010). Allostatic load biomarkers of chronic stress and impact on health and cognition. *Neuroscience and Biobehavioral Reviews*, *35*(1), 2-16. doi:10.1016/j.neubiorev.2009.10.002

Karasek, R. A. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative Science Quarterly*, 285-308. doi:10.2307/2392498

Kelly, E. L., & Kalev, A. (2006). Managing flexible work arrangements in US organizations: Formalized discretion or 'a right to ask'. *Socio-Economic Review*, *4*(3), 379-416. doi:10.1093/ser/mwl001

Kim, S. D., Hollensbe, E. C., Schwoerer, C. E., & Halbesleben, J. R. (2015). Dynamics of a wellness program: A conservation of resources perspective. *Journal of Occupational Health Psychology*, *20*(1), 62-71. doi:10.1037/a0037675

King, R. B., Karuntzos, G., Casper, L. M., Moen, P., Davis, K., Berkman, L., … Kossek, E. (2013). Work-family balance issues and work-leave policies. In R. J. Gatchel & I. Z.

Schultz (Eds.), *Handbook of occupational health and wellness* (pp. 323–340). New York, NY: Springer.

Kirk, M. A., & Rhodes, R. E. (2011). Occupation correlates of adults' participation in leisure-time physical activity: Systematic review. *American Journal of Preventive Medicine*, *40*(4), 476-485. doi:10.1016/j.amepre.2010.12.015

Kossek, E. E., Pichler, S., Bodner, T., & Hammer, L. B. (2011). Workplace social support and work–family conflict: A meta-analysis clarifying the influence of general and work–family-specific supervisor and organizational support. *Personnel Psychology*, *64*(2), 289-313. doi:10.1111/j.1744-6570.2011.01211.x

Kwak, L., Berrigan, D., Van Domelen, D., Sjöström, M., & Hagströmer, M. (2016). Examining differences in physical activity levels by employment status and/or job activity level: Gender-specific comparisons between the United States and Sweden. *Journal of Science and Medicine in Sport*, *19*(6), 482-487. doi:10.1016/j.jsams.2015.05.008

Lapierre, L. M., Spector, P. E., Allen, T. D., Poelmans, S., Cooper, C. L., O'Driscoll, M. P., ... & Kinnunen, U. (2008). Family-supportive organization perceptions, multiple dimensions of work–family conflict, and employee satisfaction: A test of model across five samples. *Journal of Vocational Behavior*, *73*(1), 92-106. doi:10.1016/j.jvb.2008.02.001

Leininger, L. J., Adams, K. J., & DeBeliso, M. (2015). Differences in health promotion program participation, barriers and physical activity among faculty, staff and administration at a university worksite. *International Journal of Workplace Health Management*, *8*(4), 246-255. doi:10.1108/IJWHM-10-2014-0045

Lindwall, M., Gerber, M., Jonsdottir, I. H., Börjesson, M., & Ahlborg Jr, G. (2014). The relationships of change in physical activity with change in depression, anxiety, and

burnout: A longitudinal study of Swedish healthcare workers. *Health Psychology*, *33*(11), 1309-1318. doi:10.1037/a0034402

Mark, G., & Smith, A. P. (2012). Effects of occupational stress, job characteristics, coping, and attributional style on the mental health and job satisfaction of university employees. *Anxiety, Stress and Coping*, *25*(1), 63-78. doi:10.1080/10615806.2010.548088

Martin, B., & MacDonnell, R. (2012). Is telework effective for organizations? A meta-analysis of empirical research on perceptions of telework and organizational outcomes. *Management Research Review*, *35*(7), 602-616. doi:10.1108/01409171211238820

Maslach, C., & Jackson, S. E. (1981). The measurement of experienced burnout. *Journal of Organizational Behavior*, *2*(2), 99-113. doi:10.1002/job.4030020205

Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2001). Job burnout. *Annual Review of Psychology*, *52*(1), 397-422. doi:10.1146/annurev.psych.52.1.397

McNall, L. A., Nicklin, J. M., & Masuda, A. D. (2010). A meta-analytic review of the consequences associated with work–family enrichment. *Journal of Business and Psychology*, *25*(3), 381-396. doi:10.1007/s10869-009-9141-1

Michel, J. S., Kotrba, L. M., Mitchelson, J. K., Clark, M. A., & Baltes, B. B. (2011). Antecedents of work–family conflict: A meta-analytic review. *Journal of Organizational Behavior*, *32*(5), 689-725. doi:10.1002/job.695

Moen, P., Kelly, E. L., Tranby, E., & Huang, Q. (2011). Changing work, changing health: can real work-time flexibility promote health behaviors and well-being? *Journal of Health and Social Behavior, 52*(4), 404-429. doi:10.1177/0022146511418979

Morganson, V. J., Major, D. A., Oborn, K. L., Verive, J. M., & Heelan, M. P. (2010). Comparing telework locations and traditional work arrangements: Differences in work-life balance support, job satisfaction, and inclusion. *Journal of Managerial Psychology*, *25*(6), 578-595. doi:10.1108/02683941011056941

Moustou, I., Panagopoulou, E., Montgomery, A. J., & Benos, A. (2010). Burnout predicts health behaviors in ambulance workers. *The Open Occupational Health and Safety Journal*, *2*(1), 16-18. doi:10.2174/1876216601002010016]

Nägel, I. J., & Sonnentag, S. (2013). Exercise and sleep predict personal resources in employees' daily lives. *Applied Psychology: Health and Well-Being*, *5*(3), 348-368. doi:10.1111/aphw.12014

Nägel, I. J., Sonnentag, S., & Kühnel, J. (2015). Motives matter: A diary study on the relationship between job stressors and exercise after work. *International Journal of Stress Management, 22*, 346-371. doi:10.1037/a0039115

Netemeyer, R. G., Boles, J. S., & McMurrian, R. (1996). Development and validation of work-family conflict and family-work conflict scales. *Journal of Applied Psychology, 81*(4), 400–410. doi:10.1037/0021-9010.81.4.400

Ng, S. W., & Popkin, B. M. (2012). Time use and physical activity: a shift away from movement across the globe. *Obesity Reviews*, *13*(8), 659-680. doi:10.1111/j.1467-789X.2011.00982.x

Nomaguchi, K. M., & Bianchi, S. M. (2004). Exercise time: Gender differences in the effects of marriage, parenthood, and employment. *Journal of Marriage and Family*, *66*(2), 413-430. doi:10.1111/j.1741-3737.2004.00029.x

Odle-Dusseau, H. N., Britt, T. W., & Greene-Shortridge, T. M. (2012). Organizational work-family resources as predictors of job performance and attitudes: The process of work-family conflict and enrichment. *Journal of Occupational Health Psychology, 17*, 28-40. doi:10.1037/a0026428

Oerlemans, W. G., & Bakker, A. B. (2014). Burnout and daily recovery: A day reconstruction study. *Journal of Occupational Health Psychology*, *19*(3), 303. doi:10.1037/a0036904

Office of Disease Prevention and Health Promotion, US Department of Health and Human Services. *Healthy People 2020: Topics & Objectives—Physical Activity.* Retrieved from https://www.healthypeople.gov/2020/topics-objectives/topic/physical-activity

Ohly, S., Sonnentag, S., Niessen, C., & Zapf, D. (2010). Diary studies in organizational research. *Journal of Personnel Psychology, 9*(2), 79-93. doi:10.1027/1866-5888/a000009

Olson, S. M., Odo, N. U., Duran, A. M., Pereira, A. G., & Mandel, J. H. (2014). Burnout and physical activity in Minnesota internal medicine resident physicians. *Journal of Graduate Medical Education*, *6*(4), 669-674. doi:10.4300/JGME-D-13-00396

Rabe-Hesketh, S., & Skrondal, A. (2008). *Multilevel and longitudinal modeling using Stata* (2nd ed.), College Station, TX: Stata Press.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods.* Thousand Oaks, CA: Sage Publications.

Reis, H. T. (2012). Why researcher should think "real-world": A conceptual rationale. In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds.), *APA handbook of research methods in psychology, vol 1: Foundations, planning, measures, and psychometrics* (pp. 3-21). Washington, DC: American Psychological Association.

Reis, H. T., & Gable, S. L. (2000). Event-sampling and other methods for studying everyday experience. In H. T. Reis & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 190– 222). New York, NY: Cambridge University Press.

Rotem, M., Epstein, L., & Ehrenfeld, M. (2009). Does the conservation of resources motivate middle-aged women to perform physical activity? *Western Journal of Nursing Research*, *31*(8), 999-1013. doi:10.1177/0193945909340909

Rothmann, S., & Essenko, N. (2007). Job characteristics, optimism, burnout, and ill health of support staff in a higher education institution in South Africa. *South African Journal of Psychology*, *37*(1), 135-152. doi:10.1177/008124630703700110

Sane, M. A., Devin, H. F., Jafari, R., & Zohoorian, Z. (2012). Relationship Between Physical Activity and It's Components with Burnout in Academic Members of Daregaz Universities. *Procedia-Social and Behavioral Sciences*, *46*, 4291-4294. doi:10.1016/j.sbspro.2012.06.242

Sardeshmukh, S. R., Sharma, D., & Golden, T. D. (2012). Impact of telework on exhaustion and job engagement: A job demands and job resources model. *New Technology, Work and Employment*, *27*(3), 193-207. doi:10.1111/j.1468-005X.2012.00284.x

Schaufeli, W. B., Leiter, M. P., & Maslach, C. (2009). Burnout: 35 years of research and practice. *Career Development International*, *14*(3), 204-220. doi:10.1108/13620430910966406

Shin, J. C., & Jung, J. (2014). Academics job satisfaction and job stress across countries in the changing academic environments. *Higher Education*, *67*(5), 603-620. doi:10.1007/s10734-013-9668-y

Sliter, K. A., Sinclair, R., Cheung, J., & McFadden, A. (2014). Initial evidence for the buffering effect of physical activity on the relationship between workplace stressors and individual outcomes. *International Journal of Stress Management*, *21*(4), 348-360. doi:10.1037/a0038110

Stawski, R. S., Sliwinski, M. J., Almeida, D. M., & Smyth, J. M. (2008). Reported exposure and emotional reactivity to daily stressors: the roles of adult age and global perceived stress. *Psychology and Aging*, *23*(1), 52-61. doi:10.1037/0882-7974.23.1.52

Toker, S., & Biron, M. (2012). Job burnout and depression: unraveling their temporal relationship and considering the role of physical activity. *Journal of Applied Psychology*, *97*(3), 699-710. doi:10.1037/a0026914

Treiber, L. A., & Davis, S. N. (2012). The role of 'workplace family' support on worker health, exhaustion and pain. *Community, Work and Family*, *15*(1), 1-27. doi:10.1080/13668803.2011.580123

Tytherleigh, M. Y., Jacobs, P. A., Webb, C., Ricketts, C., & Cooper, C. (2007). Gender, health and stress in English university staff—Exposure or vulnerability? *Applied Psychology*, *56*(2), 267-287. doi:10.1111/j.1464-0597.2006.00254.x

US Department of Health and Human Services (2018). *Physical Activity Guidelines for Americans*. 2nd ed. Washington, DC.

Wang, M., Liu, S., Zhan, Y., & Shi, J. (2010). Daily work–family conflict and alcohol use: Testing the cross-level moderation effects of peer drinking norms and social support. *Journal of Applied Psychology*, *95*(2), 377-386. doi:10.1037/a0018138

Ware, J. E., & Sherbourne, C. D. (1992). The MOS 36-item short-form health survey (SF-36): I. Conceptual framework and item selection. *Medical Care*, *30*(6), 473-483. doi:10.1097/00005650-199206000-00002

Wieneke, K. C., Clark, M. M., Sifuentes, L. E., Egginton, J. S., Lopez-Jimenez, F., Jenkins, S. M., ... & Olsen, K. D. (2016). Development and impact of a worksite wellness champions program. *American Journal of Health Behavior*, *40*(2), 215-220. doi:10.5993/AJHB.40.2.6

Wood, S., Stride, C., Threapleton, K., Wearn, E., Nolan, F., Osborn, D., ... & Johnson, S. (2011). Demands, control, supportive relationships and well-being amongst British mental health workers. *Social Psychiatry and Psychiatric Epidemiology*, *46*, 1055-1068. doi:10.1007/s00127-010-0263-6

Chapter 5: Discussion

In this daily diary study, we sought to examine levels of daily physical activity among university staff employees who use flexible work arrangements. Our study moves beyond previous inquiries examining physical activity by incorporating the daily diary research design with a unique sample in a specific workplace. The employees in our sample used flexible work arrangements. Such arrangements are becoming increasingly common, yet research lacks an understanding of health behaviors in the context of non-standard work arrangements. We examined how personal (e.g., self-efficacy) and environmental factors (e.g., barriers, work stress) influenced daily physical activity, specifically on workdays people teleworked, used flextime, or had a standard day (i.e. non-flexible). Our study provides evidence for the different benefits of telework and flextime arrangements regarding physical activity. The following chapter provides insight on what we have learned about physical activity, university staff, flexible work arrangements, and daily diary designs. In addition, implications, limitations, and suggestions for ways to advance this field are discussed.

Physical Activity

Most research on physical activity has measured physical activity by self-report retrospectively, asking the individual to report on their levels of physical activity within the past week or the past four weeks (Sylvia, Bernstein, Hubbard, Keating, & Anderson 2013). These measures are subject to recall bias (van der Ploeg, Merom, Chau, Bittman, Trost, & Bauman, 2010). Furthermore, a cross-sectional design does not allow researchers to examine day-to-day variation in physical activity, nor does it acknowledge the role of daily factors, such as work stress, in influencing how much or how little a person engages in physical activity each day. We saw in this study that there was significant within-person variation in physical activity; thus, we

demonstrated the importance of measuring physical activity day-to-day to advance the field of health behavior research.

Daily barriers were significantly related to physical activity. We found that as daily barriers increased, minutes of daily physical activity decreased. From an SCT framework, the environment, the person, and behavior are constantly interacting and changing. To measure barriers and physical activity at one time point, via a cross-sectional design, would fail to capture this reciprocal determinism, the hallmark of SCT. While reciprocal determinism is not easily empirically measured (Simons-Morton, McLeroy, & Wendel, 2011), daily diaries are a way to attempt to capture the changes between the person, the environment, and their behavior from day to day. In addition, by examining barriers daily, we can see which barriers are constantly in the individual's life and barriers that may not be as frequently occurring. From a COR perspective (Hobfoll, 1989, 2001), identifying barriers allows investigators and practitioners to have a better idea of the barriers that may be threatening or depleting an individual's resources (e.g., energy, time) required to invest in physical activity.

Self-efficacy was not a significant predictor of daily physical activity in our study, but it could be because we did not capture all components that comprise self-efficacy (i.e. past performance, observation of others, social persuasion, and physiological cues). However, even though self-efficacy was not significantly related to daily physical activity in our study, self-efficacy should still be viewed as a resource from a theoretical standpoint and based on evidence from previous research (e.g., Ayotte et al., 2010; Pan et al., 2009). We argue for self-efficacy as a resource in future investigations of physical activity, because from a COR perspective it can contribute to the maintenance of an individual's resources (Hobfoll, 2001).

University Staff

Our study was one of the select few studies that specifically examined university staff in relation to their health behaviors. As previously mentioned in Chapter 1 and 2, faculty and staff are two different social structures within the university that differ in regard to responsibilities, supervision, and schedule control (Davis, 1996; Krebs, 2003; Tytherleigh et al., 2005). Our sample, staff members at a large university in Southwest Virginia, were majority female, earned at least a Bachelor's degree, and had at least one child. These individuals ranged in their age and their household income. It is important to note that characteristics of our sample may not generalize to all university staff populations. Universities classify types of staff in a variety of ways. At the university data were collected from, 'staff' refers to a variety of positions from entry-level to administrative or managerial positions. At a nearby large university in Southwest Virginia, the term university staff includes operational and administrative, managerial and professional, and executive and senior administrative positions for example.

Our sample was generally physically active, perhaps more so than a random sample might have been if we sampled differently within the population. About 80% of our university staff employees in our sample was physically active for at least one day during the study. For half of the study days, our sample was physically active and reported similar barriers to physical activity as other populations, such as lack of time and motivation. These staff members also reported low levels of daily work stress and feelings of work-to-family conflict. However, even though they reported low levels of these factors, it is important to continue to examine this population as past research fails to separate staff and faculty during analyses (e.g., Mark & Smith, 2012), only examines between-group differences (e.g., Cooper & Barton, 2016), or just

focuses on faculty (e.g., Shin & Jung, 2013). It is important we continue to know more about this population as they are understudied.

Flexible Work Arrangements

Staff members reported using flexible work arrangements for a variety of reasons. The top reasons included: to accommodate children and their schedule, to achieve work-life balance, to avoid commute/traffic, to increase productivity, and for personal health reasons. From a COR perspective, these reasons can all be viewed as processes in which an individual aims to protect or maintain their resources (Hobfoll, 2001). For example, by accommodating their children and achieving a work-life balance, these individuals are maintaining resources such as having a good relationship with children, family stability, and time with loved ones (Hobfoll, 1989). By avoiding traffic or the commute to work, individuals are protecting their time. As previously discussed, time is an energy resource that provides access to other resources. We can see how this reasoning for using a flexible work arrangement could be beneficial for resource gains over time as individuals accrue free time they can invest in other valued resources. Lastly, by using flexible work arrangements for personal health reasons, individuals are protecting their personal health.

As for the frequency of use for flexible work arrangements, individuals used a flexible work arrangement on almost three-fourths of the study days, meaning these arrangements were used quite often. It is noteworthy that about half of the staff members did not have their flexible work arrangement officially documented through the university. In other words, this flexible work agreement was strictly between their supervisor and the staff member. At this university, employees only have official documentation if their work schedule shifted by more than one hour each day or teleworked at least 32 hours a month. It could be that some of the employee's

flexible work arrangements were too minimal to meet this threshold for documentation. When trying to estimate the prevalence of flexible work arrangements, investigators should be aware that not all arrangements are required to be documented, similar to other work-life policies that also may not be documented (Crouter & Booth, 2009). The practical implications of this finding are several. First, we were gratified to have recruited a sample throughout all university listservs and the wellness department, rather than only sampling from individuals with formally documented arrangements, or we would have missed half of the sample. Investigators studying flexible work arrangements at universities should recruit through multiple avenues to capture all employees with flexible work arrangements, both formal and informal. Second, from a policy perspective, employees without documentation are not protected from changes in supervisors or supervisor policy. It is possible that employees with informal arrangements may have different perceptions or experiences of flexible work arrangements compared to those who have official documentation through the university.

