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Promoting Workplace Health Using Wearable Technology: A Mixed Methods Study in a Nonprofit Organization

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Promoting Workplace Health Using Wearable Technology: A Mixed Methods Study in a Nonprofit Organization

by

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ABSTRACT

Despite efforts to improve the designs and benefits of workplace wellness programs (WWPs), there are two major problems preventing employers from optimizing the human capital of their employees: (a) many WWPs are limited and do not include an exercise component, which increases the potential for chronic health conditions; and (b) more than 50% of employees are reluctant to participate in WWPs due to the common barriers of time, convenience, and location. A lack of physical activity is a problem because studies have shown that chronic conditions increase rates of absenteeism and presenteeism, both of which increase productivity loss. Additionally, low participation rates in WWPs impact the future costs of employee health. For these reasons, employers are now more interested in innovative tools that enhance WWP dynamics such as the use of wearable technology devices as wearables can increase cost-effectiveness and mitigate barriers to employee participation. This embedded mixed methods study aimed to explain the relationship between the physical activity levels of employees and their rates of productivity by measuring their steps taken and rates of health-related absenteeism and presenteeism in an 8-week WWP. The qualitative portion of this study consisted of select participants providing journal entries focused on their use of a wearable device and the impact the features of the device had on their physical activity and well-being. Forty-one participants began the intervention, but only 38 completed the program. Six participants started and completed the qualitative portion. The results did not show a significant relationship between physical activity and health-related absenteeism. However, the results did indicate a significant relationship between physical activity and rates of presenteeism. The study used a thematic analysis to determine results for the

qualitative portion. The results indicated that participants found the step tracking features of the wearable device to be most motivational as competition with others and meeting goals were primary drivers. Additionally, the participants noted improvements in sleep, focus and concentration, time management skills, and relatedness with others in the workplace. The study results show that investments in wearable technology for employee health can positively impact productivity levels and employee participation in WWPs.

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DEDICATION

I have received support from many family members, friends, professors, classmates, and work colleagues throughout this process. I feel extremely lucky to have such support and encouragement in my life. I will always remember this 4-year journey. I dedicate this research to my partner, Andrew Olds, and my mother, Lisa Robinson, for always supporting my dreams. I also dedicate this research to Elaine Cottle for teaching me to have faith and for showing me that things always work out when you focus on and happily pursue your goals.

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LIST OF ABBREVIATIONS

ACA	Affordable Care Act
BLS	Bureau of Labor Statistics
CDC	Centers for Disease Control & Prevention
HHS	Department of Health and Human Services
HIPAA	Health Insurance Portability & Accountability Act
HCT	Human Capital Theory
HPQ	Health & Work Performance Questionnaire
HRA	Health Risk Assessment
IRB	Institutional Review Board
ODPHP	Office of Disease Prevention & Health Promotion
PWC	PricewaterhouseCoopers
SDT	Self-Determination Theory
SHRM	Society for Human Resource Management
WHO	World Health Organization
WWP	Workplace Wellness Program

CHAPTER I – INTRODUCTION

Among the many challenges that employers in the United States face, two growing concerns are the rising cost of health insurance and decreases in productivity levels due to health-related problems (Parkinson, 2013; Troy & Jones, 2016). Part of the cause is due to the sedentary nature of office work. American workers, on average, spend between 11 and 13 hours per day in seated positions (Bureau of Labor Statistics [BLS], 2016), increasing the potential for obesity and the development of various noncommunicable diseases and conditions, including cardiovascular disease, stroke, diabetes, and cancer (Hamilton, Hamilton, & Zderic, 2007; Healy et al., 2008; Inoue et al., 2008; Owen, Bauman, & Brown, 2009). In addition to the burden on individuals, unhealthy workers create economic burdens on organizations via losses in productivity (Burton, Pransky, Conti, Chen, & Edington, 2004). If unhealthy workers do not engage in regular physical activity, there is a higher likelihood for absenteeism or presenteeism, both of which decrease productivity levels (Gaoshan, 2014). Research predicts that absenteeism costs in the United States are approximately $225 billion per year (Centers for Disease Control & Prevention [CDC], 2015) while experts estimate the cost of presenteeism to be approximately $180 billion per year (Prater & Smith, 2011).

The following embedded mixed methods study aimed to explain the relationship between the physical activity and productivity levels of participants, and to explore the perceptions of select participants in relation to the wearable technology device provided for the study. Chapter 1 begins with the background of the study. The chapter continues with the statement of the problem, purpose of the study, significance of the study,

research questions and objectives, conceptual framework, limitations, delimitations, assumptions, and the definitions of key terms.

Background of the Study

Recent studies cite the need for interventions aimed at the American workforce to improve national economic circumstances related to healthcare costs and employee productivity levels (Eng, Moy, & Bulgiba, 2016; U.S. Department of Health & Human Services [HHS], 2015; Klatt, Sieck, Gascon, Malarkey, & Huerta, 2016). A rise in the prevalence rates of chronic health conditions prompts the need for such interventions; chronic diseases are now the leading causes of death for Americans (Rasmussen, Sweeny, & Sheehan, 2016). Physical and mental health problems negatively affect the American workforce, both occupationally and economically, by reducing the production of goods and services and adding greater burdens on the U. S. healthcare system (HHS, 2015a). Each chronic condition increases costs to the United States, either through direct medical expenditures or indirect costs to employers (CDC, 2017a). Overall, chronic health conditions account for an estimated 86% of the annual $2.7 trillion costs of health care in the United States (Gerteis et al., 2014).