We also need to view need to view telework and flextime as separate types of flexible work arrangements in research. We saw how levels of physical activity and other daily constructs (e.g., barriers, work-to-family conflict) were different for each type of arrangement used that day; therefore, different types of flexible work arrangements should not be grouped together in analyses. From an SCT and COR perspective, each flexible work arrangement occurs in a different environment (i.e. one away from the physical office and the other physically in the office) and individuals' resources vary based on the context. Researchers would benefit from examining the variability between the types but also within the types of arrangements. By doing so, we deepen the understanding of various outcomes of using flexible work arrangements, and

we can more appropriately develop and evaluate policies related to these arrangements (Allen et al., 2013).

Telework. In our sample 20% of employees reported telework as their flexible work arrangement in the initial survey. Over the course of the 281 days, telework was used on 55 days (19.6%). It is important to note that the interpretations we make in the current section are based on a small subgroup of employees from our sample. We present the ways in which telework could provide the environmental conditions (i.e. caravan passageways; Hobfoll, 2001) for physical activity and low levels of work stress.

We found that levels of physical activity were the highest and the number of perceived barriers were the lowest on days in which an individual teleworked. Among the many possibilities of resource gain that individuals may experience when teleworking, it is possible individuals arrange their physical activity around their telework schedule. More specifically, individuals in our sample did not telework every day of the week, so perhaps they planned to be physically active on telework days when more resources were available to them. On days in which they were in the office, there may be more chances for resources to be depleted (e.g., physical energy, time) by traveling to and from work, as well as interacting with co-workers and the office environment, which may make it difficult to invest resources in physical activity at the end of the day; thus, individuals may plan their physical activity around telework days.

It is also possible that on telework days, individuals experience resource gains from the time saved from the commute, as well as the environment in which they are working. Individuals may schedule physical activity before their work day begins or during their lunch break, for example. When these individuals are working from home, they would likely have quick access to showers making them more likely to be physically active, as other studies have found that lack of

showers in the workplace is a barrier to physical activity during lunch (Mailey et al., 2014). In line with SCT, their environment (home versus the office) could be influencing their subsequent behavior. A COR perspective assists in a better understanding of the resources located within that environment that may hinder or enhance physical activity.

We also found that levels of work stress were the lowest on telework days. From a COR perspective, flexible work arrangements may act as resources that help employees protect other resources. Teleworking provides the opportunity for an office environment of the individual's choosing and a place for employees to invest time and energy in work potentially without interruptions; thus, preventing these employees from a negative resource spiral. In other words, workspaces away from the office (at least for some of the workers' workdays) may support and protect individuals' resources instead of depleting individuals of their resources. This logic could be extended to their families as well. Employees who bring negative emotions home from the office, termed negative spillover, because of stress for example, may have negative interactions with their family members. This negative interaction may deplete resources related to family such as: family stability, intimacy with family members, and good relationships with family members (Hobfoll & Lilly, 1993). It could be that teleworking interrupts possible negative resource spirals from the work to family domain. This idea of spillover is discussed in more detail in a later section of this paper.

Flextime. Flextime was the most frequently reported flexible work arrangement used in our study. Almost 58% of employees in our sample reported flextime as their flexible work arrangement. Of the 281 study days, flextime was used on 158 days (56.2%). One possibility for the popularity of flextime in our sample is that all participants had at least one family member living with them as a criterion for participation in the study. Most our sample had children

present in the home. These individuals may have altered their start and end times to meet family demands.

Unlike telework days, we found that employees reported the least amount of physical activity on flextime days. One possible reason is that individuals may be using this flextime for purposes that are not compatible with physical activity. Accommodating children was the top reason reported by our sample for using a flexible work schedule, so it is possible that individuals shifted the times of their workday to invest in other resources they value, such as their relationship with children, or to protect other resources, such as money for childcare. In addition, participants may plan to be physically active on non-flextime days since demands outside of work on flextime days may be higher.

Flextime may not be beneficial for physical activity for all university staff; however, the use of flextime was beneficial for physical activity for individuals with high levels of job burnout. In the literature, longitudinal studies have found many adverse health consequences from high levels of job burnout (Schaufeli, Leiter, & Maslach, 2009). However, physical activity can act as a buffering mechanism to this link, as past research using longitudinal designs or randomized control trials using pre-post designs suggest if individuals increase their levels of physical activity, subsequent burnout significantly decreases (Bretland & Thorsteinsson, 2015; Toker & Biron, 2012).

Therefore, it is crucial to find ways to increase physical activity among individuals experiencing high levels of job burnout in order to prevent resource spirals, as high job burnout can deplete physical and cognitive resources, such as feelings of chronic exhaustion or disengagement from work (Demerouti et al., 2010; Oerlemans & Bakker, 2014; Schaufeli et al., 2009). One way to attempt to prevent resource spirals for individuals may be using a flextime

arrangement. Overall, it appears a flextime schedule may be a more valuable resource for an individual experiencing high levels of burnout compared to those experiencing low levels of burnout. However, it is important to note that even though our design was not cross-sectional, we only focused on a short period of days. We are not able to understand the mechanisms that led these individuals to feelings of burnout, so although flextime may be a possible resource for these individuals, it is clearly not the only resource to attempt to reduce levels of burnout.

Daily Diary Research

Although not all daily factors measured in our study were significantly related to physical activity, in order to better understand the loss, maintenance, or gain of an individual's resources, researchers should continue to use daily diary designs. These designs capture processes, behaviors, emotions, and stressors in an individual's natural context (Reis, 2012). Both of the theoretical perspectives that guided this study, SCT and COR, position the environment centrally in understanding resources (Hobfoll, 1989) and behavior (Bandura, 1989, 1997). Daily diaries provide information about the day-to-day environment in which behavior occurs/does not occur, so we as researchers can better understand the daily processes in the environment that may have enhanced or depleted resources. In our study, flexible work arrangements were not used every day and individuals did not engage in physical activity every day. This variation was expected as work experiences and health behaviors fluctuate daily (Almeida, 2005; O'Connor, Conner, Jones, McMillan, & Ferguson, 2009). The daily diary design allowed us to capture these fluctuations day-to-day by examining the daily variability (Laurenceau & Bolger, 2005).

Daily diary designs also allow for incorporation of lagged effects. The examination of lagged effects allows the researchers to better understand antecedents of health behaviors (Wickham & Knee, 2013). We tested for lagged effects in our analyses, on the thought that

workers might have arranged their weeks with the knowledge of when they planned to use their flexible arrangements, and that this arrangement (in COR terms, the planning and management of the resource of a flexible arrangement) might affect their daily experience even on days when they did not use their work schedule flexibility. However, lagged effects were not significant in our models. However, it is still advisable to design studies that allow for testing of lagged effects, to investigate the previous day events effect the outcome the next day. Such analyses would allow researchers to investigate beyond the concurrent effects (i.e. examining events within the same day) (Wickham & Knee, 2013). More specifically, lagged effects provide information about resources that may transfer beyond one day (e.g., positive affect). Nägel and Sonnentag (2013) found that the combination of exercise and sleep together predicted personal resources the next day. In other words, there were lagged effects of health behaviors on personal resources.

In sum, daily diary designs allow us to investigate daily fluctuations across individuals that cross-sectional studies would fail to capture collecting data at one time point. Daily diary designs examine psychological processes, experiences, and behaviors as they naturally occur in the environment. Directly capturing these day-to-day processes provides us with information about the immediate impact (i.e. same day) and the short-term impact (i.e. next day) of events and experiences. Daily diary designs should be utilized in studies examining health behaviors, as certain factors (e.g., work stress, use of a flexible work arrangement) can fluctuate daily and subsequently influence an individual's resources from day-to-day. Findings from these future studies can provide information of much more relevance to wellness programs and interventions.

Implications

There are many implications from the findings of this study of university staff who use flexible work arrangements at the individual, family, organizational, and national level.

Individual. In regard to physical activity, our sample reported a variety of barriers to physical activity each day. Individuals should self-reflect and identify which barriers are influencing their health behaviors the most each day. Goal setting and monitoring can be useful to help plan for setbacks from barriers (Bandura, 1986). Individuals should set smaller goals in the beginning so they can have opportunities to be successful. Goal setting and monitoring are both components of self-regulation, a construct of SCT that is closely linked to self-efficacy (Bandura, 1986). In addition, while many barriers are outside the individual's control, other barriers are within their control, and a variety of resources exist in the literature to assist individuals in tasks, such as time management and task prioritization (e.g., Eerde, 2003; Kirillov, Tanatova, Vinichenki, & Makushkin, 2015; Ouweneel, Le Blanc, & Schaufeli, 2013).

Individuals should also seek out experiences to increase their levels of self-efficacy. Although self-efficacy was not a significant predictor of physical activity in our study, our sample reported average levels of self-efficacy. People can increase their self-efficacy by creating opportunities to have successful experiences with physical activity, that is, mastery experiences. Increased self-efficacy allows individuals to adapt in different settings (Bandura, 1986). Increased self-regulation and self-efficacy can be especially useful for individual's in our sample experiencing high levels of burnout. An increase in these personal factors may help increase levels of physical activity and subsequently lower levels of burnout over time.

When examining work-to-family conflict, although our sample reported low amounts of work-to-family conflict, it is still important to acknowledge that there were still days in which

individuals felt conflict. The presence of conflict alludes to the point that work-family policies do not eliminate all conflict between work and family. As work-to-family conflict can fluctuate daily, we recommend that on days an individual perceives work-to-family conflict, they seek out resources (e.g., co-worker social support) or mechanisms (e.g., psychological detachment from work) to help buffer or alleviate the conflict between work and family to protect their resources (e.g., mental health) (Amstad et al., 2011; Byron, 2005). Resources and mechanisms to decrease work-to-family conflict may differ among individuals, so it is important for the individual to explore what fits best for them in their environment.

Family. Extending beyond the individual, our study provides implications for families. In our sample, individuals were the least physically active on flextime days. One possible way to increase physical activity on flextime days is to encourage families to participate in physical activity together. Research suggests that parents report benefits of family time spent together involving physical activity (Thompson, Brockman, Cartwright, Page, & Fox, 2010). These benefits include increased parent-child communication, spending time together, enhanced mental health, and enjoyment (Thompson et al., 2010). Families can participate in non-structured activities, such as going for a walk around their neighborhood, or more structured activities, such as a community run. Research suggests that community participation events (e.g., 5k runs) are appealing to both active and non-active people (Stevinson & Hickson, 2013), so families should be encouraged to seek out community events. Collecting more information from individuals regarding daily family demands in research would assist in making more family-level recommendations for physical activity.

In our sample, individuals reported the most physical activity on telework days. It is possible that individuals engaged in physical activity while their family member(s) were home,

which provides the opportunity for observational modeling for their family members(s). Children could also see their parents prioritizing time for physical activity or overcoming barriers each day to engage in physical activity. Observational modeling is a construct of SCT that involves learning from others (Bandura, 1986). Research suggests that greater parental levels of physical activity are associated with increased levels of physical activity for children (Fuemmeler, Anderson, & Mâsse, 2011). Children may be learning this behavior through observing their parents. Thus, it is possible that a parent's level of physical activity not only improves their own well-being but also extends to their child's well-being.

Supervisors. As mentioned above, close to half of the individuals in our sample did not have a formal flexible work arrangement documented through the university; rather, they had a standing agreement with their supervisor. An implication of the prevalence of employees in our sample who participated in flexible work arrangements without a formal university arrangement is that the role of the supervisor is vital. Thus, the role of the supervisor merits more attention. Kelly and Kalev (2006) suggested that individuals who are perceived as more valuable and productive to the company will most likely get approval for flexible work arrangements. However, the average worker who needs a flexible arrangement in order to meet all of their family and personal life demands may not be approved for the flexible arrangement, putting them at risk for poor health and well-being. If these individuals were granted flexible work arrangements, they may be better able to manage their multiple roles (at home and at work) and become a better, more productive worker (Odle-Dusseau, Britt, & Greene-Shortridge, 2012). Workplaces should offer workshops to teach and train employers and supervisors about the benefits of providing flexible work arrangements to their employees and how to manage their

relationship once the agreement is in place. Supervisor support for employees' use of policies is also an important factor for successful policy implementation (Ryan & Kossek, 2008).

Similarly, workplaces can provide workshops to employees about the different types of flexible work arrangements available to them and how to navigate their departments to request these flexible arrangements. We suggest incorporating family-supportive supervisor trainings at workplaces if they are not already available, as research shows the employees are more likely to request these flexible work arrangements if they have a family-supportive supervisor (Kossek, Pichler, Bodner, & Hammer, 2011). Once employees adopt a flexible work arrangement, employers and supervisors should not assume that the use of flexible work arrangements will automatically create a work-family balance, as the arrangements have been promoted to create (Allen et al., 2013). Even with a flexible work arrangement in place, employers and supervisors need to continuously provide support and encouragement to employees to develop a culture of health in the workplace and balance between work and their personal life in order to ultimately protect their resources and prevent resource loss spirals. Supervisors can do so by acknowledging employee's family roles, assisting employees to fulfill commitments outside of work, and promote workplace wellness programs to their employees (Goodman & Crouter, 2009). These suggestions are economically feasible for companies to implement.

Workplace programs. Findings from our study also have the potential to improve or develop workplace programs regarding physical activity. There is a body of research providing evidence that workplace prevention and wellness programs create a return on investment for businesses (Baxter, Sanderson, Venn, Blizzard, & Palmer, 2014). From a business perspective, healthy employees generate savings to the business, as there will be less absenteeism, higher

levels of productivity, and lower levels of turnover (Baicker, Cutler, & Song, 2010; Goetzel et al., 2014).

Although the focus of our study was physical activity, wellness programs do not have to limit their focus to physical activity, as there are many other health behaviors that are beneficial to health and well-being as well (e.g., healthy eating, sleep). Given that the circumstances that might be associated with employees wanting flexible work arrangements can be diverse, a needs assessment is warranted before any wellness program is instituted. From this needs assessment, we can better understand the barriers and facilitators to health behaviors, such as physical activity. From our sample, it appears that time and fatigue were barriers, so a program for our sample would prioritize those barriers by possibly incorporating a wellness program during the workday in the morning prior to fatigue setting in. Barriers least reported, such as cost and safety, could be briefly mentioned in worksite wellness programs but they would not be the priority.

Offering trainings for supervisors (e.g., educational programs) in the areas of wellness would also benefit employees. An example would be for the workplace to offer trainings to improve supervisors' skills in the identification of strategies for mental health and health conditions (Ammendolia et al., 2016; Cancelliere, Cassidy, Ammendolia, & Côté, 2011). In addition, supervisors can be important stakeholders for the workplace programs offered. Supervisor engagement may positively influence whether employees will choose to participant in the wellness programs (Ammendolia et al., 2016). Supervisors should also be a population of interest in the worksite and have their own needs assessment, as they may have needs that are different than their employees. Providing opportunities for supervisors to improve their own health and well-being is beneficial for employees, specifically because research suggests that

supervisor stress and affective well-being directly influences employee stress and well-being (Skakon, Nielsen, Borg, & Guzman, 2010). Supervisors engaging in positive health behaviors also provide the opportunity for observational modeling within the work environment.

One low-cost option to improve workplace wellness is implementing workplace wellness champions within the department or worksite. Wellness champions, recruited from within the worksite, provide opportunities for participation in wellness activities, promote a culture of health in the workplace, and increase positive health behaviors by focusing on the needs of the workplace (Amaya, Battista, & Melnyk, 2018; Wieneke et al., 2016). The adoption of wellness champions is relatively new; however, current research suggests many positive effects from implementing a wellness champion program. In one study of a healthcare organization in the United States, employees participating in the wellness champion program reported higher levels of workplace and co-worker support for a healthy lifestyle compared to individuals not aware of the program (Wieneke et al., 2016). Individuals also reported better health and wellness compared to those employees not aware of the wellness champion program (Wieneke et al., 2016). Wellness champions are a cost-effective way to foster a culture and community around healthy behaviors in the workplace.

Lastly, there are program implications for employees experiencing high levels of job burnout. Individuals reporting no burnout in our study had higher levels of physical activity on non-flexible work days, unlike the individuals with high levels of burnout. Perhaps individuals that report no levels of burnout prioritize resources related to physical activity, such as free time and physical energy. Future research would benefit investigating the environmental conditions (i.e. resource caravan passageways; Hobfoll, 2011) that produce zero or low levels of burnout

and high physical activity. Insights from this research should then be incorporated into wellness programs for individuals with high levels of burnout.

Policy. As for policy, there are policies within the workplace and there are also laws employers must adhere to in the workplace. At both the organizational and national level, evaluation of policies is key. For current workplaces that have a type of flexible work option in place, such as the university in which the data for this study were collected, evaluation of how these policies benefit the employees is necessary. Evaluation can help ensure the policy is effective and is directly benefiting employees (e.g., improving social conditions). In places that have adopted the "right to request," the flexible work policies somewhat differ among the three locations, so it is difficult to directly compare the policies; however, evaluation is still possible for each location. The "right to request," previously mentioned in Chapter 2, provides an employee the right to request flexible work arrangements from their supervisor. When researchers study the impact of policies, flexible work arrangements should not be lumped together with other work-family policies (e.g., family leave, paid sick leave, employer-provided child care). There was considerable variation between our two types of flexibility we examined, so grouping flexible work policies with others when evaluating policy is doing flexible work arrangement policies a disservice.

The implementation of policies in the workplace alludes to the importance of implementation science, the study of methods to promote the integration of evidence-based practices, interventions, and policies to maximize successful outcomes (Eccles & Mittman, 2006; Kelly & Perkins, 2012). The focus of implementation science is the evaluation of the process of implementation, which can involve process, formative, and summative evaluation (Bauer, Damschroder, Hagedorn, Smith, & Kilbourne, 2015). This evaluation provides useful

information for the success or failure of adoption, as well as factors that are essential for sustainability. In the workplace, the implementation of policy can impact inclusiveness by eliminating or reinforcing barriers to inclusion (Ryan & Kossek, 2008). Ryan and Kossek (2008) examined the work-life policy literature and proposed four attributes that can influence the effectives of implementation: supervisor support for policy use, perceptions of availability to employees, the degree to which the policy use can be negotiated, and communication about the details regarding how and when the policy can be used. In sum, both the policy and the process of *how* the policy was implemented need to be evaluated to understand the impact of the policy (Kelly & Perkins, 2012). Evaluation is important as flexible work policies become increasingly common in the workplace.

At the national level, the United States lags in their work-family policies compared to other developed nations. As for flexible work arrangement policies, only Vermont, San Francisco, and New York City currently have adopted the "right to request," in addition to federal employees having the "right to request." Gassman-Pines and Goldstein (2017) state that the "right to request" movement is growing. We support that more states consider adopting the "right to request" in order to allow workers to formally request flexible working arrangements, as our study showed benefits of both telework and flextime for various groups of employees. In addition, formally adopting policies into the workplace may also address the stigma and possible hesitancy to request workplace flexibility. As the use of flexible work arrangements increase, it is imperative we continue to study employees using this flexibility to measure the impact, benefits, and effectiveness of policies.

In addition, adopting policies may help assist in formalizing these work arrangements. Individuals with informal arrangements may possibly be overlooked in research because there

are no documents or record on file of their flexibility. Perhaps with policies in place across the United States, more arrangements will become formalized and we can expand our samples in research to gain a deeper understanding of flexible work arrangements.

Limitations and Future Research

While our study had many strengths with our unique sample and study design, the results should be interpreted considering the limitations of the sample, measures, and design.

Sample. First, our sample size was small and limited to one university in Southwest Virginia; thus, we cannot generalize to all university staff members using flexible work arrangements. In addition, because of the smaller sample size we were limited to the number of predictors that could be included in the models. Including too many predictors in a model (i.e. beyond what was accounted for in power analyses) with a small sample size would have limited the ability to detect a true effect if one exists (Keith, 2015). Future research should increase the sample size to test more complex models.

Before conclusions can be drawn about flexible work arrangements at universities, studies should collect data from multiple universities throughout the United States with flexible work arrangements available for their staff. Universities with different physical and social environments (e.g., urban versus rural, private versus public) may have different resources that subsequently influence physical activity. These studies should also examine the policies of flexible work arrangements among universities, as these may differ university to university. Lastly, the majority of our sample used a flextime arrangement, not telework. Future studies should sample more individuals who engage in telework, as teleworking appears to be beneficial for physical activity, but we may not have had enough employees using telework to fully capture this relationship in the multilevel models.

Measures. The daily diary design of our study required that the number of questions respondents were to answer each day be minimized, to assure that participating would not be so burdensome and threaten the reliability of the study (Gunthert & Wenze, 2012). Therefore, decisions were made to use shortened versions of measures, as well as to not include certain measures that may have been helpful.

We did not measure whether university staff intended to be physically active each day. Findings may have been more robust if we knew their intention to engage in physical activity each day. Future research should also examine if the employees' intention was to be physically active each day. In addition, we were not able to capture all dimensions of burnout or barriers. For burnout, we measured the core dimension of burnout most associated with resources and physical activity, emotional exhaustion (Maslach et al., 2001; Nägel & Sonnentag, 2013), but did not measure the other dimensions of job burnout: depersonalization and personal accomplishment. However, future studies should include these other two dimensions to explore if they are related to resources and physical activity. As for barriers, we did not capture many details about each specific barrier beyond if the barrier was present that day. Future studies should examine the severity of barriers to better understand how certain barriers may impact an individual's resources or perception of the environment more so than other barriers.

We also were not able to measure all constructs of SCT, more specifically, we did not measure SCT constructs that are related to self-efficacy (e.g., self-regulation, observational modeling). Including these factors in future research is beneficial to gain a better understanding factors that influences behavior. By including these constructs, self-efficacy could also be tested as a mediator, as some studies show an indirect relationship between self-efficacy and physical activity (e.g., Ayotte et al., 2010). In addition, research suggests that interventions that are

grounded in health behavior theory produce greater health behavior change (Glanz & Bishop, 2010); therefore, including all constructs of SCT in relation to physical activity with this sample would benefit interventions and programs for university staff using flexible work arrangements.

Lastly, due to the intensive nature of daily diary designs, participants were compensated for their time and commitment to the study (Connor & Lehman, 2012). Therefore, all monetary resources were allocated to participant compensation, and we were not able to purchase accelerometers to measure physical activity. While other studies suggest reasonably good agreement between self-report questionnaires and accelerometers for adults (Miller, Freedson, & Kline, 1994; Slootmaker, Schuit, Chinapaw, Seidell, & van Mechelen, 2009) and minimal evidence of social desirability for our measure of physical activity (Motl, McAuley, & DiStefano, 2005), our self-report measure is still a limitation of our study. As devices, such as fitness trackers, become more widespread, measures that are more objective than self-report may be increasingly feasible.

Design. While the design of this daily diary study has many strengths (e.g., minimal recall bias), our data were only collected over the course of one workweek. The work environment (e.g., co-workers, demands, stress) may vary week-to-week and subsequently influence perceptions of the environment and resources. We only required participants to complete a week of daily diaries in which they would be using their flexible work arrangement. We did not specify to select a week that they would consider 'normal' at their work. Thus, we may not have captured a week the employee considered a 'normal week' (e.g., if multiple co-workers were on vacation so they were tasked with more work). Therefore, future studies should collect daily diary data for multiple workweeks to get a more accurate picture of the employees' lives.

Advancing the Field

A few suggestions for future research were discussed in the previous section as ways to address the limitations of our study. However, we suggest that family studies, occupational, and health behavior researchers also incorporate or consider the following in future studies to advance the field and improve the well-being of employees: broadening the sample and outcomes, using more complex measures and designs, and evaluation of programs.

Broadening the sample. Future research should not limit samples to universities. Other occupations outside the university should be examined as these occupations may also have sedentary type of work but have their own unique work environment and flexible work arrangements that may influence physical activity. In other words, we know that environmental factors influence behavior but not all occupational environments are the same, so it is important to understand the relationship between personal and environmental factors on physical activity in other occupations and occupational settings.

Scholars should also consider the physical environment surrounding the worksite, more specifically to sample employees in worksites that located in urban, suburban and rural areas, when examining flexible work arrangements in relation to physical activity. It is well documented in research that place of residence influences health outcomes and health behaviors, such as physical activity (Bennett, Olatosi, & Probst, 2008; Parks, Housemann, & Brownson, 2003). However, we currently do not know how flexible work arrangements in these different locations may impact the relationship between the person and health behaviors. This research will also help us understand the prevalence and use of flexible work arrangements in these different physical locations. It is possible that employees working in certain geographic locations, such as rural locations, may telework more often because of the distance needed to

travel to work or that urban areas use flextime in order to avoid the morning and evening commute on public transportation. Examining employees in different geographic locations will provide us with more descriptive information about how flexible work arrangements are used in different areas.

Studies should also focus on cohort effects with regard to health behaviors as more individuals start to use flexible work arrangements. More specifically, as flexible work arrangements become adopted and widespread, research should examine how this length of time using a flexible work arrangement influences health behaviors. This research would examine if there is an immediate benefit to using a flexible work arrangement or if it takes a few months or years to receive the benefits for example. In other words, from a COR framework, are the resources associated with flexible work arrangements immediate or does it take time for these resources to accrue? Studying cohorts of individuals using flexible work arrangements is also important as technology continues to change and become more advanced (Holland & Bardoel, 2016), as one specific type of flexible work arrangement, telework, is dependent on technology.

Lastly, it would benefit the field to consider gathering data from a group of employees with no flexible work arrangements in addition to the group with flexible work arrangements. This comparison group would add to the understanding of how flexible work arrangements are related to physical activity, amongst other outcomes. For example, in our study we compared levels of physical activity on flextime days, telework days, and non-flexible workdays in a sample that has a flexible work arrangement. It would be beneficial to examine levels of physical activity for employees at the same worksite that do not have flexible work arrangements to help better understand overall levels of physical activity at the worksite.

Exploring other outcomes. Scholars also need to consider how flexible work arrangements influence other health behaviors beyond physical activity. There are many health behaviors that are related to health outcomes, such as sleep, fruit and vegetable consumption, smoking, and alcohol use (Kvaavik, Batty, Ursin, Huxley, & Gale, 2010). These behaviors explored in a daily diary design will add knowledge about the benefits of flexible work schedules. In addition, scholars should examine the co-variation between health behaviors (Segerstrom & O'Connor, 2012). For example, as previously mentioned, Nägel and Sonnentag (2013) found that the co-occurrence of exercise and sleep behaviors together predicted personal resources. This avenue needs to be explored in more detail via sophisticated methodological designs, such as daily diaries, to better understand how to maximize and protect an individual's resources.

Scholars in the field should also consider examining emotions (e.g., negative affect) and stress as an outcome on flexible and non-flexible workdays, specifically in relation to resource loss or gain. Spillover is the process in which emotions and stress in one domain of an individual's life carry over in to another domain (Piotrkowski, 1979). Work-to-family spillover is the process in which experiences or emotions (i.e., positive, negative) at work are brought home by the employee (Piotrkowski, 1979).The effects from work-family spillover at the individual level include, but are not limited to, emotional burnout, more frequent symptoms of distress (Keene & Reynolds, 2006), poorer health outcomes (Song, Mailick, & Greenberg, 2014), lower levels of job satisfaction (Keene & Reynolds, 2006) and life satisfaction (Wofram & Gratton, 2014). If individuals do not have to resources to be resilient against negative emotions or stress at work, they may subsequently bring these negative experiences home. Therefore, spillover is important to consider to improve the well-being of employees. Ann Crouter (1994) stated that

many studies in the work-family literature only study one side of the work-family equation, that is, they only examine the work side or only examine the family side. The study of emotions and stress through spillover (e.g., negative and positive emotions at work carried into home and vice-versa) is one way to try to examine both sides of the equation.

Measures. Based on findings about barriers to physical activity in our study, in addition to expanding on the set of outcome variables and theory-related measures, the following types of information should also be considered in future studies to provide a more comprehensive understanding of work experiences, to design interventions for worker's well-being with the largest chance of success, and to enhance reliability in study results.

Studies should consider off job time-use, specifically what activities individuals are engaging in during the day (e.g., housework, running errands) outside of work. By doing so, results will provide a clearer picture of how the individuals spend their time. For example, in our study, lack of time was a large barrier to physical activity. It could possibly be that individuals prioritize certain activities, such as housework or social activities, to maintain or protect their time, so it is important to gain a deeper understanding of those resources. In addition, examining off-job time use will also assist in providing a more comprehensive understanding of how work experiences influence well-being outside of work, as studies suggest that psychological detachment from work through leisure activities (e.g., physical, social) increases daily well-being (e.g., vigor), as well as assist in helping employees stay engaged at work (e.g., ten Brummelhuis & Bakker, 2012; Oerlemans & Bakker, 2014). However, other high-duty activities, such as household tasks of working off the clock, can diminish psychological detachment and subsequently decrease daily well-being (ten Brummelhuis & Bakker, 2012). Overall, this

research would provide us with a better understanding of the allocation of resources (e.g., time) outside of work and subsequent impact on well-being.

In addition, because control over work schedules and workplace interventions are promoted to reduce stress of workers, we also suggest that physiological measures of stress, such as cortisol, be collected. Cortisol is a steroid hormone that is released in response to events, such as acute stress and can be used to measure stress (Esposito & Bianchi, 2012). For example, we can study daily trajectories of cortisol (i.e., diurnal cortisol rhythms) over the course of the work week and examine if these trajectories differ on flexible and non-flexible workdays. By measuring cortisol levels and in line with COR, we can measure stress produced by resource loss. Over the course of time, as an individual experiences an accumulation of stressors and the body releases too much cortisol, this surplus can have negative health consequences because levels of cortisol are flattened (Phillips, Ginty, & Hughes, 2013). Flattened cortisol levels are particularly important for individuals experiencing burnout, as they are in a prolonged state of chronic stress, and their body may no longer be as efficient to adapt to physical and psychosocial changes in their environments (Burke, Davis, Otte, & Mohr, 2005). As previously mentioned, flextime may be valuable resource for physical activity for individuals experiencing high levels of burnout; thus, an avenue of research worth exploring is cortisol levels of highly burned out individuals on flextime and non-flexible workdays. Findings from this research could assist in intervening for this population at risk for ill-health.

Lastly, before we can draw any conclusions from multilevel analyses, we need to ensure the measures we used are accurately reflecting the construct that we intended to measure. As daily diary designs become more prevalent in research, measures are adapted or developed for daily measurement. The psychometric properties of these scales need to be tested, which can be

done through a MCFA (Muthén, 1994), a statistical procedure, previously mentioned in Chapter 3, used to evaluate the factor structure of a construct. Results of the MCFA will determine if the items in the scale are reflective of the construct at both the between- and within-person level.

Design. Daily diary designs investigating flexible work arrangements and health behaviors should consider collecting data at multiple time points throughout the day, specifically in the morning before work, in the afternoon, after work, and right before bed. Collecting data at multiple time points would reduce participant recall and would also allow researchers to better understand the processes underlying the gain or depletion of resources within the day. For example, we would be able to examine if barriers accumulate throughout the day or if certain barriers occur only at certain points of the day (e.g., afternoon but not after work). For example, an employee may not report feeling too tired as a barrier to physical activity in the morning or early afternoon, but after a long day of investing their resources in work (e.g., time, effort) they may report feeling too tired at the end of the day to be physically active. In other words, multiple data collection points throughout the day would allow for a better understanding of the intra-individual variation in resources (e.g., Demerouti, Bakker, Sonnentag, & Fullagar, 2012).

However, for this design with multiple times of data collection, cooperation from the worksite may also be necessary as the employees would be completing surveys during work hours. Scholars should consider collaborating with workplaces to overcome this potential barrier. An example of is the ROWE (Results-Only Work Environment) initiative in which Moen, Kelly, and Chermack (2009) collaborated with Best Buy. However, it is important to note that this type of design can be very burdensome to the participant and is subsequently subject to participant fatigue and habituation (e.g., participants respond with a particular response every time or more randomly over time) or participant attrition (Gunthert & Wenze, 2012).

In line with spillover and Ann Crouter's (1994) suggestion to incorporate both the work and family side, studies should consider more than just the employee but also their partner and/or child(ren). Dyadic data analysis is important because research suggests there can be a transmission of stress or strain from one individual to another, otherwise known as crossover (Bakker, Westman, & Hetty van Emmerik, 2009; Westman, Shadach, & Keinan, 2013). It is important to better understand how emotions and strain from the employee at work transfer over to their partner or children when they return home. Researchers should also investigate if this crossover effect if buffered by using a flexible work arrangement.

A mixed-methods approach to studying flexible work arrangements and health behaviors is also important to provide nuanced information. Qualitative research can supplement findings from daily dairies, such as capturing an individual's experience of using a flexible work arrangement or why certain resources are perceived as more valuable than others. Qualitative research allows for the voice of the participant's experience to be captured. As mentioned previously, we suggested exploring the group of individuals with no levels of burnout and high levels of physical activity. Interviews with these employees would help researchers understand the conditions that give rise to no burnout and high levels of physical activity. During these interviews, researchers would have the opportunity to explore meanings of behaviors, to address processes as a function of context (Ganong & Coleman, 2014), and to gather rich data on intersectionality (Crenshaw, 1993), all of which are limited in quantitative data collection.

Evaluation. As the research in this field of flexible work arrangements and health behaviors develops, it is the hope that workplace wellness programs are developed and implemented at the worksite. With any program, program evaluation is critical to make any desired changes during the program if needed and to evaluate the effectiveness and impact of the

program on the population (Smith, 2010). We suggest developing an evaluation plan that contains a logic model (i.e. inputs, outputs, outcomes) and includes evaluation questions, methods to collect and analyze data, evaluation expenses, and an evaluation timeline. Outcomes for programs should focus not only at the individual-level (i.e. employee) but also employer and organizational level outcomes. We suggest collecting data throughout the program to measure any change. We also suggest conducting focus group interviews with participants in the programs to examine successes, challenges, and feedback of the program (Ryan et al., 2019). Key informant interviews with wellness champions and wellness program staff should also be conducted to gather information on recommendations for improvement, challenges, and involvement (Ryan et al., 2019). Lastly, for financial reasons, cost-effectiveness analysis can be conducted to compare the costs to the outcomes of the programs (Grembowski, 2001). Program evaluation is a key factor in program sustainability; thus, as more research occurs overtime in the flexible work arrangement population and subsequent worksite wellness programs are generated, program evaluation is imperative (Ryan et al., 2019; Smith, 2010).

Conclusion

Our study provides useful information for organizations, researchers, health professionals, and policymakers. We extended the flexible work arrangement research by incorporating daily measurement of flexible work arrangements, examining physical activity as the outcome. Findings suggest that telework and flextime offer resources to employees in different ways, specifically telework days allow for more resources to be invested in physical activity, while flextime days allows individuals experiencing high levels of burnout to invest more resources into physical activity. However, flextime was not beneficial for physical activity for all university staff. Our research can be used to improve worksite wellness programs, inform

organizations and policymakers about flexible work arrangements, and improve the well-being of university staff using flexible work arrangements.

References

Acock, A. (2006). A gentle introduction to Stata. College Stations, TX: StataCorp

Adekola, B. (2010). Gender differences in the experience of work burnout among university staff. *African Journal of Business Management*, *4*(6), 886-889.