The Society for Human Resource Management (2017) states that employers are now investing more in wellness benefit programs aimed at the health of employees. However, many employers continue to struggle with productivity losses due to employee health problems, which increase absenteeism and presenteeism rates and significantly impact the organizational bottom line (Schaefer, 2018). Employers and researchers alike have realized the increasing associations between productivity losses, absenteeism, and presenteeism (Driver, Panjwani, Spring, Lloyd-Jones, & Allen, 2015; Holden et al.,

2011). In fact, researchers project a rise in the costs of these work performance indicators between now and 2030 (Rasmussen et al., 2016). While employers understand the impact of lost productivity, there are negative implications for employees when productivity decreases. Employee absences and illness decrease rates of productivity, which can, in turn, decrease wages paid to employees (CDC, 2016a). Experts estimate that widespread performance problems caused an 8.2% impact on the United States' growth domestic product in 2015 alone due to a combination of costs related to absenteeism, presenteeism, and early retirement due to poor health (Rasmussen et al., 2016).

Despite predictions that employers would stop providing health insurance benefits under the Affordable Care Act (ACA), the Congressional Budget Office (2016) estimates that approximately 169 million American workers continue to receive health insurance through their employers. Troy and Jones (2016) suggest that organizations are more likely to continue the trend of providing health insurance benefits to employees as a strategy for retaining qualified staff. Employers are always looking for a competitive edge, so many are now designing their own health benefits packages with the expectation of improving employee health and productivity while maintaining lower medical costs (Mattke et al., 2013). Madison, Volpp, and Halpern (2011) conducted a review of literature and policy on the ACA related to employer investments in employee health and concluded that employers cannot solve all problems surrounding employee health, even when the benefits extend to gym memberships and incentives. However, they assert that employers can help remove barriers and provide needed information for employee health.

Workplace wellness programs (WWPs) have become popular methods for employers to invest in employee health (Mattke et al., 2013). Rasmussen et al. (2016) state that increases in the prevalence rates of chronic diseases in the United States called for the development of WWPs. Employers began developing WWPs in the mid-1970s, which triggered a "shift in responsibility for health care from government to employer" (Reardon, 1998, p. 117). The development of WWPs resulted in response to cost containment of health care and the worksite health promotion movement (Novelli & Ziska, 1982). Novelli and Ziska (1982) asserted that disease prevention was the primary goal of WWPs at the time, and that viable programs aimed to improve the physical and mental health of participants. According to Remington and Brownson (2011), studies focused on chronic diseases in the United States began in the 1960s as the prevalence rates were increasing. Since that time, the rates of chronic conditions have continued to rise. Recent global projections indicate that developing countries, including the United States, will experience significant losses due to chronic diseases through 2030, which increases the need for WWPs (Rasmussen et al., 2016).

Mattke et al. (2014) state that effective WWPs produce positive results in relation to employee health, the cost of health care, and productivity levels. Various research studies have identified specific benefits from WWPs, which include increases in health measures (Stoler, Touger-Decker, O'Sullivan-Maillet, & Debchoudhary, 2006), reductions in health-related absences (Goetzel et al., 2009; Loeppke et al., 2008), reductions in medical cost (Goetzel et al., 2009; Hochart & Lange, 2011), better productivity levels (Burton et al., 2004; Gates, Succop, Brehm, Gillespie, & Sommers, 2008), lower prevalence rates of disease (Boshtam et al., 2010; Jung, Lee, Lee, Kwon, &

Song, 2012), and increased happiness levels with greater organizational commitment (Fitzgerald & Danner, 2012). The benefits result in cost savings for organizations as well as increased productivity, physical activity, and the overall quality of life for employees who participate (Dallat, Hunter, Tulley, Carins, & Kee, 2013).

The ACA (2010) categorizes WWPs in two ways: (a) participatory wellness programs, or programs that do not reward someone for merely participating; and (b) health-contingent wellness programs, or programs that require an employee to meet a standard to obtain a reward (Incentive for Nonparticipatory Wellness Programs in Health Plans Final Rule, 2013). However, the type of intervention provided in a WWP can vary by organization. Most WWPs include a health risk assessment, or initial screening, which is the only component necessary to qualify a WWP under the ACA (Incentive for Nonparticipatory Wellness Programs in Health Plans Final Rule, 2013). WWPs provide two types of interventions: (a) disease prevention; and (b) diagnosis management (Mattke et al., 2013). A majority of WWPs fall into the disease prevention category, which are primary prevention methods. Disease prevention programs aim to prevent chronic conditions and focus on six primary lifestyle management topics: (a) nutrition or weight loss information; (b) smoking cessation; (c) fitness and exercise; (d) alcohol and drug abuse; (e) stress management; (f) health; and (g) education (Mattke et al., 2013). These types of programs are beneficial as the CDC (2017a) states that common chronic diseases, such as heart disease, stroke, cancer, diabetes, obesity, and arthritis are preventable. Disease management interventions focus on chronic conditions and the prevention of such conditions from worsening (Mattke et al., 2013).

Mattke et al. (2014) conducted a study sponsored by the U. S. Department of Labor focused on the dynamics of WWPs across the United States. Through the study findings, the authors identified five different program configurations: (a) limited; (b) comprehensive; (c) screening-focused; (d) intervention focused; and (e) prevention-focused. Each program configuration has a unique definition as seen below.

1. Limited – This type of program limits program activities to those related to screening, lifestyle, and in the management of disease. Screening does include the collection of basic biometric information, and most programs do not offer a disease management component.
2. Comprehensive – This type of program is comprehensive in relation to screening. Additionally, this type of program offers comprehensive lifestyle and disease management interventions as well as comprehensive services in all program components.
3. Screening-Focused – This type of program provides a range of screening tests that are more extensive than in comprehensive programs. However, the program limits lifestyle components as in limited programs. Disease management interventions are more extensive than in limited programs but are less extensive than in comprehensive programs.
4. Intervention-Focused – This type of program is heavily focused on lifestyle and disease management interventions and offers hardly any screening activities.
5. Prevention-Focused – This type of program provides more screening services than limited programs but less screening than comprehensive programs. These programs closely mirror comprehensive programs in relation to lifestyle

interventions. In relation to disease management, these programs typically only provide programming around diabetes management (Mattke et al., 2014). The study reported that approximately 34% of programs fit into the limited category, while 13% are screening-focused, 20% are comprehensive, 21% are intervention-focused, and 12% are prevention-focused (Mattke et al., 2014).