Ahola, K., Pulkki-Råback, L., Kouvonen, A., Rossi, H., Aromaa, A., & Lönnqvist, J. (2012). Burnout and behavior-related health risk factors: results from the population-based Finnish health 2000 study. *Journal of Occupational and Environmental Medicine*, *54*(1), 17-22. doi:10.1097/JOM.0b013e31823ea9d9

Allen, T. D., & Armstrong, J. (2006). Further examination of the link between work-family conflict and physical health: The role of health-related behaviors. *American Behavioral Scientist*, *49*(9), 1204-1221. doi:10.1177/0002764206286386

Allen, T. D., Johnson, R. C., Kiburz, K. M., & Shockley, K. M. (2013). Work–family conflict and flexible work arrangements: Deconstructing flexibility. *Personnel psychology*, *66*(2), 345-376. doi:10.1111/peps.12012

Allen, T. D., & Shockley, K. (2009). Flexible work arrangements: Help or hype. In D. R. Crane & E. J. Hill (Eds.), *Handbook of families and work: Interdisciplinary perspectives*, (pp. 265-284). Lanham, MD: University Press of America.

Almeida, D. M. (2005). Resilience and vulnerability to daily stressors assessed via diary methods. *Current Directions in Psychological Science, 14*(2), 62-68. doi:10.1111/j.0963-7214.2005.00336

Almeida, D. M., Davis, K. D., Lee, S., Lawson, K. M., Walter, K. NA., & Moen, P. (2016). Supervisor support buffers daily psychological and physiological reactivity to work-to-

family conflict. *Journal of Marriage and Family*, *78*(1), 165-179. doi:10.1111/jomf.12252

Almeida, D. M., Neupert, S. D., Banks, S. R., & Serido, J. (2005). Do daily stress processes account for socioeconomic health disparities? *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *60*(2), S34-S39. doi:10.1093/geronb/60.Special_Issue_2.S34

Almeida, D. M., Wethington, E., & Kessler, R. C. (2002). The daily inventory of stressful events: An interview-based approach for measuring daily stressors. *Assessment*, *9*(1), 41-55. doi:10.1177/1073191102091006

Amaya, M., Battista, L., & Melnyk, B. (2018). The Ohio State University's strategic approach to improving total population health. *American Journal of Health Promotion, 32*(8), 1823-1826. doi:10.1177/0890117118804149e

Ammendolia, C., Côté, P., Cancelliere, C., Cassidy, J. D., Hartvigsen, J., Boyle, E., ... & Amick, B. (2016). Healthy and productive workers: using intervention mapping to design a workplace health promotion and wellness program to improve presenteeism. *BMC Public Health*, *16*(1), 1190-1207. doi:10.1186/s12889-016-3843-x

Amstad, F. T., Meier, L. L., Fasel, U., Elfering, A., & Semmer, N. K. (2011). A meta-analysis of work–family conflict and various outcomes with a special emphasis on cross-domain versus matching-domain relations. *Journal of Occupational Health Psychology*, *16*(2), 151-169. doi:10.1177/0890117118804149e

Anderson, E. S., Wojcik, J. R., Winett, R. A., & Williams, D. M. (2006). Social-cognitive determinants of physical activity: the influence of social support, self-efficacy, outcome

expectations, and self-regulation among participants in a church-based health promotion study. *Health Psychology*, *25*(4), 510-520. doi:10.1037/0278-6133.25.4.510

Anderson-Bill, E. S., Winett, R. A., & Wojcik, J. R. (2011). Social cognitive determinants of nutrition and physical activity among web-health users enrolling in an online intervention: The influence of social support, self-efficacy, outcomes expectations, and self-regulation. *Journal of Medical Internet Research*, *13*(1), e28. doi:10.2196/jmir.1551

Arvola, R., & Kristjuhan, Ü. (2015). Workload and health of older academic personnel using telework. *Agronomy Research*, *13*(3), 741-749.

Ashford, S., Edmunds, J., & French, D. P. (2010). What is the best way to change self-efficacy to promote lifestyle and recreational physical activity? A systematic review with meta-analysis. *British Journal of Health Psychology*, *15*(2), 265-288. doi:10.1348/135910709X461752

Awa, W. L., Plaumann, M., & Walter, U. (2010). Burnout prevention: A review of intervention programs. *Patient education and counseling*, *78*(2), 184-190. doi:10.1016/j.pec.2009.04.008

Ayotte, B. J., Margrett, J. A., & Hicks-Patrick, J. (2010). Physical activity in middle-aged and young-old adults: the roles of self-efficacy, barriers, outcome expectancies, self-regulatory behaviors and social support. *Journal of Health Psychology*, *15*(2), 173-185. doi:10.1177/1359105309342283

Baard, N., & Thomas, A. (2010). Teleworking in South Africa: Employee benefits and challenges. *SA Journal of Human Resource Management*, *8*(1), 1-10. doi:10.4102/sajhrm.v8i1.298

Baicker, K., Cutler, D., & Song, Z. (2010). Workplace wellness programs can generate savings. *Health Affairs*, *29*(2), 304-311. doi:10.1377/hlthaff.2009.0626

Bakker, A. B., & Costa, P. L. (2014). Chronic job burnout and daily functioning: A theoretical analysis. *Burnout Research*, *1*(3), 112-119. doi:10.1016/j.burn.2014.04.003

Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology*, *22*(3), 309-328. doi:10.1108/02683940710733115

Bakker, A. B., Westman, M., & Hetty van Emmerik, I. J. (2009). Advancements in crossover theory. *Journal of Managerial Psychology*, *24*(3), 206-219. doi:10.1108/02683940910939304

Ball, J. W., Bice, M. R., & Maljak, K. A. (2017). Exploring the relationship between self-determination theory, adults' barriers to exercise, and physical activity. *Health Educator*, *49*(1), 19-37.

Baltes, B. B., Briggs, T. E., Huff, J. W., Wright, J. A., & Neuman, G. A. (1999). Flexible and compressed workweek schedules: A meta-analysis of their effects on work-related criteria. *Journal of Applied Psychology*, *84*(4), 496-513. doi:10.1037/0021-9010.84.4.496

Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist, 37*, 122-147. doi:10.1037/0003-066X.37.2.122

Bandura, A. (1986). *Social foundations of thought and action*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist*, *44*(9), 1175-1184. doi:10.1037/0003-066X.44.9.1175

Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York, NY: W. H. Freeman and Company.

Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, *52*(1), 1-26. doi:10.1146/annurev.psych.52.1.1

Baranowski, T., Perry, C.L., & Parcel, G.S. (2002). How individuals, environments, and health behavior interact. In K. Glanz, B.K. Rimer, & F. M., Lewis (Eds.), *Health behavior and health education: Theory, research, and practice*. (pp.165-184). San Francisco, CA: Jossey-Bass.

Barney, C. E., & Elias, S. M. (2010). Flex-time as a moderator of the job stress-work motivation relationship: A three nation investigation. *Personnel Review*, *39*(4), 487-502. doi:10.1108/00483481011045434

Baxter, S., Sanderson, K., Venn, A. J., Blizzard, C. L., & Palmer, A. J. (2014). The relationship between return on investment and quality of study methodology in workplace health promotion programs. *American Journal of Health Promotion*, *28*(6), 347-363. doi:10.4278/ajhp.130731-LIT-395

Bauer, M. S., Damschroder, L., Hagedorn, H., Smith, J., & Kilbourne, A. M. (2015). An introduction to implementation science for the non-specialist. *BMC Psychology*, *3*(1), 32-43. doi:10.4278/ajhp.130731-LIT-395

Bauman, A. E., Reis, R. S., Sallis, J. F., Wells, J. C., Loos, R. J., Martin, B. W., & Lancet Physical Activity Series Working Group. (2012). Correlates of physical activity: why are some people physically active and others not? *The Lancet*, *380*(9838), 258-271. doi:10.1016/S0140-6736(12)60735-1

Bennett, G. G., McNeill, L. H., Wolin, K. Y., Duncan, D. T., Puleo, E., & Emmons, K. M. (2007). Safe to walk? Neighborhood safety and physical activity among public housing residents. *PLoS Medicine*, *4*(10), 1599-1606. doi:10.1371/journal.pmed.0040306

Bennett, K. J., Olatosi, B., & Probst, J. C. (2008). Health disparities: a rural-urban chartbook. *Health disparities: a rural-urban chartbook.* Retrieved from https://sc.edu/study/colleges_schools/public_health/research/research_centers/sc_rural_health_research_center/documents/73healthdisparitiesaruralurbanchartbook2008.pdf

Bianchi, S. M., & Milkie, M. A. (2010). Work and family research in the first decade of the 21st century. *Journal of Marriage and Family, 72,* 705-725. doi:10.1111/j.1741-3737.2010.00726.x

Biron, C., Brun, J. P., & Ivers, H. (2008). Extent and sources of occupational stress in university staff. *Work*, *30*(4), 511-522.

Black, A. C., Harel, O., & Matthews, G. (2012). Techniques for analyzing intensive longitudinal data with missing values. In H. T. Reis & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (2nd ed.). (pp. 339-356). New York, NY: Cambridge University Press.

Bolger, N., Davis, A., & Rafaeli, E. (2003). Diary methods: Capturing life as it is lived. *Annual Review of Psychology, 54*, 579-616. doi:10.1146/annurev.psych.54.101601.145030

Bolger, N., & Laurenceau, J. P. (2013). *Intensive longitudinal methods: An introduction to diary and experience sampling research.* New York, NY: Guilford Press

Booth, M. L., Bauman, A., Owen, N., & Gore, C. J. (1997). Physical activity preferences, preferred sources of assistance, and perceived barriers to increased activity among

physically inactive Australians. *Preventive Medicine, 26*(1), 131-137. doi:10.1186/s12877-017-0687-x

Bos, J. T., Donders, N. C., Bouwman-Brouwer, K. M., & Van der Gulden, J. W. (2009). Work characteristics and determinants of job satisfaction in four age groups: university employees' point of view. *International Archives of Occupational and Environmental Health*, *82*(10), 1249-1259. doi:10.1007/s00420-009-0451-4

Bray, J. W., Kelly, E. L., Hammer, L. B., Almeida D. M., Dearing, J. W., King, R. B., & Buxton, O. M. (2013). An integrative, multilevel, and transdisciplinary research approach to challenges of work, family, and health. RTI Press publication No. MR-0024-1302. Research Triangle Park, NC: RTI Press. Retrieved from http://www.rti.org/rtipress

Bretland, R. J., & Thorsteinsson, E. B. (2015). Reducing workplace burnout: The relative benefits of cardiovascular and resistance exercise. *PeerJ*, *3*, e891. doi:10.7717/peerj.891

Burke, H. M., Davis, M. C., Otte, C., & Mohr, D. C. (2005). Depression and cortisol responses to psychological stress: a meta-analysis. *Psychoneuroendocrinology*, *30*(9), 846-856. doi:10.1016/j.psyneuen.2005.02.010

Butler, C. E., Clark, B. R., Burlis, T. L., Castillo, J. C., & Racette, S. B. (2015). Physical activity for campus employees: a university worksite wellness program. *Journal of Physical Activity and Health*, *12*(4), 470-476.

Byron, K. (2005). A meta-analytic review of work–family conflict and its antecedents. *Journal of Vocational Behavior*, *67*(2), 169-198. doi:10.1016/j.jvb.2004.08.009

Cahalin, L. P., Myers, J., Kaminsky, L., Briggs, P., Forman, D. E., Patel, M. J., ... & Arena, R. (2014). Current trends in reducing cardiovascular risk factors in the United States: focus

on worksite health and wellness. *Progress in Cardiovascular Diseases*, *56*(5), 476-483. doi:10.1016/j.pcad.2013.10.002

Cancelliere, C., Cassidy, J. D., Ammendolia, C., & Côté, P. (2011). Are workplace health promotion programs effective at improving presenteeism in workers? A systematic review and best evidence synthesis of the literature. *BMC Public Health*, *11*(1), 395-405. doi:10.1186/1471-2458-11-395

Carlson, S. A., Adams, E. K., Yang, Z., & Fulton, J. E. (2018) Percentage of deaths associated with inadequate physical activity in the United States. *Preventing Chronic Disease*. E38. doi:10.5888/pcd18.170354.

Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public Health Reports*, *100*(2), 126-131.

Caudroit, J., Boiche, J., Stephan, Y., Le Scanff, C., & Trouilloud, D. (2011). Predictors of work/family interference and leisure-time physical activity among teachers: The role of passion towards work. *European Journal of Work and Organizational Psychology*, *20*(3), 326-344. doi:10.1080/13594320903507124

Centers for Disease Control and Prevention (2018a). *Physical activity: Why it matters.* Retrieved from https://www.cdc.gov/physicalactivity/about-physical-activity/why-it-matters.html

Centers for Disease Control and Prevention (2018b). *2008 Physical Activity Guidelines for Americans: Trends in Meeting the 2008 Physical Activity Guidelines, 2008 – 2017.* Retrieved from https://www.cdc.gov/physicalactivity/downloads/trends-in-the-prevalence-of-physical-activity-508.pdf

Cerin, E., Leslie, E., Sugiyama, T., & Owen, N. (2010). Perceived barriers to leisure-time physical activity in adults: an ecological perspective. *Journal of Physical Activity and Health*, *7*(4), 451-459. doi:10.1123/jpah.7.4.451

Chandola, T., Britton, A., Brunner, E., Hemingway, H., Malik, M., Kumari, M., ... & Marmot, M. (2008). Work stress and coronary heart disease: what are the mechanisms? *European Heart Journal*, *29*(5), 640-648. doi:10.1093/eurheartj/ehm584

Church, T. S., Thomas, D. M., Tudor-Locke, C., Katzmarzyk, P. T., Earnest, C. P., Rodarte, R. Q., ... & Bouchard, C. (2011). Trends over 5 decades in US occupation-related physical activity and their associations with obesity. *PloS one*, *6*(5), e19657. doi:10.1371/journal.pone.0019657

Connor, T. S., & Lehman, B. J. (2012). Getting started: Launching a study in daily life. In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds.), *APA handbook of research methods in psychology, vol 1: Foundations, planning, measures, and psychometrics* (pp. 89-107). Washington, DC: American Psychological Association.

Cooper, K., & Barton, G. C. (2016). An exploration of physical activity and wellbeing in university employees. *Perspectives in Public Health*, *136*(3), 152-160. doi:10.1177/1757913915593103

Cramp, A. G., & Bray, S. R. (2011). Understanding exercise self-efficacy and barriers to leisure-time physical activity among postnatal women. *Maternal and Child Health Journal*, *15*(5), 642-651. doi:10.1007/s10995-010-0617-4

Crenshaw, K. (1993). Demarginalizing the interaction of race and sex: A Black feminist critique of antidiscrimination doctrine, feminist theory, and anti-racist politics. In D. Weisberg,

(Ed.), *Feminist legal theory: Foundations* (pp. 383-411). Philadelphia, PA: Temple University Press.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16, 297-334. doi:10.1006/jvbe.1999.1713

Crouter, A. C. (1994). Processes linking families and work: Implications for behaviors and development in both settings. In R. D. Parke & S. G. Kellam (Eds.), *Exploring family relationship with other social contexts* (pp. 9-28). Hillsdale, NJ: Lawrence Erlbaum Associates.

Davis, A. J. (1996). Employee assistance provision in higher education. *Employee Councelling Today*, *8*(5), 4-12. doi:10.1108/13665629610127735

Daniali, S. S., Darani, F. M., Eslami, A. A., & Mazaheri, M. (2017). Relationship between self-efficacy and physical activity, medication adherence in chronic disease patients. *Advanced Biomedical Research*, *6*, 63. doi:10.4103/2277-9175.190997

Demerouti, E., Bakker, A. B., Sonnentag, S., & Fullagar, C. J. (2012). Work-related flow and energy at work and at home: A study on the role of daily recovery. *Journal of Organizational Behavior*, *33*(2), 276-295. doi:10.1002/job.76

Demerouti, E., Le Blanc, P. M., Bakker, A. B., Schaufeli, W. B., & Hox, J. (2009). Present but sick: A three-wave study on job demands, presenteeism and burnout. *Career Development International*, *14*(1), 50-68. doi:10.1108/13620430910933574

Demerouti, E., Mostert, K., & Bakker, A. B. (2010). Burnout and work engagement: a thorough investigation of the independency of both constructs. *Journal of Occupational Health Psychology*, *15*(3), 209-222. doi:10.1037/a0019408

Department of Human Services Oregon Public Health Division, Healthy Worksites Initiative (n.d.). *Healthy worksites supporting healthy choices: Flex time/physical activity policies.* Retrieved from https://www.oregon.gov/oha/PH/PREVENTIONWELLNESS/HEALTHYCOMMUNITIES/HEALTHYWORKSITES/Documents/flextimeexample.pdf

Derks, D., van Mierlo, H., & Schmitz, E. B. (2014). A diary study on work-related smartphone use, psychological detachment and exhaustion: Examining the role of the perceived segmentation norm. *Journal of Occupational Health Psychology*, *19*(1), 74-84. doi:10.1037/a0035076

DeSalvo, K. B., Fisher, W. P., Tran, K., Bloser, N., Merrill, W., & Peabody, J. (2006). Assessing measurement properties of two single-item general health measures. *Quality of Life Research*, *15*(2), 191-201.

Dinç, Z. F. (2017). An investigation of the factors hindering adults' participation in physical activity. *Journal of Education and Training Studies, 5*(5), 64-71. doi:10.11114/jets.v5i13.2907

Ding, D., & Gebel, K. (2012). Built environment, physical activity, and obesity: What have we learned from reviewing the literature? *Health and Place, 18*, 100-105. doi:10.1016/j.healthplace.2011.08.021

Dunstan, D. W., Howard, B., Healy, G. N., & Owen, N. (2012). Too much sitting–a health hazard. *Diabetes Research and Clinical Practice*, *97*(3), 368-376. doi:10.1016/j.diabres.2012.05.020

Eccles, M. P, & Mittman, B. S. (2006). Welcome to implementation science. *Implementation Science*, *1,* 1-3, doi:10.1186/1748-5908-1-1.

Eerde, W. V. (2003). Procrastination at work and time management training. *The Journal of Psychology*, *137*(5), 421-434. doi:10.1080/00223980309600625

Eichinger, M., Titze, S., Haditsch, B., Dorner, T. E., & Stronegger, W. J. (2015). How are physical activity behaviors and cardiovascular risk factors associated with characteristics of the built and social residential environment? *PLoS One*, *10*(6), e0126010. doi:10.1371/journal.pone.0126010

Enders, C. K., & Tofighi, D. (2007). Centering predictor variables in cross-sectional multilevel models: A new look at an old issue. *Psychological Methods, 12*(2), 121-138. doi:10.1037/1082-989X.12.2.121

Esposito, A., & Bianchi, V. (2012). *Cortisol: Physiology, regulation and health implications*. New York, NY: Nova Science Publishers.

Eyler, A. A., Budd, E., Camberos, G. J., Yan, Y., & Brownson, R. C. (2016). State legislation related to increasing physical activity: 2006–2012. *Journal of Physical Activity and Health*, *13*(2), 207-213. doi:10.1123/jpah.2015-0010

Florindo, A. A., Mielke, G. I., de Oliveira Gomes, G. A., Ramos, L. R., Bracco, M. M., Parra, D. C., ... & Hallal, P. C. (2013). Physical activity counseling in primary health care in Brazil: a national study on prevalence and associated factors. *BMC Public Health*, *13*(1), 794. doi:10.1186/1471-2458-13-794

Fountaine, C. J., Piacentini, M., & Liguori, G. A. (2014). Occupational sitting and physical activity among university employees. *International Journal of Exercise Science*, *7*(4), 295-301.

Fransson, E. I., Nyberg, S. T., Heikkilä, K., Alfredsson, L., Bacquer, D. D., Batty, G. D., ... & Kittel, F. (2012). Comparison of alternative versions of the job demand-control scales in

17 European cohort studies: The IPD-Work consortium. *BMC Public Health*, *12*(1), 62-70. doi:10.1186/1471-2458-12-62

Fuemmeler, B. F., Anderson, C. B., & Mâsse, L. C. (2011). Parent-child relationship of directly measured physical activity. *International Journal of Behavioral Nutrition and Physical Activity*, *8*(1), 17-25. doi:10.1186/1479-5868-8-17

Gajendran, R. S., & Harrison, D. A. (2007). The good, the bad, and the unknown about telecommuting: Meta-analysis of psychological mediators and individual consequences. *Journal of Applied Psychology*, *92*(6), 1524-1541. doi:10.1037/0021-9010.92.6.1524

Ganong, L., & Coleman, M. (2014). Qualitative research on family relationships. *Journal of Social and Personal Relationships, 3,* 451-459. doi:10.1177/0265407514520828

Ganster, D. C., & Rosen, C. C. (2013). Work stress and employee health: A multidisciplinary review. *Journal of Management*, *39*(5), 1085-1122. doi:10.1177/0149206313475815

Gassman-Pines, A., & Goldstein, R. (2017). Work-family policies. In E. Votruba-Drzal, & E. Dearing (Eds.), *The Wiley handbook of early childhood development program, practices, and policies* (pp. 469-486). West Sussex, UK: Wiley & Sons.

Gerber, M., Jonsdottir, I. H., Lindwall, M., & Ahlborg Jr, G. (2014). Physical activity in employees with differing occupational stress and mental health profiles: A latent profile analysis. *Psychology of Sport and Exercise*, *15*(6), 649-658. doi:10.1016/j.psychsport.2014.07.012

Giles-Corti, B., & Donovan, R. J. (2002). The relative influence of individual, social and physical environment determinants of physical activity. *Social Science and Medicine*, *54*(12), 1793-1812. doi:10.1016/S0277-9536(01)00150-2

Gist, M. E., & Mitchell, T. R. (1992). Self-efficacy: A theoretical analysis of its determinants and malleability. *Academy of Management review*, *17*(2), 183-211. doi:10.5465/amr.1992.4279530

Glanz, K., & Bishop, D. B. (2010). The role of behavioral science theory in development and implementation of public health interventions. *Annual Review of Public Health*, *31*, 399-418. doi:10.1146/annurev.publhealth.012809.103604

Godin, G., & Shephard, R. J. (1985). A simple method to assess exercise behavior in the community. *Canadian Journal of Applied Sport Sciences*, *10*(3), 141-146. doi:10.12691/jpar-2-2-6

Goetzel, R. Z., Henke, R. M., Tabrizi, M., Pelletier, K. R., Loeppke, R., Ballard, D. W., ... & Serxner, S. (2014). Do workplace health promotion (wellness) programs work? *Journal of Occupational and Environmental Medicine*, *56*(9), 927-934. doi:10.1097/JOM.0000000000000276

Goodman, W. B., Crouter, A. C., & Family Life Project Key Investigators. (2009). Longitudinal associations between maternal work stress, negative work-family spillover, and depressive symptoms. *Family Relations*, *58*(3), 245-258. doi:10.1111/j.1741-3729.2009.00550.x

Gordon-Larsen, P., Nelson, M. C., Page, P., & Popkin, B. M. (2006). Inequality in the built environment underlies key health disparities in physical activity and obesity. *Pediatrics*, *117*(2), 417-424. doi:10.1542/peds.2005-0058

Granger, C. L., McDonald, C. F., Parry, S. M., Oliveira, C. C., & Denehy, L. (2013). Functional capacity, physical activity and muscle strength assessment of individuals with non-small

cell lung cancer: a systematic review of instruments and their measurement properties. *BMC Cancer*, *13*(1), 135. doi:10.1186/1471-2407-13-135

Greenhaus, J. H., Allen, T. D., & Spector, P. E. (2006). Health consequences of work–family conflict: The dark side of the work–family interface. In P. L. Perrewé & D. C. Canster (Eds.), *Employee health, coping and methodologies* (pp. 61-98). Bingley, UK: Emerald Group Publishing Limited.

Greenhaus, J. H., & Beutell, N. J. (1985). Sources of conflict between work and family roles. *Academy of Management Review*, *10*(1), 76-88. doi:10.5465/amr.1985.4277352

Grembowski, D. (2001). *In the practice of health program evaluation.* Thousand Oaks, CA: Sage Publications

Grzywacz, J. G., Casey, P. R., & Jones, F. A. (2007). The effects of workplace flexibility on health behaviors: A cross-sectional and longitudinal analysis. *Journal of Occupational and Environmental Medicine*, *49*(12), 1302-1309. doi:10.1097/JOM.0b013e31815ae9bc

Grzywacz, J. G., & Marks, N. F. (2001). Social inequalities and exercise during adulthood: toward an ecological perspective. *Journal of Health and Social Behavior*, 202-220. doi:10.2307/3090178

Gunthert, K. C., & Wenze, S. J. (2012). Daily diary methods. In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds.), *APA handbook of research methods in psychology, vol 1: Foundations, planning, measures, and psychometrics* (pp. 144-159). Washington, DC: American Psychological Association.

H.R. 857. (2018). General Assembly Regular Session (P.A. 2018).

Halbesleben, J. R., Neveu, J. P., Paustian-Underdahl, S. C., & Westman, M. (2014). Getting to the "COR" understanding the role of resources in conservation of resources theory. *Journal of Management*, *40*(5), 1334-1364.

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis. A regression-based approach.* New York, NY: The Guildford Press

Henke, R. M., Benevent, R., Schulte, P., Rinehart, C., Crighton, K. A., & Corcoran, M. (2016). The effects of telecommuting intensity on employee health. *American Journal of Health Promotion*, *30*(8), 604-612. doi:10.4278/ajhp.141027-QUAN-544

Hilbe, J. M. (2011). *Negative binomial regression*. Cambridge, MA: University Press.

Hoare, E., Stavreski, B., Jennings, G. L., & Kingwell, B. A. (2017). Exploring motivation and barriers to physical activity among active and inactive Australian adults. *Sports*, *5*(3), 47-55. doi:10.3390/sports5030047

Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist*, *44*, 513-524. doi:10.1037/0003-066X.44.3.513

Hobfoll, S. E. (2001). The influence of culture, community, and the nested-self in the stress process: advancing conservation of resources theory. *Applied Psychology*, *50*, 337-421. doi:10.1111/1464-0597.00062

Hobfoll, S. E. (2011). Conservation of resource caravans and engaged settings. *Journal of Occupational and Organizational Psychology*, *84*(1), 116-122. doi:10.1111/j.2044-8325.2010.02016.x

Hobfoll, S. E., & Lilly, R. S. (1993). Resource conservation as a strategy for community psychology. *Journal of Community Psychology*, *21*(2), 128-148. doi:10.1002/1520-6629(199304)21:2<128::AID-JCOP2290210206>3.0.CO;2-5

Holland, P., & Bardoel, A. (2016). The impact of technology on work in the twenty-first century: Exploring the smart and dark side. *The International Journal of Human Resource Management, 27*(21), 2579-258. doi:10.1080/09585192.2016.1238126

Horton, S. (2006). High aspirations: differences in employee satisfaction between university faculty and staff. *Applied Research in Quality of Life*, *1*(3-4), 315-322.

Hox, J. J. (2010). *Multilevel analysis: Techniques and applications* (2nd ed.). New York, NY: Routledge.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1-55.

Iida, M., Shrout, P. E., Laurenceau, J., & Bolger, N. (2012). Using diary methods in psychological research. In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds.), *APA handbook of research methods in psychology, vol 1: Foundations, planning, measures, and psychometrics* (pp. 277-305). Washington, DC: American Psychological Association.

Ilies, R., Schwind, K. M., Wagner, D. T., Johnson, M. D., DeRue, D. S., & Ilgen, D. R. (2007). When can employees have a family life? The effects of daily workload and affect on work-family conflict and social behaviors at home. *Journal of Applied Psychology*, *92*(5), 1368-1379. doi:10.1037/0021-9010.92.5.1368

Jans, M. P., Proper, K. I., & Hildebrandt, V. H. (2007). Sedentary behavior in Dutch workers: differences between occupations and business sectors. *American Journal of Preventive Medicine*, *33*(6), 450-454. doi:10.1016/j.amepre.2007.07.033

Jones, F., O'connor, D. B., Conner, M., McMillan, B., & Ferguson, E. (2007). Impact of daily mood, work hours, and iso-strain variables on self-reported health behaviors. *Journal of Applied Psychology*, *92*(6), 1731-1740. doi:10.1037/0021-9010.92.6.1731

Jonsdottir, I. H., Rödjer, L., Hadzibajramovic, E., Börjesson, M., & Ahlborg Jr, G. (2010). A prospective study of leisure-time physical activity and mental health in Swedish health care workers and social insurance officers. *Preventive Medicine*, *51*(5), 373-377. doi:10.1016/j.ypmed.2010.07.019

Joseph, R. P., Ainsworth, B. E., Keller, C., & Dodgson, J. E. (2015). Barriers to physical activity among African American women: an integrative review of the literature. *Women and Health*, *55*(6), 679-699. doi:10.1080/03630242.2015.1039184

Juster, R. P., McEwen, B. S., & Lupien, S. J. (2010). Allostatic load biomarkers of chronic stress and impact on health and cognition. *Neuroscience and Biobehavioral Reviews*, *35*(1), 2-16. doi:10.1016/j.neubiorev.2009.10.002

Justine, M., Azizan, A., Hassan, V., Salleh, Z., & Manaf, H. (2013). Barriers to participation in physical activity and exercise among middle-aged and elderly individuals. *Singapore Medical Journal*, *54*(10), 581-586. doi:10.11622/smedj.2013203

Karasek, R. A. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative Science Quarterly*, 285-308. doi:10.2307/2392498

Karusisi, N., Bean, K., Oppert, J. M., Pannier, B., & Chaix, B. (2012). Multiple dimensions of residential environments, neighborhood experiences, and jogging behavior in the RECORD Study. *Preventive Medicine*, *55*(1), 50-55. doi:10.1016/j.ypmed.2012.04.018

Keene, J. R., & Reynolds, J. R. (2006). The job costs of family demands: Gender differences in negative family-to-work spillover. *Journal of Family Issues, 26,* 275-299. doi:10.1177/0192513X04270219

Keith, T. Z. (2015). *Multiple regression and beyond: An introduction to multiple regression and structural equation modeling* (2nd ed.). New York, NY: Routledge.

Kelly, E. L., & Kalev, A. (2006). Managing flexible work arrangements in US organizations: Formalized discretion or 'a right to ask'. *Socio-Economic Review*, *4*(3), 379-416. doi:10.1093/ser/mwl001

Kelly, B., & Perkins, D. F. (Eds.). (2012). *Handbook of implementation science for psychology in education*. New York, NY: Cambridge University Press.

Kim, S. D., Hollensbe, E. C., Schwoerer, C. E., & Halbesleben, J. R. (2015). Dynamics of a wellness program: A conservation of resources perspective. *Journal of Occupational Health Psychology*, *20*(1), 62-71. doi:10.1037/a0037675

King, R. B., Karuntzos, G., Casper, L. M., Moen, P., Davis, K., Berkman, L., … Kossek, E. (2013). Work-family balance issues and work-leave policies. In R. J. Gatchel & I. Z. Schultz (Eds.), *Handbook of occupational health and wellness* (pp. 323–340). New York, NY: Springer.

Kirillov, A. V., Tanatova, D. K., Vinichenko, M. V., & Makushkin, S. A. (2015). Theory and practice of time-management in education. *Asian Social Science*, *11*(19), 193-204. doi:10.5539/ass.v11n19p193

Kirk, M. A., & Rhodes, R. E. (2011). Occupation correlates of adults' participation in leisure-time physical activity: Systematic review. *American Journal of Preventive Medicine*, *40*(4), 476-485. doi:10.1016/j.amepre.2010.12.015

Kline, R. B. (2016). *Principles and practices of structural equation modeling* (4th ed.). New York, NY: Guilford Press.

Knittle, K. P., De Gucht, V., Hurkmans, E. J., Vlieland, T. P. V., Peeters, A. J., Ronday, H. K., & Maes, S. (2011). Effect of self-efficacy and physical activity goal achievement on arthritis pain and quality of life in patients with rheumatoid arthritis. *Arthritis Care and Research*, *63*(11), 1613-1619. doi:10.1002/acr.20587

Koeneman, M. A., Verheijden, M. W., Chinapaw, M. J., & Hopman-Rock, M. (2011). Determinants of physical activity and exercise in healthy older adults: a systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, *8*(1), 142-154. doi:10.1186/1479-5868-8-142

Kohl, H. W., Craig, C. L., Lambert, E. V., Inoue, S., Alkandari, J. R., Leetongin, G., ... & Lancet Physical Activity Series Working Group. (2012). The pandemic of physical inactivity: global action for public health. *The Lancet*, *380*(9838), 294-305. doi: 10.1016/ S0140-6736(12)60898-8

Kossek, E. E., Pichler, S., Bodner, T., & Hammer, L. B. (2011). Workplace social support and work–family conflict: A meta-analysis clarifying the influence of general and work–family-specific supervisor and organizational support. *Personnel Psychology*, *64*(2), 289-313. doi:10.1111/j.1744-6570.2011.01211.x

Kouvonen, A., Kivimäki, M., Väänänen, A., Heponiemi, T., Elovainio, M., Ala-Mursula, L., ... & Vahtera, J. (2007). Job strain and adverse health behaviors: the Finnish Public Sector Study. *Journal of Occupational and Environmental Medicine*, *49*(1), 68-74. doi:10.1097/JOM.0b013e31802db54a

Krebs, P. M. (2003). The faculty-staff divide. *The Chronicle of Higher Education.* Retrieved from https://www.chronicle.com/article/The-Faculty-Staff-Divide/4741

Kroll, T., Kratz, A., Kehn, M., Jensen, M. P., Groah, S., Ljungberg, I. H., ... & Bombardier, C. (2012). Perceived exercise self-efficacy as a predictor of exercise behavior in individuals aging with spinal cord injury. *American Journal of Physical Medicine and Rehabilitation*, *91*(8), 640-651. doi:10.1097/PHM.0b013e31825a12cd

Kvaavik, E., Batty, G. D., Ursin, G., Huxley, R., & Gale, C. R. (2010). Influence of individual and combined health behaviors on total and cause-specific mortality in men and women: The United Kingdom health and lifestyle survey. *Archives of Internal Medicine*, *170*(8), 711-718. doi:10.1001/archinternmed.2010.76

Kwak, L., Berrigan, D., Van Domelen, D., Sjöström, M., & Hagströmer, M. (2016). Examining differences in physical activity levels by employment status and/or job activity level: Gender-specific comparisons between the United States and Sweden. *Journal of Science and Medicine in Sport*, *19*(6), 482-487. doi:10.1016/j.jsams.2015.05.008

KY Rev Stat § 12.550 (2014).

Lapierre, L. M., Spector, P. E., Allen, T. D., Poelmans, S., Cooper, C. L., O'Driscoll, M. P., ... & Kinnunen, U. (2008). Family-supportive organization perceptions, multiple dimensions of work–family conflict, and employee satisfaction: A test of model across five samples. *Journal of Vocational Behavior*, *73*(1), 92-106. doi:10.1016/j.jvb.2008.02.001

Laurenceau, J., & Bolger, N. (2005). Using diary methods to study marital and family processes. *Journal of Family Psychology, 19*, 86-97. doi:10.1037/0893-3200.19.1.86

Leicht, A. S., Sealey, R. M., & Devine, S. (2013). Relationship between employment category and gender on quality of life, physical activity and their barriers and motivators, for full-

time university staff. *International Journal of Workplace Health Management*, *6*(3), 160-173. doi:10.1108/IJWHM-04-2012-0008

Leininger, L. J., Adams, K. J., & DeBeliso, M. (2015). Differences in health promotion program participation, barriers and physical activity among faculty, staff and administration at a university worksite. *International Journal of Workplace Health Management*, *8*(4), 246-255. doi:10.1108/IJWHM-10-2014-0045

Lindwall, M., Gerber, M., Jonsdottir, I. H., Börjesson, M., & Ahlborg Jr, G. (2014). The relationships of change in physical activity with change in depression, anxiety, and burnout: A longitudinal study of Swedish healthcare workers. *Health Psychology*, *33*(11), 1309-1318. doi:10.1037/a0034402

Little, R. J., & Rubin, D. B. (2002). *Statistical analysis with missing data* (2nd ed.), Hoboken, NJ: John Wiley & Sons.

Luszczynska, A., & Schwarzer, R. (2015). Predicting health behaviours In M. Conner & P. Norman (Eds.), *Social-cognitive theory* (3rd ed., pp. 225-251). Maidenhead, UK: McGraw Hill Open University Press

Maas, C. J. M., & Hox, J. J. (2005). Sufficient sample sizes for multilevel modeling. *Methodology, 1*(3), 86-92. doi:10.1027/1614-1881.1.3.86.

MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods*, *1*(2), 130-149. doi:10.1037/1082-989X.1.2.130

Maddux, J. E. (1995). Self-efficacy theory. In J. E. Maddux (Ed.), *Self-efficacy, adaptation, and adjustment* (pp. 3-33). Boston, MA: Springer,

Mailey, E. L., Huberty, J., Dinkel, D., & McAuley, E. (2014). Physical activity barriers and facilitators among working mothers and fathers. *BMC Public Health*, *14*(1), 657-665. doi:10.1111/ajpy.12103

Major, D. A., Virive, J. M., & Joice, W. (2008). Telework as a dependent care solution: Examining current practice to improve telework management strategies. *The Psychologist-Manager Journal, 11*, 65–91. doi:10.1080/10887150801967134

Marcus, B. H., & Owen, N. (1992). Motivational readiness, self-efficacy and decision-making for exercise. *Journal of Applied Social Psychology*, *22*(1), 3-16. doi: 10.1111/j.1559-1816.1992.tb01518.x

Marcus, B. H., Selby, V. C., Niaura, R. S., & Rossi, J. S. (1992). Self-efficacy and the stages of exercise behavior change. *Research Quarterly for Exercise and Sport*, *63*(1), 60-66. doi:10.1080/02701367.1992.10607557

Mark, G., & Smith, A. P. (2012). Effects of occupational stress, job characteristics, coping, and attributional style on the mental health and job satisfaction of university employees. *Anxiety, Stress and Coping*, *25*(1), 63-78. doi:10.1080/10615806.2010.548088

Martin, B., & MacDonnell, R. (2012). Is telework effective for organizations? A meta-analysis of empirical research on perceptions of telework and organizational outcomes. *Management Research Review*, *35*(7), 602-616. doi:10.1108/01409171211238820

Maslach, C., & Jackson, S. E. (1981). The measurement of experienced burnout. *Journal of Organizational Behavior*, *2*(2), 99-113. doi:10.1002/job.4030020205

Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2001). Job burnout. *Annual Review of Psychology*, *52*(1), 397-422. doi:10.1146/annurev.psych.52.1.397

Masuda, A. D., Poelmans, S. A., Allen, T. D., Spector, P. E., Lapierre, L. M., Cooper, C. L., ... & Lu, L. (2012). Flexible work arrangements availability and their relationship with work-to-family conflict, job satisfaction, and turnover intentions: A comparison of three country clusters. *Applied psychology*, *61*(1), 1-29. doi:10.1111/j.1464-0597.2011.00453.x

McAuley, E., & Blissmer, B. (2000). Self-efficacy determinants and consequences of physical activity. *Exercise Sport Science Review*, *28*(2), 85-88.

McNall, L. A., Nicklin, J. M., & Masuda, A. D. (2010). A meta-analytic review of the consequences associated with work–family enrichment. *Journal of Business and Psychology*, *25*(3), 381-396. doi:10.1007/s10869-009-9141-1

McNeill, L. H., Kreuter, M. W., & Subramanian, S. V. (2006). Social environment and physical activity: a review of concepts and evidence. *Social Science and Medicine*, *63*(4), 1011-1022. doi:10.1016/j.socscimed.2006.03.012

Mendoza-Vasconez, A. S., Marquez, B., Benitez, T. J., & Marcus, B. H. (2018). Psychometrics of the self-efficacy for physical activity scale among a Latina women sample. *BMC Public Health*, *18*(1), 1097. doi:10.1186/s12889-018-5998-0

Michel, J. S., Kotrba, L. M., Mitchelson, J. K., Clark, M. A., & Baltes, B. B. (2011). Antecedents of work–family conflict: A meta-analytic review. *Journal of Organizational Behavior*, *32*(5), 689-725. doi:10.1002/job.695

Mielenz, T. J., Edwards, M. C., & Callahan, L. F. (2011). Item-response-theory analysis of two scales for self-efficacy for exercise behavior in people with arthritis. *Journal of Aging and Physical Activity*, *19*(3), 239-248

Milkie, M. A., Mattingly, M. J., Nomaguchi, K. M., Bianchi, S. M., & Robinson, J. P. (2004). The time squeeze: Parental statuses and feelings about time with children. *Journal of Marriage and Family*, *66*(3), 739-761. doi:10.1111/j.0022-2445.2004.00050.x

Miller, D. J., Freedson, P. S., & Kline, G. M. (1994). Comparison of activity levels using the Caltrac accelerometer and five questionnaires. *Medicine and Science in Sports and Exercise, 26*(3), 376-382. doi:10.1249/00005768-199403000-00016

Miss. Code. Ann. § 41-97-9 (2010).

Moen, P., Kelly, E., & Chermack, K. (2009). Learning from a natural experiment: Studying a corporate work-time policy initiative. In *Work-life policies that make a real difference for individuals, families, and organizations* (pp. 97–131). Washington, DC: Urban Institute.

Moen, P., Kelly, E. L., Tranby, E., & Huang, Q. (2011). Changing work, changing health: can real work-time flexibility promote health behaviors and well-being? *Journal of Health and Social Behavior, 52*(4), 404-429. doi:10.1177/0022146511418979

Morganson, V. J., Major, D. A., Oborn, K. L., Verive, J. M., & Heelan, M. P. (2010). Comparing telework locations and traditional work arrangements: Differences in work-life balance support, job satisfaction, and inclusion. *Journal of Managerial Psychology*, *25*(6), 578-595. doi:10.1108/02683941011056941

Motl, R. W., McAuley, E., & DiStefano, C. (2005). Is social desirability associated with self-reported physical activity? *Preventive Medicine, 40*(6), 735-739. doi:10.1016/j.ypmed.2004.09.016

Moustou, I., Panagopoulou, E., Montgomery, A. J., & Benos, A. (2010). Burnout predicts health behaviors in ambulance workers. *The Open Occupational Health and Safety Journal*, *2*(1), 16-18. doi:10.2174/1876216601002010016]

Mullahy, J., & Robert, S. A. (2008). *No time to lose? Time constraints and physical activity* (No. w14513). National Bureau of Economic Research.

Muthén, B. O. (1994). Multilevel covariance structure analysis. *Sociological Methods and Research*, *22*(3), 376-398. doi:10.1177/0049124194022003006

Nägel, I. J., & Sonnentag, S. (2013). Exercise and sleep predict personal resources in employees' daily lives. *Applied Psychology: Health and Well-Being*, *5*(3), 348-368. doi:10.1111/aphw.12014

Nägel, I. J., Sonnentag, S., & Kühnel, J. (2015). Motives matter: A diary study on the relationship between job stressors and exercise after work. *International Journal of Stress Management, 22*, 346-371. doi:10.1037/a0039115

National Physical Activity Plan Alliance (2016). *National Physical Activity Plan.* Retrieved from http://physicalactivityplan.org/NationalPhysicalActivityPlan.pdf.

Netemeyer, R. G., Boles, J. S., & McMurrian, R. (1996). Development and validation of work-family conflict and family-work conflict scales. *Journal of Applied Psychology, 81*(4), 400–410. doi:10.1037/0021-9010.81.4.400

Ng, S. W., & Popkin, B. M. (2012). Time use and physical activity: a shift away from movement across the globe. *Obesity Reviews*, *13*(8), 659-680. doi:10.1111/j.1467-789X.2011.00982.x

Nomaguchi, K. M., & Bianchi, S. M. (2004). Exercise time: Gender differences in the effects of marriage, parenthood, and employment. *Journal of Marriage and Family*, *66*(2), 413-430. doi:10.1111/j.1741-3737.2004.00029.x

O'connor, D. B., Conner, M., Jones, F., McMillan, B., & Ferguson, E. (2009). Exploring the benefits of conscientiousness: An investigation of the role of daily stressors and health

behaviors. *Annals of Behavioral Medicine*, *37*(2), 184-196. doi:10.1007/s12160-009-9087-6

Odle-Dusseau, H. N., Britt, T. W., & Greene-Shortridge, T. M. (2012). Organizational work-family resources as predictors of job performance and attitudes: The process of work-family conflict and enrichment. *Journal of Occupational Health Psychology, 17*, 28-40. doi:10.1037/a0026428

Oerlemans, W. G., & Bakker, A. B. (2014). Burnout and daily recovery: A day reconstruction study. *Journal of Occupational Health Psychology*, *19*(3), 303-314. doi:10.1037/a0036904

Office of Disease Prevention and Health Promotion, US Department of Health and Human Services. *Healthy People 2020: Topics & Objectives—Physical Activity.* Retrieved from https://www.healthypeople.gov/2020/topics-objectives/topic/physical-activity

Ohly, S., Sonnentag, S., Niessen, C., & Zapf, D. (2010). Diary studies in organizational research. *Journal of Personnel Psychology, 9*(2), 79-93. doi:10.1027/1866-5888/a000009

Olson, S. M., Odo, N. U., Duran, A. M., Pereira, A. G., & Mandel, J. H. (2014). Burnout and physical activity in Minnesota internal medicine resident physicians. *Journal of Graduate Medical Education*, *6*(4), 669-674. doi:10.4300/JGME-D-13-00396

Oregon Health Authority Public Health Division (2007). *Healthy worksites, health promotion and chronic disease prevention: Physical activity at work.* Retrieved from https://www.oregon.gov/oha/PH/PREVENTIONWELLNESS/HEALTHYCOMMUNITIES/HEALTHYWORKSITES/Pages/physactwk.aspx

Ouweneel, E., Le Blanc, P. M., & Schaufeli, W. B. (2013). Do-it-yourself: An online positive psychology intervention to promote positive emotions, self-efficacy, and engagement at

work. *Career Development International*, *18*(2), 173-195. doi:10.1108/CDI-10-2012-0102

Oyeyemi, A. L., Adegoke, B. O., Sallis, J. F., Oyeyemi, A. Y., & De Bourdeaudhuij, I. (2012). Perceived crime and traffic safety is related to physical activity among adults in Nigeria. *BMC Public Health*, *12*(1), 294-304. doi:10.1186/1471-2458-12-294

Pan, S. Y., Cameron, C., DesMeules, M., Morrison, H., Craig, C. L., & Jiang, X. (2009). Individual, social, environmental, and physical environmental correlates with physical activity among Canadians: A cross-sectional study. *BMC Public Health*, *9*(1), 21-33. doi:10.1186/1471-2458-9-21

Parks, S. E., Housemann, R. A., & Brownson, R. C. (2003). Differential correlates of physical activity in urban and rural adults of various socioeconomic backgrounds in the United States. *Journal of Epidemiology and Community Health*, *57*(1), 29-35. doi:10.1136/jech.57.1.29

Phillips, A. C., Ginty, A. T., & Hughes, B. M. (2013). The other side of the coin: Blunted cardiovascular and cortisol reactivity are associated with negative health outcomes. *International Journal of Psychophysiology*, *90*(1), 1-7. doi:10.1016/j.ijpsycho.2013.02.002

Piotrkowski, C. S. (1979). *Work and the family system*. New York, NY: Collier Macmillan.

Quick, J. C. E., & Tetrick, L. E. (2011). *Handbook of occupational health psychology*. Washington, DC: American Psychological Association.

Rabe-Hesketh, S., & Skrondal, A. (2008). *Multilevel and longitudinal modeling using Stata* (2nd ed.), College Station, TX: Stata Press.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods.* Thousand Oaks, CA: Sage Publications.

Reis, H. T. (2012). Why researcher should think "real-world": A conceptual rationale. In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds.), *APA handbook of research methods in psychology, vol 1: Foundations, planning, measures, and psychometrics* (pp. 3-21). Washington, DC: American Psychological Association.

Reis, H. T., & Gable, S. L. (2000). Event-sampling and other methods for studying everyday experience. In H. T. Reis & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 190– 222). New York, NY: Cambridge University Press.

Rhodes, R. E., Naylor, P. J., & McKay, H. A. (2010). Pilot study of a family physical activity planning intervention among parents and their children. *Journal of Behavioral Medicine*, *33*(2), 91-100. doi:10.1007/s10865-009-9237-0

Ross, A. M., & Melzer, T. (2016). Beliefs as barriers to healthy eating and physical activity. *Australian Journal of Psychology*, *68*(4), 251-260. doi:10.1111/ajpy.12103.

Rotem, M., Epstein, L., & Ehrenfeld, M. (2009). Does the conservation of resources motivate middle-aged women to perform physical activity? *Western Journal of Nursing Research*, *31*(8), 999-1013. doi:10.1177/0193945909340909

Rothmann, S., & Essenko, N. (2007). Job characteristics, optimism, burnout, and ill health of support staff in a higher education institution in South Africa. *South African Journal of Psychology*, *37*(1), 135-152. doi:10.1177/008124630703700110

Russell, H., O'Connell, P. J., & McGinnity, F. (2009). The impact of flexible working arrangements on work–life conflict and work pressure in Ireland. *Gender, Work and Organization*, *16*(1), 73-97.

Ryan, M., Erck, L., McGovern, L., McCabe, K., Myers, K., Nobrega, S., ... & Punnett, L. (2019). "Working on Wellness:" protocol for a worksite health promotion capacity-building program for employers. *BMC Public Health*, *19*(1), 111-121. doi:10.1002/hrm.20213

Ryan, A. M., & Kossek, E. E. (2008). Work-life policy implementation: Breaking down or creating barriers to inclusiveness? *Human Resource Management: Published in Cooperation with the School of Business Administration, The University of Michigan and in alliance with the Society of Human Resources Management*, *47*(2), 295-310. doi:10.1002/hrm.20213

Sallis, J. F., & Glanz, K. (2009). Physical activity and food environments: solutions to the obesity epidemic. *The Milbank Quarterly*, *87*(1), 123-154. doi:10.1111/j.1468-0009.2009.00550.x

Salmon, J., Owen, N., Crawford, D., Bauman, A., & Sallis, J. F. (2003). Physical activity and sedentary behavior: a population-based study of barriers, enjoyment, and preference. *Health Psychology*, *22*(2), 178-188. doi:10.1037/0278-6133.22.2.178

Sane, M. A., Devin, H. F., Jafari, R., & Zohoorian, Z. (2012). Relationship Between Physical Activity and It's Components with Burnout in Academic Members of Daregaz Universities. *Procedia-Social and Behavioral Sciences*, *46*, 4291-4294. doi:10.1016/j.sbspro.2012.06.242

Sardeshmukh, S. R., Sharma, D., & Golden, T. D. (2012). Impact of telework on exhaustion and job engagement: A job demands and job resources model. *New Technology, Work and Employment*, *27*(3), 193-207. doi:10.1111/j.1468-005X.2012.00284.x

Sas-Nowosielski, K., Nowicka, M., & Kowalczyk, A. (2017). Age-related differences in motives for and barriers to exercise among women exercising in fitness centers. *The New Educational Review, 49*, 30-39. doi:10.15804/tner.2017.49.3.02

Sawyer, A., Ucci, M., Jones, R., Smith, L., & Fisher, A. (2018). Supportive environments for physical activity in deprived communities in the United Kingdom: A qualitative study using photo elicitation. *Social Science and Medicine*, *197*, 49-58. doi:10.1016/j.socscimed.2017.11.048

Schaufeli, W. B., Leiter, M. P., & Maslach, C. (2009). Burnout: 35 years of research and practice. *Career Development International*, *14*(3), 204-220. doi:10.1108/13620430910966406

Scholz, U., Nagy, G., Göhner, W., Luszczynska, A., & Kliegel, M. (2009). Changes in self-regulatory cognitions as predictors of changes in smoking and nutrition behaviour. *Psychology and Health*, *24*(5), 545-561.

Segerstrom, S. C., & O'Connor, D. B. (2012). Stress, health and illness: Four challenges for the future. *Psychology and Health*, *27*(2), 128-140. doi:10.1080/08870446.2012.659516

Shin, J. C., & Jung, J. (2014). Academics job satisfaction and job stress across countries in the changing academic environments. *Higher Education*, *67*(5), 603-620. doi:10.1007/s10734-013-9668-y

Simons-Morton, B., McLeroy, K. R., & Wendel, M. (2011). *Behavior theory in health promotion practice and research*. Burlington, MA: Jones & Bartlett Publishers.

Skakon, J., Nielsen, K., Borg, V., & Guzman, J. (2010). Are leaders' well-being, behaviours and style associated with the affective well-being of their employees? A systematic review of

three decades of research. *Work and Stress*, *24*(2), 107-139. doi:doi:10.1080/02678373.2010.495262

Sliter, K. A., Sinclair, R., Cheung, J., & McFadden, A. (2014). Initial evidence for the buffering effect of physical activity on the relationship between workplace stressors and individual outcomes. *International Journal of Stress Management*, *21*(4), 348-360. doi:10.1037/a0038110

Slootmaker, S. M., Schuit, A. J., Chinapaw, M. J., Seidell, J. C., & Van Mechelen, W. (2009). Disagreement in physical activity assessed by accelerometer and self-report in subgroups of age, gender, education and weight status. *International Journal of Behavioral Nutrition and Physical Activity, 6*(1), 17-26. doi:10.1186/1479-5868-6-17

Smith, M. J. (2010). *Handbook of program evaluation for social work and health professionals*. New York, NY: Oxford University Press.