Even though WWPs focus on health, the ACA (2010) qualifies programs that do not incorporate an exercise component. In fact, of the limited workplace wellness programs in the United States, only 40% offer an exercise component to employees (Mattke et al., 2014). The Office of Disease Prevention and Health Promotion recommends (ODPHP; 2008) that individuals engage in at least 150 minutes of physical activity per week. Therefore, limited WWPs that do not offer an exercise component are problematic for employers aiming to improve their employees' health as exercise is a proven primary preventer of chronic health conditions (Booth, Roberts, & Laye, 2012).

A secondary problem found is that even though WWPs can be effective and beneficial for individuals, less than half of employees participate (Mattke et al., 2013). Putnam (2017) estimates that less than 20% of employees participate and make effective change in traditional WWPs (Putnam, 2017). Traditional WWPs focus on contingent health outcomes or goals and are less beneficial in helping employees cultivate healthy lifestyles (Weafer, 2016). Additionally, research has identified common barriers to participation in traditional programs. Person, Colby, Bulova, and Eubanks (2010) identified time, convenience, and location as top factors that prevent employee participation. The RAND Corporation conducted research in a university setting in 2013 and determined that employees are more likely not to participate in a wellness program

because of the following reasons: (a) location, (b) timing of events, (c) too much focus on education and less on physical fitness, (d) a lack of support by leadership, (e) staff not being on campus daily, and (f) a lack of exposure to the program (RAND, 2013). Additionally, the Harvard Business Review (HBR) posted an article indicating that employees do not use WWPs because of the following reasons: (a) inconvenience, (b) unsupportive company culture, (c) trust and privacy concerns, and (d) not being aware of the program (McManamy, 2016). Common themes from these two studies align with Person et al.'s (2010) assertion and indicate that employers operating successful WWPs will consider the common barriers of time, convenience, and location.

DeVries (2010) states that the demands for wellness programs have caused employers to look for innovative tools to enhance the effectiveness of WWPs. The top recommendation is to use wireless technologies. Wireless technologies, and specifically wearable technology, have the potential to overcome the common WWP participation challenges of time, convenience, and location (Chesky, 2015; PricewaterhouseCoopers [PWC], 2014). BridgeCrest Medical (2015) asserts that wearable technologies allow for real-time data-collection, mitigating the need for employees to be present for monitoring. Telehealth services provide medical professionals and patients accessibility to real-time monitoring at different locations and at times that are convenient for the doctor or patient (Vo, Brooks, Farr, & Raimer, 2016). Wireless technology is among one of the most valuable and evolving tools that is increasing the capabilities of WWPs (DeVries, 2010). Wearable devices are not only convenient, they are among the most popularized choices of technology aimed at the improvement of individual health and medical care (Lamkin, 2014). Powell, Landman, and Bates (2014) identified wearable and mobile technologies

as being effective and of interest to developers and clinicians focused on fitness and health.

While WWPs are now popular options for employers who want to invest in their employees' health (Mattke et al., 2014), wearable technologies demonstrate their capabilities in assisting employers in monitoring employee activity levels in relation to health outcomes and organizational cost. The combination of technology, new program architectures, and innovative strategies is helping with better health outcomes, increased participation rates, and decreases in medical costs (DeVries, 2010). Additionally, employers and researchers have used wearable technology to monitor and improve wellness (Belsi, Papi, & McGregor, 2016; DeVries, 2010; Springbuk, 2015). Belsi et al. (2016) used a wearable device to determine its impact on communication and self-management in a group of individuals with osteoarthritis. The study determined positive improvements in their perceptions of self-control and awareness of progress in relation to their condition. Springbuk (2015) used a wearable device in a corporate-sponsored WWP and determined a relationship between the number of steps taken and the health status of employees participating. The study determined that those who took more steps cost the organization less in relation to health care. DeVries (2010) cited a study conducted by a wellness company, Healthyroads, where 6 organizations participated in a 25-day walking challenge to determine which company could walk the most steps with an aim at improving employee health. The study concluded that each of the participants of the winning company exceeded 10,000 steps per day the Surgeon General's 30-minutes of physical activity per day.

Asimakopoulos, Asimakopoulos, and Spillers (2017) conducted a study aimed at determining the impact that wearable technology has on user motivation during exercise. Their study used the criteria of self-determination theory (SDT) to determine motivation and if the use of wearable technology met user needs. SDT focuses on human behavior in relation to three universal and innate psychological needs: (a) *autonomy* or self-control; (b) *competence* in completing tasks and activities; and (c) *relatedness* or inclusion with others (Deci & Ryan, 1985, 2000). The results revealed that "user motivation and self-efficacy are highly dependent on successful data, gamification, and the content design of applications as well as the sensing content and providing appropriate motivational feedback to the user" (Asimakopoulos et al., p. 10). The results suggested that the intervention met the psychological needs of users through the monitoring of application and competition with other users. Karapanos, Gouveia, Hassenzahl, and Forlizzi (2016) conducted a similar study and determined that wearable devices enhance feelings of autonomy and relatedness and are capable of boosting user self-esteem. Giddens, Leidner, and Gonzalez (2017) found that extended use of wearables can improve employee well-being and physical activity levels. However, Giddens et al. (2017) recommend research on which features of wearable technology that have the most impact on the physical activity levels and well-being of users. The current study aims to utilize a wearable device in a WWP to determine if increased physical activity influences employee health-related absenteeism and presenteeism, both of which contribute to productivity losses (Driver et al., 2015), In addition, this study aims to determine which features of the wearable device have the most impact on user physical activity levels and well-being.