Song, J., Mailick, M. R., & Greenberg, J. S. (2014). Work and health of parents of adult children with serious mental illness. *Family Relations, 63,* 122-134. doi:10.1111/fare.12043

Stawski, R. S., Sliwinski, M. J., Almeida, D. M., & Smyth, J. M. (2008). Reported exposure and emotional reactivity to daily stressors: the roles of adult age and global perceived stress. *Psychology and Aging*, *23*(1), 52-61. doi:10.1037/0882-7974.23.1.52

Stevinson, C., & Hickson, M. (2013). Exploring the public health potential of a mass community participation event. *Journal of Public Health*, *36*(2), 268-274. doi:10.1093/pubmed/fdt082

Sylvia, L. G., Bernstein, E. E., Hubbard, J. L., Keating, L., & Anderson, E. J. (2014). Practical guide to measuring physical activity. *Journal of the Academy of Nutrition and Dietetics*, *114*(2), 199-208. doi:10.1016/j.jand.2013.09.018

Taris, T. W., Ybema, J. F., Beckers, D. G., Verheijden, M. W., Geurts, S. A., & Kompier, M. A. (2011). Investigating the associations among overtime work, health behaviors, and health: a longitudinal study among full-time employees. *International Journal of Behavioral Medicine*, *18*(4), 352-360. doi:10.1007/s12529-010-9103-z

ten Brummelhuis, L. L., & Bakker, A. B. (2012). Staying engaged during the week: The effect of off-job activities on next day work engagement. *Journal of Occupational Health Psychology*, *17*(4), 445-455. doi:10.1037/a0029213

Thompson, J. L., Jago, R., Brockman, R., Cartwright, K., Page, A. S., & Fox, K. R. (2010). Physically active families–de-bunking the myth? A qualitative study of family participation in physical activity. *Child: Care, Health and Development*, *36*(2), 265-274. doi:10.1111/j.1365-2214.2009.01051.x

Toker, S., & Biron, M. (2012). Job burnout and depression: unraveling their temporal relationship and considering the role of physical activity. *Journal of Applied Psychology*, *97*(3), 699-710. doi:10.1037/a0026914

Treiber, L. A., & Davis, S. N. (2012). The role of 'workplace family' support on worker health, exhaustion and pain. *Community, Work and Family*, *15*(1), 1-27. doi:10.1080/13668803.2011.580123

Trost, S. G., Owen, N., Bauman, A. E., Sallis, J. F., & Brown, W. (2002). Correlates of adults' participation in physical activity: Review and update. *Medicine and Science in Sports and Exercise*, *34*(12), 1996-2001. doi:10.1097/00005768-200212000-00020

Tudor-Locke, C., Leonardi, C., Johnson, W. D., & Katzmarzyk, P. T. (2011). Time spent in physical activity and sedentary behaviors on the working day: The American time use

survey. *Journal of Occupational and Environmental Medicine*, *53*(12), 1382-1387. doi:10.1097/JOM.0b013e31823c1402.

Tytherleigh, M. Y., Jacobs, P. A., Webb, C., Ricketts, C., & Cooper, C. (2007). Gender, health and stress in English university staff—Exposure or vulnerability? *Applied Psychology*, *56*(2), 267-287. doi:10.1111/j.1464-0597.2006.00254.x

US Department of Health and Human Services (2018). *Physical Activity Guidelines for Americans*. 2nd ed. Washington, DC.

van der Ploeg, H. P., Merom, D., Chau, J. Y., Bittman, M., Trost, S. G., & Bauman, A. E. (2010). Advances in population surveillance for physical activity and sedentary behavior: reliability and validity of time use surveys. *American Journal of Epidemiology*, *172*(10), 1199-1206. doi:10.1093/aje/kwq265

Van Dyck, D., Cerin, E., De Bourdeaudhuij, I., Hinckson, E., Reis, R. S., Davey, R., ... & Sallis, J. F. (2015). International study of objectively measured physical activity and sedentary time with body mass index and obesity: IPEN adult study. *International Journal of Obesity*, *39*(2), 199-207. doi:10.1038/ijo.2014.115

Wang, M., Liu, S., Zhan, Y., & Shi, J. (2010). Daily work–family conflict and alcohol use: Testing the cross-level moderation effects of peer drinking norms and social support. *Journal of Applied Psychology*, *95*(2), 377-386. doi:10.1037/a0018138

Ware, J. E., & Sherbourne, C. D. (1992). The MOS 36-item short-form health survey (SF-36): I. Conceptual framework and item selection. *Medical Care*, *30*(6), 473-483. doi:10.1097/00005650-199206000-00002

Warner, L. M., Stadler, G., Lüscher, J., Knoll, N., Ochsner, S., Hornung, R., & Scholz, U. (2018). Day-to-day mastery and self-efficacy changes during a smoking quit attempt:

Two studies. *British Journal of Health Psychology*, *23*(2), 371-386. doi:10.1111/bjhp.12293

Westman, M., Shadach, E., & Keinan, G. (2013). The crossover of positive and negative emotions: The role of state empathy. *International Journal of Stress Management, 20*(2), 116-133. doi:10.1037/a0033205

White, S. M., Wójcicki, T. R., & McAuley, E. (2011). Social cognitive influences on physical activity behavior in middle-aged and older adults. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *67*(1), 18-26. doi:10.1093/geronb/gbr064

Wickham, R. E., & Knee, C. R. (2013). Examining temporal processes in diary studies. *Personality and Social Psychology Bulletin*, *39*(9), 1184-1198. doi:10.1177/0146167213490962

Wieneke, K. C., Clark, M. M., Sifuentes, L. E., Egginton, J. S., Lopez-Jimenez, F., Jenkins, S. M., ... & Olsen, K. D. (2016). Development and impact of a worksite wellness champions program. *American Journal of Health Behavior*, *40*(2), 215-220. doi:10.5993/AJHB.40.2.6

Wolfram, H., & Gratton, L. (2014). Spillover between work and home, role importance and life satisfaction. *British Journal of Management, 25*, 77-90. doi:10.1111/j.1467-8551.2012.00833.x

Wood, S., Stride, C., Threapleton, K., Wearn, E., Nolan, F., Osborn, D., ... & Johnson, S. (2011). Demands, control, supportive relationships and well-being amongst British mental health workers. *Social Psychiatry and Psychiatric Epidemiology*, *46*, 1055-1068. doi:10.1007/s00127-010-0263-6

World Health Organization (WHO) (2019). *National health policies, strategies, plans,* Retrieved from https://www.who.int/nationalpolicies/nationalpolicies/en/

Yeo, G. B., & Neal, A. (2006). An examination of the dynamic relationship between self-efficacy and performance across levels of analysis and levels of specificity. *Journal of Applied Psychology*, *91*(5), 1088-1101. doi:10.1037/0021-9010.91.5.1088

Young, M. D., Plotnikoff, R. C., Collins, C. E., Callister, R., & Morgan, P. J. (2014). Social cognitive theory and physical activity: A systematic review and meta-analysis. *Obesity Reviews*, *15*(12), 983-995. doi:10.1111/obr.12225

Yusuf, M. (2011). The impact of self-efficacy, achievement motivation, and self-regulated learning strategies on students' academic achievement. *Procedia-Social and Behavioral Sciences*, *15*, 2623-2626. doi:10.1016/j.sbspro.2011.04.158

Appendix A

Informed Consent Form

Principal Investigator: Anisa Zvonkovic, PhD
Study Title: Flexibility Options in the Workplace: The Influence on Work, Family, and Health

Purpose of the Project
This research project is designed to gather information about what it is like to have a job with flexibility. We are interested in your perceptions and feelings about your job and family and how this influences your health and personal life. The data gathered will be used for a doctoral student's dissertation and to publish in academic journals.

Procedures
You will complete an initial survey that will take about 30 minutes asking questions about work, family, and health behaviors. You will select a week to start 7 daily surveys about your daily work activities and feelings at the end of each day. The surveys will start on a Monday and can be completed between 4:30pm to 10pm. You will receive a link each day through Qualtrics to complete these surveys. These surveys can be completed on any device that has internet access (e.g., laptop, cell phone, tablet).

Confidentiality
The surveys will not have your name on them; instead, an identifying number has been selected so that your information will remain confidential. Neither your name nor any information from which you might be identified will be used in any summaries of the data or in publication.

Voluntary Participation
Your participation in this study is completely voluntary. You may either refuse to participate or withdraw from the study at any time. Any questions you have about the research study or specific procedures should be directed to Professor Anisa Zvonkovic at anisaz@vt.edu (540-231-4794). If you have questions about your rights as a research participant, you should contact the Institutional Review Board for the Protection of Human Subjects, Office of Research Compliance by phone (540-231-3732) or email (irb@vt.edu).

Benefits of the Study
The results of this study will be used to develop materials to aid those who use flexible work arrangements, and their family members, in managing their work-life schedules and health.

Risks
There are no reasonable risks associated with participating. You do not need to answer any question that you do not want too. In addition, your decision to participate or not participate will not affect your relationship with Virginia Tech or your employment.

Compensation

The project will pay up to $50 for your time in this important research. You will receive $15 for completing the initial survey and $5 for every daily survey completed. You will receive this compensation by email in the form of an amazon.com gift card.

Checking the 'yes' box below indicates that you have read and understand the procedures described above and that you give your informed and voluntary consent to participate in this study. You understand that you will receive a copy of this consent form by email.

Would you like to participate in this study?

- ☐ Yes, I have read the participation details and would like to participate in the survey.
- ☐ No, I would not like to participate.

Appendix B

Initial Survey

What is your participant ID number? (This was provided to you in an email)

_____

What is your job title?

_____
_____
_____
_____
_____

What work flexibility are you using at your current job? (check all that apply)

- Telework (such as working from home or different location)
- Alternate work schedule (such as a compressed work schedule)
- Other _____

How long have you used this work flexibility at your current job? (Please write in a numeric value for 'years' and 'months')

- Years _____
- Months _____

Is this work flexibility documented through the university?

- Yes
- No

On average, how many days a week do you use this work flexibility at your current job?

- Number of days per week _____

Why do you use work flexibility at your current job?

_____
_____
_____
_____
_____

What is your gender?

- Male
- Female
- Other

What is your age (in years)?

- Years _____

Are you *currently:*

- Married/partnered
- Single/Never Married
- Widowed
- Divorced/Separated

What family member(s) do you currently live with? (check all that apply)

- Spouse/Significant other
- Child
- Parent
- Sibling
- Other _____

What is your ethnicity?

- Hispanic/Latina/o
- Not Hispanic/Latina/o

What is your race?

- White
- Black or African American
- American Indian or Alaska Native
- Asian
- Native Hawaiian or Pacific Islander
- More than one race
- Other _____

What is your highest level of education?

- Completed less than high school
- High school or GED
- Associate's Degree
- Bachelor's Degree
- Graduate or Professional school
- Other _____

Do you have children?

- Yes
- No

What are the ages of the children? (please separate ages by a comma if you have multiple children)

_____

How many children are living in your household full time?

_____

What are the ages of the children living in your household full time? (please separate ages by a comma if you have multiple children living in the home full time)

_____

What is your *personal* income before taxes?

- Under $20,000
- $20,001 - $30,000
- $30,001 - $40,000
- $40,001 - $50,000
- $50,001 - $60,000
- $60,001 - $70,000
- $70,001 - $80,000
- $80,001 - $90,000
- $90,001 - $100,000
- Greater than $100,000

What is your *household* income before taxes?

- Under $20,000
- $20,001 - $30,000
- $30,001 - $40,000
- $40,001 - $50,000
- $50,001 - $60,000
- $60,001 - $70,000
- $70,001 - $80,000
- $80,001 - $90,000
- $90,001 - $100,000
- $100,001 - $120,000
- $120,001 - $140,000
- $140,001 - $160,000
- Greater than $160,000

Please rate to what extent the following statements are true for you.

	Not at all true	Hardly true	Moderately true	Exactly true
I can always manage to solve	Not at all true	Hardly true	Moderately true	Exactly true

difficult problems if I try hard enough				
If someone opposes me, I can find the means and ways to get what I want	Not at all true	Hardly true	Moderately true	Exactly true
It is easy for me to stick to my aims and accomplish my goals	Not at all true	Hardly true	Moderately true	Exactly true
I am confident that I could deal efficiently with unexpected events	Not at all true	Hardly true	Moderately true	Exactly true
Thanks to my resourcefulness, I know how to handle unforeseen situations	Not at all true	Hardly true	Moderately true	Exactly true
I can solve most problems if I invest the necessary effort	Not at all true	Hardly true	Moderately true	Exactly true
I can remain calm when facing difficulties because I can rely on my coping abilities	Not at all true	Hardly true	Moderately true	Exactly true
When I am confronted with a problem, I can usually find several solutions	Not at all true	Hardly true	Moderately true	Exactly true

If I am in trouble, I can usually think of a solution	Not at all true	Hardly true	Moderately true	Exactly true
I can usually handle whatever comes my way	Not at all true	Hardly true	Moderately true	Exactly true

The next set of questions are about your physical health.

In general, would you say your health is:

- Poor
- Fair
- Good
- Very good
- Excellent

Do you have any chronic health conditions?

- Yes
- No

What is your approximate height?

- Feet _____
- Inches _____

What is your approximate weight (in pounds)?

- Pounds _____

What is the average number of days per week you engage in physical activity?

- Number of days per week _____

Please rate the extent to which you disagree or agree.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Maintaining good health is very important to me	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I am very health conscious	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree

I try to take care of my health	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I don't cut corners when my health is concerned	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I frequently do things to improve my health	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree

Please rate the extent to which you disagree or agree.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
If I take care of myself, I can avoid illness	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Whenever I get sick, it is because of something I've done or not done	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Good health is largely a matter of good fortune	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
No matter what I do, if I am going to get sick I will get sick	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

Most people do not realize the extent to which their illnesses are controlled by accidental happenings	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I can only do what my doctor tells me to do	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
There are so many strange diseases around that you can never know how or when you might pick one up	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
When I feel ill, I know it is because I have not been getting the proper exercise or eating right	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
People who never get sick are just plain lucky	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
People's ill health results from	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

their own carelessness							
I am directly responsible for my health	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

What is the average number of hours of sleep you get **per night**?

- Number of hours per night _____

Counting a caffeinated drink as a cup of coffee, tea, or a bottle or can of caffeinated beverages, what is the average number of caffeinated beverages you consume **per day**?

- Number of caffeinated drinks per day

  _____

What is the average number of servings of vegetables you consume **per day**?

- Number of servings of vegetables per day

  _____

What is the average number of servings of fruits you consume **per day**?

- Number of servings of fruits per day

  _____

Counting an alcoholic drink as either a bottle of beer, a glass of wine, or a shot of liquor, what is the average number of alcoholic drinks you consume **per month**?

- Number of alcoholic drinks per month

  _____

The next set of questions are about physical activity.

I am confident I can participate in regular exercise when:

	Not at all confident	Little confident	Neutral	Somewhat confident	Very confident
I am tired	Not at all confident	Little confident	Neutral	Somewhat confident	Very confident
I am in a bad mood	Not at all confident	Little confident	Neutral	Somewhat confident	Very confident
I feel I don't have time	Not at all confident	Little confident	Neutral	Somewhat confident	Very confident

I am on vacation	Not at all confident	Little confident	Neutral	Somewhat confident	Very confident
It is raining or snowing	Not at all confident	Little confident	Neutral	Somewhat confident	Very confident

Please rate to what extent the following statements are true for you.

Personally, I exercise (or might exercise) ...

	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
To give me space to think	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
To help manage stress	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
To release tension	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
Because it makes me feel good	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
Because I enjoy the feeling of exerting myself	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
For enjoyment of the experience of exercising	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
Because after exercising I feel refreshed	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
Because I find exercise invigorating	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
Because it helps to reduce tension						

To recharge my batteries	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
To increase my endurance	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
To give me goals to work towards	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
Because I find exercising satisfying in and of itself	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
To give me personal challenges to face	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
To measure myself against personal standards	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
To show my worth to others	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
To compare my abilities with other peoples'	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
To accomplish things that others are incapable of	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
To have a healthy body	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
To develop my muscles	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
To help me explore the limits of my body	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me

To help me look younger	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
To improve my appearance	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
To gain recognition for my accomplishments	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
Because I want to maintain good health	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
To help me live a longer, more healthy life	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
To feel more healthy	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
To have a good body	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
To look more attractive	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
To build up my strength	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
To get stronger	Not at all true for me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me

Do you feel the following are barriers to exercising for you personally?

	Yes	No
Cost	Yes	No
Air or noise pollution	Yes	No
Safety	Yes	No

No sidewalks/places outside to exercise	Yes	No
No access to facilities	Yes	No
Disability or injury	Yes	No
Feeling tired	Yes	No
Weather	Yes	No
Not enough motivation	Yes	No
Lack of time	Yes	No
Work commitments	Yes	No
Family commitments	Yes	No
Not feeling well	Yes	No
Other priorities	Yes	No

The next set of questions are about your feelings about your job and family.

Please rate the extent to which you are satisfied with...

	Very dissatisfied	Somewhat dissatisfied	Neither satisfied nor dissatisfied	Somewhat satisfied	Very satisfied
The way you divide your time between work and family life	Very dissatisfied	Somewhat dissatisfied	Neither satisfied nor dissatisfied	Somewhat satisfied	Very satisfied
The way you divide your attention between work and home	Very dissatisfied	Somewhat dissatisfied	Neither satisfied nor dissatisfied	Somewhat satisfied	Very satisfied
How well your work life and your family life fit together	Very dissatisfied	Somewhat dissatisfied	Neither satisfied nor dissatisfied	Somewhat satisfied	Very satisfied

Your ability to balance the needs of your job with those of your family life	Very dissatisfied	Somewhat dissatisfied	Neither satisfied nor dissatisfied	Somewhat satisfied	Very satisfied
The opportunity you have to perform your job well and yet be able to perform home-related duties adequately	Very dissatisfied	Somewhat dissatisfied	Neither satisfied nor dissatisfied	Somewhat satisfied	Very satisfied

The next section will ask you some questions about how your job relates to your family life. Please rate the extent to which you disagree to agree with the following statements **thinking about the past 6 months**.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
The demands of your work interfere with your family time	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
The amount of time your job takes up makes it difficult to fulfill your family responsibilities	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Things you want to do at home do not get done because of the demands your	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree

job puts on you					
Your job produces strain that makes it difficult to fulfill your family duties	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Due to your work-related duties, you have to make changes to your plans for family activities	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
The demands of your family relationships interfere with work-related activities	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
You have to put off doing things at work because of demands on your time at home	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Things you want to do at work don't get done because of the demands of your family	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Your home life interferes with your responsibilities at work, such	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree

as getting to work on time, accomplishing daily tasks, and working overtime					
Family-related strain interferes with your ability to perform job-related duties	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree

The next set of questions ask you about your experiences in your workplace as a whole. Please rate the extent to which you disagree or agree. At your job, it is generally accepted that people...

	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Strongly disagree
Might share concerns about their family	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Strongly disagree
Can talk about family problems	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Strongly disagree
Can get advice on how to deal with family issues	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Strongly disagree
Must take time away from their families to get their	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Strongly disagree

work done							
Have to put their families second to their jobs	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Strongly disagree
Need to make work their top priority	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Strongly disagree

The next set of questions are about your job.