Statement of the Problem

There are two problems the study sought to address. First, while effective WWPs produce increases in employee health (Mattke et al., 2014) and decreases in employee rates of absenteeism (Biron, Burke, & Cooper, 2014) and presenteeism (Cancelliere, Cassidy, Ammendolia, & Cote, 2011), both of which reduce productivity levels (Driver et al., 2015; Kessler et al., 2003), many employers design limited WWPs that do not incorporate an exercise component (Mattke et al., 2013). A lack of physical activity increases employees' potential for developing chronic conditions, which decrease productivity levels (CDC, 2017a). Employee health is the most important human capital asset of organizations (Bleakley, 2013). Therefore, employers should use WWPs to prevent employee health problems and increase productivity levels (Devries, 2010). Without understanding the correlation between physical activity and productivity levels, employers will continue designing limited WWPs that do not effectively meet the health needs of employees.

Secondly, the common barriers of time, convenience, and location (RAND, 2013) prevent more than half of American employees from participating in WWPs (Mattke et al., 2013; Person et al., 2010). Meanwhile, previous research demonstrates that wearable technologies effectively mitigate the same perceived barriers (Chesky, 2015; DeVries, 2010) and positively influence user motivation and physical activity (Asimakopoulos et al., 2017). However, recent research recommends exploring user perceptions of wearable features as it is unclear as to which features of wearable devices have the most impact on the physical activity and well-being of users (Giddens et al., 2017). Without fully

understanding the use of wearable technology in WWPs, employers will lack the ability to improve participant experiences and outcomes.

Purpose of the Study

The purpose of this embedded mixed methods study was to accomplish two tasks: (a) explain the relationship between physical activity and rates of health-related absenteeism and presenteeism; and (b) explore which features of the wearable device used have the most impact on user physical activity and well-being (Giddens et al., 2017). Research suggests that WWPs using methods that are convenient for staff can improve rates of absenteeism (Biron et al., 2014) and presenteeism (Cancelliere et al., 2011), both of which contribute to losses in productivity levels (Driver et al., 2015). Therefore, the study utilized the Fitbit as the wearable device, and the intervention included a combination of walking challenges, health education and promotion, and incentives provided over an 8-week period.

Research Questions and Objectives

The study addressed the following research questions: (a) What is the relationship between levels of physical activity and employee work productivity? (b) Which features of the wearable technology device have the most impact on physical activity and well-being? Additionally, the study addressed the following research objectives:

RO1 – Describe WWP participants by identifying their age, gender, role in the organization, education levels, marital status, number of children, and annual household income.

RO2 – Determine if there is a relationship between the number of steps taken by participants and their rate of health-related absenteeism.

RO3 – Determine if there is a relationship between the number of steps taken by participants and their rate of presenteeism.

RO4 – Determine which features of the wearable technology device have the most impact on physical activity and well-being.

Significance of the Study

The study has the potential to improve employer investments in WWPs and encourage the use of a physical activity component as more than 50% of limited WWPs do not incorporate exercise (Mattke et al., 2014). Physical activity is a primary preventer of chronic health conditions (Booth et al., 2012). The study adds to the body of knowledge focused on the benefits of wearable technology in the workplace and will potentially offer insights into the use of wearable technology in WWPs. Additionally, the literature revealed no research that tied human capital theory to a WWP using wearable technology. The study offers insights into alternative employer interventions in organizations where employees have a higher risk for experiencing health problems.

Conceptual Framework

Because this study focuses on health behavior, two theories of human behavior provide the needed foundation: (a) Human Capital Theory (HCT); and (b) Self-Determination Theory (SDT). HCT, heavily researched by Theodore Shultz (1961) and Gary Becker (1962), focuses on the investment in the human capital of individuals to produce short-term and long-term value for society, organizations, and the individuals themselves. SDT, developed by Deci and Ryan (1985), focuses on the motivation of individuals in relation to tasks and activities while considering social influences, rewards,

and consequences. The following sections provide a context for key factors and how HCT and SDT provide the needed theoretical perspectives for this study.

Becker referred to *human capital* as the "economic approach to human behavior" (Becker, 1976, p. 3) and asserted that human capital requires investment in education, on-the-job training, and the health of individuals (Becker, 1962, 2007). The human capital of a person encompasses that individual's skills, knowledge, and health (Becker, 2008). In fact, the health of individuals is the most important human capital asset for organizations and is the means for the improving other forms of human capital (Bleakley, 2013). HCT will serve as an overarching foundation for the intervention and study.

While traditional WWPs have low participation rates due to the common barriers of time, convenience, and location (Mattke et al., 2013; Person et al., 2010), wearable technology can prevent the same barriers by allowing users to exercise and track their progress and health information simultaneously (Belsi et al., 2016). Additionally, researchers have determined that wearable devices improve the motivation of users and can meet their psychological needs and schedule needs (Asimakopoulos et al., 2017; Chesky, 2015; Karapanos et al., 2016). Giddens et al. (2017) recommends further research focused on the features of wearable technology, specifically the features that have the most impact on the physical activity and well-being of users. The intervention for this study includes a WWP that incorporates a wearable technology device. In addition to determining if there is a relationship between the physical activity levels of participants and their rates of absenteeism and presenteeism, another objective for this study is to determine the participants' perceptions of the key features provided by the wearable device in relation to their needs.

The concepts of SDT help to explain the motivation levels of participants in the present study. SDT focuses on human behavior in relation to three universal and innate psychological needs: (a) *competence* in completing tasks and activities; (b) *autonomy*, or self-control; and (c) *relatedness,* or inclusion with others (Deci & Ryan, 1985, 2000). Psychological needs, when satisfied, contribute to "health and well-being" (p. 74). When the psychological needs are unsatisfied, the effects contribute to "pathology and ill-being" (Ryan & Deci, 2000, p. 74). Additionally, SDT focuses on the motivation of individuals in relation to three types: (a) *intrinsic motivation* or doing something because it is enjoyable, challenging, or pleasing; (b) *extrinsic motivation* or doing something because it leads to rewards or shows compliance; and (c) *amotivation* or a state of not acting to produce change (Chen & Jang, 2010; Deci & Ryan, 1985). SDT describes motivation as being on a continuum from amotivation to extrinsic motivation to intrinsic motivation (Deci & Ryan, 1985). Ryan, Williams, Patrick, and Deci (2009) suggest that amotivation produces negative outcomes, and intrinsic motivation provides spontaneous rewards. However, extrinsically motivated goal-directed behavior produces positive outcomes when experienced in combination with high levels of autonomy. Even though exercise can be intrinsically or extrinsically motivated, physical activity, including exercise, is typically extrinsically motivated (Ryan et al., 2009).

Extrinsic motivation is described in four types, which also appear on a continuum: (a) external regulation, meaning that the person lacks autonomy and actions are guided by external factors; (b) introjected regulation, meaning that the person engages in behavior to avoid feelings of shame or to improve self-esteem; (c) identified regulation, meaning that the person values or starts to accept a behavior; and (d) integrated regulation,

meaning that autonomy is high and regulation is aligned with a person's goals and values (Ryan et al., 2009). According to SDT, the number of steps taken by participants should reflect the type of extrinsic motivation the person experienced during the intervention period, with integrated regulation producing a higher number of steps.

The study dynamics conceptualize that the wearable device contributes to motivation by meeting participant needs and providing instant data to report. The researcher hypothesized that a higher number of steps will correlate with a higher level of productivity. Figure 1 depicts the conceptual framework for the current study.

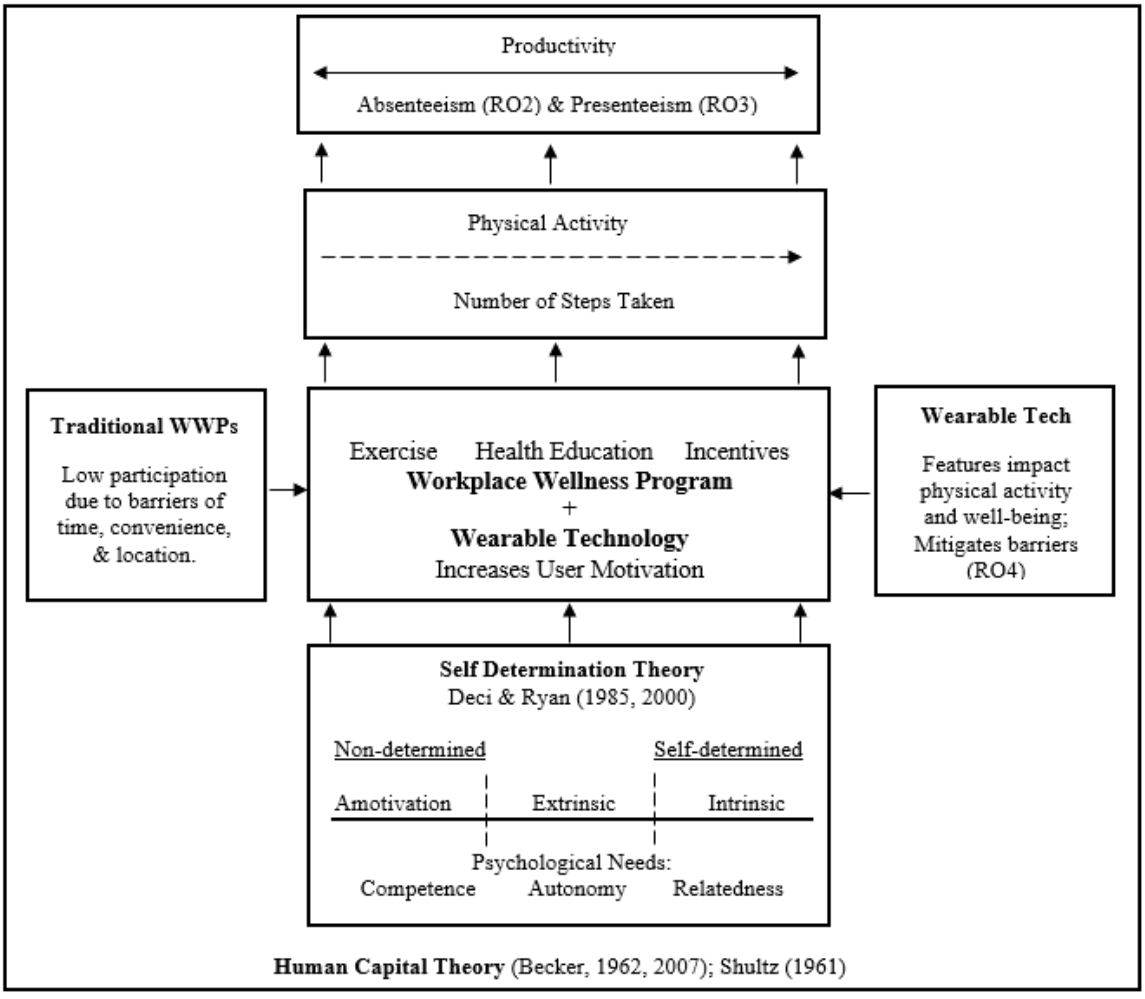


Figure 1. Conceptual Framework for Study

Limitations

The study measured changes in employee productivity levels by measuring rates of health-related absenteeism and presenteeism in relation to physical activity levels. However, survey data measuring absenteeism and presenteeism were based on employee perceptions only, which posed a threat to internal validity (Phillips, Phillips & Aaron, 2013). A second limitation is that the researcher worked in the same organization where the research occurred, which increased the potential for factors outside of the proposed study to impact the results. This limitation posed another potential threat to internal validity (Phillips et al., 2013; Swanson & Holton, 2009). Another limitation is that the study used a convenient sampling technique, asking for volunteers only, which could have potentially increased bias, so the findings may only apply to other individuals of similar demographics (Fink, 2003b). Finally, participants of the study consisted only of individuals working in a nonprofit social service organization in Alabama.