On average, how long is the commute to your office? (in minutes)

- Minutes _____

Taking into account your current work hours and schedule, how well is your work arrangement...

	Extremely poorly	Poorly	Somewhat poorly	Neutral	Somewhat well	Well	Extremely well
Working for you?	Extremely poorly	Poorly	Somewhat poorly	Neutral	Somewhat well	Well	Extremely well
Working for your family?	Extremely poorly	Poorly	Somewhat poorly	Neutral	Somewhat well	Well	Extremely well

How much choice do you have...

	Very little	A little	Neutral	Much	Very much
Over when you take vacations or days off?	Very little	A little	Neutral	Much	Very much
When you begin and end each workday?	Very little	A little	Neutral	Much	Very much

Over doing some of your work at home or at another location?	Very little	A little	Neutral	Much	Very much
The amount or times you take work home with you?	Very little	A little	Neutral	Much	Very much
Shifting to a part-time schedule if you wanted to do so?	Very little	A little	Neutral	Much	Very much
The total number of hours you work each week?	Very little	A little	Neutral	Much	Very much

To what extent...

	Never	Sometimes	Most of the time	Always
Can you choose the methods to use in carrying out your work?	Never	Sometimes	Most of the time	Always
Do you plan your own work?	Never	Sometimes	Most of the time	Always
Do you set your own pace?	Never	Sometimes	Most of the time	Always
Can you vary how you do your work?	Never	Sometimes	Most of the time	Always
Do you have the freedom to take a break whenever you wish to?	Never	Sometimes	Most of the time	Always

Do you decide on the order in which you do things?	Never	Sometimes	Most of the time	Always
Do you decide when to finish a piece of work?	Never	Sometimes	Most of the time	Always
Do you have full authority in determining how much time you spend on particular tasks?	Never	Sometimes	Most of the time	Always
Can you decide how to go about getting your job done?	Never	Sometimes	Most of the time	Always
Does your job allow you to organize your work by yourself?	Never	Sometimes	Most of the time	Always
Do you have full authority in determining the content of your work?	Never	Sometimes	Most of the time	Always

To what extent...

	Never	Sometimes	Most of the time	Always
Do you have to work fast?	Never	Sometimes	Most of the time	Always
Do you have too much work to do?	Never	Sometimes	Most of the time	Always
Do you have to work extra hard to finish a task?	Never	Sometimes	Most of the time	Always

Do you work under time pressure?	Never	Sometimes	Most of the time	Always
Do you have to rush?	Never	Sometimes	Most of the time	Always
Can you do your work in comfort?	Never	Sometimes	Most of the time	Always
Do you have to deal with a backlog at work?	Never	Sometimes	Most of the time	Always
Do you have too little work?	Never	Sometimes	Most of the time	Always
Do you have problems with the pace of work?	Never	Sometimes	Most of the time	Always
Do you have problems with the workload?	Never	Sometimes	Most of the time	Always
Do you wish you could work at an easier pace?	Never	Sometimes	Most of the time	Always

At your job...

	Never	Sometimes	Most of the time	Always
Can you rely upon your immediate supervisor when things get tough at work?	Never	Sometimes	Most of the time	Always
If necessary, can you ask your immediate supervisor for help?	Never	Sometimes	Most of the time	Always
Can you rely upon your co-workers when	Never	Sometimes	Most of the time	Always

things get tough at work?				
If necessary, can you ask your co-workers for help?	Never	Sometimes	Most of the time	Always

Please rate to what extent to which you agree or disagree with the following statements.

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
I find real enjoyment in my job	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
I like my job better than the average person	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
I am seldom bored with my job	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
I would not consider taking another kind of job	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
Most days I am enthusiastic about my job	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
I feel fairly well satisfied with my job	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree

When you are sick, you still feel obligated to come in to work.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

The next set of questions are about your family.

	A lot	A moderate amount	A little	Not at all
How much do members of your family really care about you?	A lot	A moderate amount	A little	Not at all
How much do they understand the way you feel about things?	A lot	A moderate amount	A little	Not at all
How much can you rely on them for help if you have a serious problem?	A lot	A moderate amount	A little	Not at all
How much can you open up to them if you need to talk about your worries?	A lot	A moderate amount	A little	Not at all
How often do members of your family make too many demands on you?	A lot	A moderate amount	A little	Not at all
How often do they criticize you?	A lot	A moderate amount	A little	Not at all
How often do they let you down when you are counting on them?	A lot	A moderate amount	A little	Not at all
How often do they get on your nerves?	A lot	A moderate amount	A little	Not at all

The next set of questions are about you and your spouse/partner.

	Extremely unhappy	Moderately unhappy	Slightly unhappy	Neither happy nor unhappy	Slightly happy	Moderately happy	Perfect
Please indicate the degree of happiness, all things considered, of your relationship	Extremely unhappy	Moderately unhappy	Slightly unhappy	Neither happy nor unhappy	Slightly happy	Moderately happy	Perfect

Most people have disagreements in their relationships. Please indicate below the approximate extent of agreement or disagreement between you and your partner for each item.

	All the time	Most of the time	More often than not	Occasionally	Rarely	Never
In general, how often do you think that things between you and your partner are going well?	All the time	Most of the time	More often than not	Occasionally	Rarely	Never

	Not at all	A little	Somewhat	Mostly	Almost completely	Completely
How rewarding is your relationship with your partner?	Not at all	A little	Somewhat	Mostly	Almost completely	Completely
How well does your partner meet your needs?	Not at all	A little	Somewhat	Mostly	Almost completely	Completely

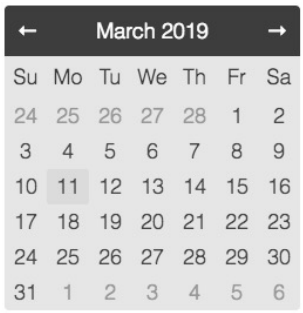
To what extent has your relationship met your original expectations?	Not at all	A little	Somewhat	Mostly	Almost completely	Completely
In general, how satisfied are you with your relationship?	Not at all	A little	Somewhat	Mostly	Almost completely	Completely

For each of the following items, select the answer that best describes how you feel about your relationship. Base your responses on your first impressions and immediate feelings about the item.

	1	2	3	4	5	
Interesting	1	2	3	4	5	Boring
Bad	1	2	3	4	5	Good
Full	1	2	3	4	5	Empty
Sturdy	1	2	3	4	5	Fragile
Discouraging	1	2	3	4	5	Hopeful
Enjoyable	1	2	3	4	5	Miserable

Thank you for finishing the initial survey. When would you like to start your 7 consecutive nights of the daily survey? This survey takes approximately 5-10 minutes. You will be emailed a link to the daily survey the day you start and everyday as a reminder. Please **start at the beginning of your work week** (e.g., if your work week starts on a Monday please select a Monday; if your work week starts on a Thursday please select a Thursday). Please also select a week where you will be using your flexibility at your job.

Please Choose a Date:



Appendix C

Daily Survey

What is your participant ID number? (This was provided to you in an email)

_____

What day of the week is it?

- Monday
- Tuesday
- Wednesday
- Thursday
- Friday
- Saturday
- Sunday

How many hours did you sleep last night?

- Hours _____

Please rate the quality of your sleep last night.

- Very good
- Fairly good
- Fairly bad
- Very bad

How many hours did you work today? (If you did not work today, please write 0).

- Hours _____

Did you use a flexible work option at your job today?

- Yes
- No

What kind of work flexibility did you use today?

- Telework
- Alternate work schedule
- Other _____

The next set of questions are about your physical activity today.

Did you engage in physical activity since this time yesterday?

- Yes
- No

What time of day were you physically active?

- Morning
- Afternoon
- Night

How many **minutes** were **strenuous** exercise (heart beats rapidly) (e.g., running, jogging, hockey, football, basketball, soccer, aerobics classes, vigorous swimming, fast bicycling, etc)?

- Minutes _____

How many **minutes** were **moderate** exercise (not exhausting) (e.g., brisk walking, yoga, volleyball, etc)?

- Minutes _____

How many **minutes** were **mild** exercise (minimal effort) (e.g., easy walking, fishing, golf, bowling, etc)?

- Minutes _____

Did you feel any of the following were barriers that made it difficult to exercise **today**?

	Yes	No
Cost	Yes	No
Air or noise pollution	Yes	No
Safety	Yes	No
No sidewalks/places outside to exercise	Yes	No
No access to facilities	Yes	No
Disability or injury	Yes	No
Feeling tired	Yes	No
Weather	Yes	No
Not enough motivation	Yes	No
Lack of time	Yes	No
Work commitments	Yes	No

Family commitments	Yes	No
Not feeling well	Yes	No
Other priorities	Yes	No

The next set of questions ask about what you consumed today.

Counting a caffeinated drink as a cup of coffee, tea, or a bottle or can of caffeinated beverages, how many caffeinated drinks did you have since this time yesterday?

- Number of caffeinated drinks _____

How many servings of vegetables did you consume since this time yesterday?

- Number of servings of vegetable _____

How many servings of fruits did you consume since this time yesterday?

- Number of servings of fruits _____

Counting an alcoholic drink as either a bottle of beer, a glass of wine, or a shot of liquor, how many alcoholic drinks did you have since this time yesterday?

- Number of Alcoholic Drinks _____

The next set of questions are about specific WORK experiences at your job that may have happened to you since this time yesterday.

Did you have an argument or disagreement with anyone at work since this time yesterday?

- Yes
- No

This argument or disagreement...

How STRESSFUL was this for you ?	Not at all	Not very	Somewhat	Very
How ANGRY did this make you feel?	Not at all	Not very	Somewhat	Very
How NERVOUS OR ANXIOUS	Not at all	Not very	Somewhat	Very

did this make you?				
How much CONTROL did you have over the situation?	None	A little	Some	A lot
Did this argument or disagreement disrupt your daily routine?	Not at all	Not very	Somewhat	Very

Since yesterday, did anything happen at work that you could have argued about but you decided to let pass in order to avoid a disagreement?

- Yes
- No

This avoided argument or disagreement...

How STRESSFUL was this for you ?	Not at all	Not very	Somewhat	Very
How ANGRY did this make you feel?	Not at all	Not very	Somewhat	Very
How NERVOUS OR ANXIOUS did this make you?	Not at all	Not very	Somewhat	Very
How much CONTROL did you have over the situation?	None	A little	Some	A lot
Did this avoided argument or disagreement disrupt your daily routine?	Not at all	Not very	Somewhat	Very

Since yesterday, did you have demands placed on you at your job that were stressful (such as facing a deadline like a release date, being on call, or too many conflicting meetings)?

- Yes
- No

These demands placed on you...

How STRESSFUL was this for you ?	Not at all	Not very	Somewhat	Very
How ANGRY did this make you feel?	Not at all	Not very	Somewhat	Very
How NERVOUS OR ANXIOUS did this make you?	Not at all	Not very	Somewhat	Very
How much CONTROL did you have over the situation?	None	A little	Some	A lot
Did these demands disrupt your daily routine?	Not at all	Not very	Somewhat	Very

Other than what you have already mentioned, since this time yesterday, did anything ELSE happen at your job that was stressful?

- Yes
- No

How STRESSFUL was this for you ?	Not at all	Not very	Somewhat	Very

How ANGRY did this make you feel?	Not at all	Not very	Somewhat	Very
How NERVOUS OR ANXIOUS did this make you?	Not at all	Not very	Somewhat	Very
How much CONTROL did you have over the situation?	None	A little	Some	A lot
Did this disrupt your daily routine?	Not at all	Not very	Somewhat	Very

Today I felt...

	Totally disagree	Disagree	Neither disagree or agree	Agree	Totally agree
Like I am at the end of my rope	Totally disagree	Disagree	Neither disagree or agree	Agree	Totally agree
Frustrated by my job	Totally disagree	Disagree	Neither disagree or agree	Agree	Totally agree
Burned out from my work	Totally disagree	Disagree	Neither disagree or agree	Agree	Totally agree
Like I worked too hard on my job	Totally disagree	Disagree	Neither disagree or agree	Agree	Totally agree
Emotionally drained from my work	Totally disagree	Disagree	Neither disagree or agree	Agree	Totally agree

Today, in my free time...

	Totally disagree	Disagree	Neither disagree or agree	Agree	Totally agree
I forgot about work	Totally disagree	Disagree	Neither disagree or agree	Agree	Totally agree
I distanced myself from work	Totally disagree	Disagree	Neither disagree or agree	Agree	Totally agree
I didn't think about work at all	Totally disagree	Disagree	Neither disagree or agree	Agree	Totally agree
I got a break from the demands of work	Totally disagree	Disagree	Neither disagree or agree	Agree	Totally agree

The next set of questions ask you about your work and family life today.

Since this time yesterday...

	Not at all	A little	Some	A lot
How much did the demands of your work interfere with your family time?	Not at all	A little	Some	A lot
How much did your time spent at work make it difficult to fulfill your family responsibilities?	Not at all	A little	Some	A lot
How much did things you wanted to do at home not get done because of the demands your job put on you?	Not at all	A little	Some	A lot

How much did your job produce strain that made it difficult to fulfill your family duties?	Not at all	A little	Some	A lot
Due to your work-related duties, how much did you have to make changes to your plans for family activities?	Not at all	A little	Some	A lot
How much did the demands of your family life interfere with your job?	Not at all	A little	Some	A lot
How much did your time spent at home make it difficult to fulfill your job responsibilities?	Not at all	A little	Some	A lot
How much did things you wanted to do at job not get done because of the demands your family life put on you?	Not at all	A little	Some	A lot
How much did your family life produce strain that made it difficult to fulfill your job duties?	Not at all	A little	Some	A lot
Due to your family-related duties, how	Not at all	A little	Some	A lot

much did you have to make changes to your plans for work activities?	

Since this time yesterday, did anything happen at HOME that was stressful?

- Yes
- No

This stressful home experience...

How STRESSFUL was this for you?	Not at all	Not very	Somewhat	Very
How ANGRY did this make you feel?	Not at all	Not very	Somewhat	Very
How NERVOUS OR ANXIOUS did this make you feel?	Not at all	Not very	Somewhat	Very
How much CONTROL did you have over the situation?	None	A little	Some	A lot
Did this disrupt your daily routine?	Not at all	Not very	Somewhat	Very

The last set of questions is a list of words that describe feelings people have. Please rate the extent to which you have experienced these feelings since this time yesterday. On a scale from *Not At All* to *Extremely*

	Not at all	Slightly	Somewhat	Moderately	Extremely
Lively	Not at all	Slightly	Somewhat	Moderately	Extremely
On edge	Not at all	Slightly	Somewhat	Moderately	Extremely
Sad	Not at all	Slightly	Somewhat	Moderately	Extremely

Resentful	Not at all	Slightly	Somewhat	Moderately	Extremely
Worn out	Not at all	Slightly	Somewhat	Moderately	Extremely
Cheerful	Not at all	Slightly	Somewhat	Moderately	Extremely
Uneasy	Not at all	Slightly	Somewhat	Moderately	Extremely
Discouraged	Not at all	Slightly	Somewhat	Moderately	Extremely
Angry	Not at all	Slightly	Somewhat	Moderately	Extremely
Exhausted	Not at all	Slightly	Somewhat	Moderately	Extremely
Vigorous	Not at all	Slightly	Somewhat	Moderately	Extremely
Anxious	Not at all	Slightly	Somewhat	Moderately	Extremely
Hopeless	Not at all	Slightly	Somewhat	Moderately	Extremely
Annoyed	Not at all	Slightly	Somewhat	Moderately	Extremely
Fatigued	Not at all	Slightly	Somewhat	Moderately	Extremely
Nervous	Not at all	Slightly	Somewhat	Moderately	Extremely
Worthless	Not at all	Slightly	Somewhat	Moderately	Extremely
Peeved	Not at all	Slightly	Somewhat	Moderately	Extremely

This is the end of todays daily survey. You will receive an email tomorrow for your next daily survey if this is not your last survey. If this is your last survey, you will be emailed your gift card soon.

Appendix D

Journal Submission Guidelines

Health Psychology

Health Psychology aims to advance the science of evidence-based health psychology. *Health Psychology* publishes research emphasizing quantitative psychological, social and behavioral aspects of physical health, medial illness and other issues in health psychology. *Health Psychology* is published monthly. The current impact factor is 3.177. The 5-year impact factor is 4.122. Detailed submission guidelines can be found at https://www.apa.org/pubs/journals/hea/?tab=4. The following is a summary of the guidelines:

- Manuscripts are limited to 30 pages (includes all parts of the manuscript)
- The title should be no more than 12 words and should not state assertion or conclusion
- Abstracts should be no more than 250 words with the headings: Objective, Methods, Results, and Conclusion.
- Supply up to five key words
- The body of the manuscript should include: a clear statement of the research questions, essential information about the Methods, descriptive statistics in the text of the Results, disclosure of study's key limitation in the Discussion, and conclusions that are consistent with the findings
- Provide information about the IRB if human participants were involved

Journal of Occupational Health Psychology

The *Journal of Occupational Health Psychology* aims to improve the quality of work life and promote the health and well-being of workers. The three foci of this journal include the organization of work, individual psychological attributes, and work-nonwork interface in relation

to occupational safety, health, and well-being. One domain of interest highlights work-related and nonwork-related psychological factors that influence occupational safety, health, and well-being. The *Journal of Occupational Health Psychology* is published bimonthly. The current impact factor is 3.766. The 5-year impact factor is 4.985. Detailed submission guidelines can be found at https://www.apa.org/pubs/journals/ocp/index?tab=4. The following is a summary of the guidelines:

- Manuscripts are limited to 40 pages (excluding figures, tables, references, and appendices)
- Abstracts should be no more than 250 words
- Supply up to five key words or brief phrases
- Manuscripts are evaluated on the following criteria:
    - Appropriateness of topic
    - Mastery of literature
    - Inclusion of theoretical framework
    - Measures for each construct
    - Research design
    - Data analysis
    - Interpretations and conclusion
    - Theoretical contributions to the field of occupational health psychology
    - Practical implications for the field of occupational health psychology
    - Clarity in writing