Delimitations

The current study had three delimitations. First, the study limited participation to full-time employees who work in the target organization, which is a nonprofit social service organization, to ensure that participants worked in the same occupation. Second, because the researcher worked in the target organization, the researcher assured participants that their confidentiality was secure and that their information would be stored in a password protected file on the researcher's home computer. Additionally, participants used tracking numbers for data collection purposes, and participants were informed that the researcher used only tracking numbers for storage purposes. Third, because research indicated that less than half of participants opt to participate in WWPs,

the study used a sample size of at least 40 to assure that 30 completed the intervention. Sampling reaches a normal distribution when the sample consists of 30 or more participants (Fink, 2003b).

Assumptions

The study included the following assumptions: (a) employees who participate in the project participated for the health benefits and not for the free wearable device; (b) the survey instrument effectively measured absenteeism and presenteeism; (c) the participants accurately recalled times when they were absent due to health-related problems as well as times when they were at work but unwell; and (d) there would be a positive completion and return rate for surveys administered. The study attempted to mitigate assumptions (a) and (b) by encouraging honest responses and strong dedication to the project for those who participated in the experimental group.

Definition of Key Terms

This section provides definitions for the key terms used in this study. The definitions provide clarification as the terms are not commonly known or understood. The key terms that are significant in this study include the following:

1. *Burnout* – A stress-related syndrome that occurs because of work-related stressors and consists of exhaustion, cynicism, and less professional efficacy (Schaufeli, Leiter, Maslach, & Jackson, 1996).
2. *Incentive* – "Something that incites or has a tendency to incite to determination or action" (Incentive, n.d.).
3. *Psychosocial* – A concept used to refer to the orientation of a person or their roles and systems in society (Roberts, 2009).

4. *Presenteeism* – "The phenomenon of employees staying at work when they should be off sick" (Demerouti, Le Blanc, Bakker, Schaufeli, & Hox, 2009, p. 50).
5. *Social Service Organization* – A nonprofit civic organization that operates specifically for the purpose of promoting the social welfare of a community or society (Carter, 2010).
6. *Wearable Technology* – Accessories or items of clothing worn comfortably and incorporate electronic technologies (Kiana & Michael, 2014).

Summary

WWPs have become increasingly popular in the United States due to the incentives organizations and employees gain in accordance with the ACA (2010). Many studies document the benefits of WWPs to not only the organization, but also individual employees (Boshtam et al., 2010; Burton et al., 2004; Fitzgerald & Danner, 2012; Gates et al., 2008; Goetzel et al., 2009; Hochart & Lange, 2011; Jung et al., 2012; Loeppke et al., 2008). Research findings reveal that effective wellness programs can save organizations healthcare and training costs and improve the health, happiness levels, job satisfaction and productivity levels of employees. Other studies have identified deterrents to employee participation in traditional WWPs: (a) location; (b) time; (c) trust in leadership; (d) lack of awareness; and (e) convenience (McManamy, 2016; RAND, 2013). A proposed solution to prevent deterrents and to allow organizations to invest in their employees' health is to implement a WWP using wearable technology.

Research is available on WWPs in different organizational settings. However, the frequency of formal WWP evaluation is low (Mattke et al., 2013). The purpose of this

study was to be determine if there is a relationship between the level of physical activity by those who participate in a WWP, in steps taken, and their rates of absenteeism and presenteeism. The following study adds to the body of knowledge focused on the benefits of wearable technology in the workplace and offers insights into the use of wearable technology in WWPs.

The study consists of four additional chapters. Chapter II contains the literature reviewed which contributed to understanding the research problem as well as the theoretical constructs that support the study. Chapter III includes the methodology used to complete the study. Chapter IV presents the results, and Chapter V discusses the findings of the study.

CHAPTER II – LITERATURE REVIEW

Recent research indicates that employers are becoming increasingly interested in investing in benefits that focus on the health and wellness of employees (Society for Human Resource Management [SHRM], 2017). Without comprehensive and effective WWPs, the United States workforce faces a continued increase in the prevalence rates of noncommunicable diseases (Alexander & Lambert, 2013). In fact, the World Health Organization (WHO) estimates that 14.3% of Americans between the ages of 30 and 70 are likely to die from four main types of noncommunicable diseases, including cardiovascular diseases, diabetes, cancer, and chronic respiratory diseases (WHO, 2014). HHS (2015a) states that chronic and non-communicable diseases correlate with obesity, which has a significant economic impact on the U.S. healthcare system and indirectly costs the American workforce via losses in productivity. Obesity alone is a major problem for employers because of its adverse effects on work performance and its economic impact on organizations (Pronk et al., 2004).

While the health of employees is not solely the responsibility of companies, the American Health Policy Institute (AHPI) researched and determined that employers are more likely to continue taking an active role in their employees' health through the provision of health insurance benefits to retain qualified staff (Troy & Jones, 2016). AHPI found that organizations are more open to accepting guidance on the most cost-effective solutions and methods to decrease their bottom-line costs in relation to employee health (Troy & Jones, 2016). Therefore, WWPs are more appealing to employers now, not only for the health benefits but for the financial incentives put in place by the ACA (Madison et al., 2011).

Because effective WWPs depend on the cooperation and motivation of participants (RAND, 2013), the use of psychological theory is necessary for this study. The field of Human Capital Development recognizes the importance of focusing on social systems and the individual performer when attempting to develop human capital (Swanson & Holton, 2009). A theoretical perspective focused on human behavior and reward systems helps in providing a framework for the proposed study. A relevant theory is Self-Determination Theory (Deci & Ryan, 1985), which emphasizes motivation as an indicator of the learning, application, and change processes. SDT focuses on the individual but considers social influences in the motivation process.

This study utilizes HCT (Becker, 1962, 1993) as an overarching theoretical perspective to encompass the efforts in determining if a WWP using wearable technology can increase employee performance and well-being. Human capital development not only draws from psychological theory but also from economic and systems theories (Swanson & Holton, 2009). Therefore, the proposed study focuses on two aspects of participant experience: (a) the social reward system as an indicator of motivation and (b) the economic return as demonstrated by levels of change in the performance variables of productivity and job satisfaction.

This chapter investigates the types and components of WWPs, legislation surrounding WWPs, the benefits and challenges of WWPs, the relevance of wearable technology in WWPs, and the target population's need for the implementation of WWPs. As a part of addressing the need for the intervention, this chapter investigates specific problems relating to the target population that justify the need for the intervention and study. The sections of the chapter devoted to the target population focus on common

attributes and the implications of using a WWP to impact performance variables. Additionally, this chapter investigates theories in human behavior and human capital development to provide a framework for studying a WWP intervention.

Types of Workplace Wellness Programs

The ACA (2010) divides WWPs into two categories: (a) participatory wellness programs and (b) health-contingent wellness programs. Participatory wellness programs are those programs that do not provide a reward, or do not provide conditions for obtaining a reward, other than participating in the program. The reward is not based on outcomes. In contrast, health-contingent programs require that an employee meet a standard tied to a health outcome before providing a reward. These programs may require individuals to meet goals in relation to weight or other biometrics (height, weight, blood pressure, blood-glucose levels, etc.; ACA, 2010). Despite legislation categorizing programs, the ACA does not provide a universal definition or structure for a wellness program, and employers are free to operate their programs how they choose (ACA, 2010).

Research conducted by Mattke et al., (2014) for the U.S. Department of Labor identified five different program configurations in WWPs across the nation: (a) limited; (b) comprehensive; (c) screening-focused; (d) intervention focused; and (e) prevention-focused. Mattke et al. (2014) found that employers remain focused on screening for health risks, lifestyle management, and disease management as primary program components. However, employers may restrict the scope of use of certain program components depending on the type of program. Additionally, each program configuration has a unique definition as seen below.

1. Limited – Limited programs include activities such as health risk screening, lifestyle management, and disease management. However, this type of program limits activities. Screening does include the collection of biometric data. Most programs do not offer disease management activities, and only 40% of limited programs include an exercise component.
2. Comprehensive – Typically, these programs include comprehensive activities in relation to screening, lifestyle management, and disease management.
3. Screening-Focused – These programs include multiple levels of screening tests, which collect more information than comprehensive programs. However, employers who start this type of program typically limit lifestyle management activities, while disease management activities can vary depending on the employer and program design.
4. Intervention-Focused – Employers who implement this type of program typically design these programs to heavily focus on lifestyle management and disease management. This type of program does not put emphasis on screening activities.
5. Prevention-Focused – The design of this type of program mirrors comprehensive programs in relation to lifestyle management but limits activities in relation to disease management and screening (Mattke et al., 2014).

The study reported that approximately 34% of programs fit into the limited category, while 13% are screening-focused, 20% are comprehensive, 21% are intervention-focused, and 12% are prevention-focused (Mattke et al., 2014).

Mattke et al. (2013) state that WWPs provide one of two types of interventions: (a) disease prevention; and (b) diagnosis and treatment of disease. The disease

prevention category is primary prevention, and the diagnosis and treatment category is secondary prevention. Most WWPs fall under the primary prevention category and, therefore, focus on providing information to participants on lifestyle topics such as nutrition, health education, smoking cessation, and substance use, with many programs having an exercise component (Mattke et al., 2013). Disease prevention programs are appropriate as the CDC (2017b) states that common chronic diseases are preventable. Heart disease, stroke, cancer, diabetes, and obesity are among the top chronic conditions and are the leading causes of death for Americans and individuals across the globe (CDC, 2017a).

Legislation Surrounding Workplace Wellness Programs

WWPs have rapidly gained attention from American employers since the inception of the Affordable Care Act (ACA; 2010), not only because of the predicted savings in healthcare costs but also for the implied health benefits to employees (Levenson, 2015). The ACA (2010) provides current guidelines for incentives that employers can offer employees in exchange for participation in wellness programs (Miller, 2016). Employers benefit financially from implementing a qualified WWP as employers gain tax deductions in relation to medical-related costs and program offerings that align with the governing legislation (Incentives for Nondiscriminatory Wellness Programs Rule, 2013). The benefits can greatly help employers improve their benefits packages. However, many employers have not fully understood the limitations of the legislation and how the Internal Revenue Service (IRS) interprets its meanings. Recent clarifications include that employers cannot deduct incentives, including cash rewards or gift cards, from the taxable gross income of an employee for simply participating in a

program (Internal Revenue Service [IRS], 2016). Additionally, the IRS states that employers may not exclude reimbursements from an employee's income for WWP participation if the premium occurred through a salary reduction from a cafeteria plan sponsored by the organization (IRS, 2016).

Even though WWPs focus on health, the ACA (2010) qualifies programs that do not incorporate an exercise component. A program qualifies when participating individuals simply complete a health risk assessment (HRA; Incentives for Nondiscriminatory Wellness Programs Rule, 2013), which consists of questions focused on health risk and behaviors and that may include the collection of biometric data (Mattke et al., 2014). The ACA allows employers operating wellness programs, with or without an exercise component, to utilize the tax deductions and offer incentives (Incentives for Non-discriminatory Wellness Programs Rule, 2013).

Financial Incentives and the ACA

The ongoing debate about employers using financial and other incentives to promote enrollment in wellness programs has become more intense since the ACA passed (Bagenstos, 2017; Madison et al., 2011; Pomeranz, 2015). The Affordable Care Act (2010) allows companies to increase incentives for participation in wellness programs from 20% to 30% of the cost of health coverage. The Incentives for Nondiscriminatory Wellness Programs in Group Health Plans Rule (2013) allows employers to offer incentives in different forms such as discounts or reimbursements on gym memberships, reductions on co-pays, or contributions to health savings accounts. However, Pomeranz (2015) cites that under the legislation such incentive programs may also penalize individuals who fail to complete an HRA, which is in violation of both the

Americans with Disabilities Act (1990) and the Genetic Information Nondiscrimination Act (2008) as they both state that employers cannot require a disclosure of medical and genetic information. Therefore, employers "should" voluntarily provide all health information to employees according to the Americans with Disabilities Act (1990) and the Genetic Information Nondiscrimination Act (2008). Even though employers that enforce penalties believe that they are looking out for the balance of insurance costs, unions and other opponents believe that penalties for nonparticipation in wellness programs are unethical (Finkelstein, Linnan, Tate, & Birkin, 2007).

Despite wording in the ACA legislation, scholars believe that there are ethical considerations for penalizing employees who do not meet specific health contingencies. Pearson and Lieber (2009) argue that employers should tie incentives to voluntary actions and not to biometric measures because genetics may prevent a participant from reaching a targeted goal. Madison et al. (2011) assert that other types of measures "may be less ethically problematic" when employers tie incentives to specific behaviors (p. 17). An example given is tying incentives to a smoking cessation program rather than only providing an incentive when one stops smoking due to potential genetic ties to severity levels of nicotine addiction. According to Pomeranz (2015), the ACA allows penalties for nonparticipation in participatory wellness programs, even with the completion of a HRA. Penalties are allowable for health-contingent programs as well, and the ACA allows employers to penalize employees who do not participate (Pomeranz, 2015). A penalty can come in the form of an additional surcharge for an employee's health insurance plan. An incentive, in this case, would be to participate and not pay the surcharge. Pomeranz (2015) concluded that employers may be open to lawsuits for

enforcing penalties and that Congress could consider further protections for employees against penalties.

The Health Information Portability and Accountability Act and WWPs

HHS (2015b) states that organizations that implement a WWP must comply with the Health Insurance Portability and Accountability Act (HIPAA; 1996) guidelines as set forth by the U. S. Federal government (2015). HIPAA rules do not directly apply to employers. However, once an employer collects health information, with the intention to store and measure changes in biometric statuses, the health plan becomes a covered entity under HIPAA (Larose, Katz, & Zahedi, 2017). Therefore, employers implementing a WWP with the intention of collecting biometric data should take security and confidentiality precautions to ensure they remain in compliance with HIPAA.

The Benefits of Workplace Wellness Programs

Many large-sized organizations have increased the complexity of wellness programs by offering flu shots, lunchtime educational sessions, and gym memberships (Mattke et al., 2012). Approximately four-fifths of large employers provide HRAs, disease management, case management, and nursing service lines to individuals who have chronic conditions (Fronstin & Roebuck, 2015). In addition, research estimates that one-half of those organizations offer financial incentives to participating employees. Research suggests that large-sized organizations employing more than 1,000 employees are more likely to offer wellness programs (Bondi, Harris, Atkins, French, & Upland, 2006). Hannon, Hammerback, Garson, Harris, and Sopher (2012) assert that many white-collar organizations have higher participation rates.

Even though large, white-collar organizations provide WWPs more frequently than low-wage industries, research focused on WWPs has reached small (100 or less employees) and mid-sized organizations (100 to 999 employees; Hannon et al., 2012). Business classifications vary depending on government and business definitions. The BLS defines organizations according to the number of employees in a class system (1-9), with class 9 being the largest (1000 employees or more) and organizations that fit within classes 6 through 9 having 250 employees or more (BLS, 2016). Through their research, Hannon et al. (2012) found that employees of small and midsized organizations categorized in blue-collar and low-wage industries are often receptive to participating in WWPs. Their receptivity is beneficial to employers as low-wage workers with household incomes less than $35,000 per year have more health risk behaviors than individuals with higher household incomes (Harris, Huang, Hannon, & Williams, 2011).

Beresford et al. (2010) conducted a follow-up study with mid-sized, blue collar organizations that implemented a WWP, specifically the '5 a Day' intervention focused on an increase in the fruit and vegetable consumption of workers. A total of 44 organizations had originally participated in the initial intervention, but only 29 participated in the follow-up study. A total of 17 organizations agreed to participate in the experimental group, with 12 agreeing to participate in the comparison group. The researchers found there to be a sustained increase in fruit and vegetable intake for over 2 years after the intervention ended and for 4.5 years after baseline enrollment. The authors noted that the findings suggest that the inclusion of "simple, straightforward, and positive messages" (p. 716) in WWPs can reach across educational levels.

Mattke et al. (2013) conducted a study that consisted of a literature review, a survey of 50 public and private employers, and case studies involving five employers with established wellness programs. During the study process, the team found five factors that increase wellness program success: (a) effective communication strategies; (b) opportunities for employees to engage; (c) leadership engaged at all levels; (d) the use of existing relationships with resources; and (e) continuous evaluation. The findings align with research focused on challenges to employee participation. Other research indicates that lack of time, awareness, convenience, location, and trust in leadership are factors that prevent employee participation in WWPs (Berry, Mirabito, & Baun, 2010; McManamy, 2016; RAND, 2013). Hannon et al. (2012) found cost to be an added barrier to participation during a qualitative study of a mid-sized organization's wellness program.

Harden, Peerman, Oliver, Mauthner, and Oakley (1999) conducted a study focused on the evaluation of over 100 WWPs operating in the United States and in the United Kingdom. The study uncovered 15 methodologically sound outcome evaluations, with 13 being in U.S. organizations. The study findings revealed that strategically promising programs are those that are comprehensive, meaning that they not only focused on the individual level but also on the environmental and organizational levels. The authors noted that the comprehensive programs studied correlated with strong employee partnerships. However, there were programs found to be partially effective, specifically those that had a focus on healthy eating, skill development, and substance abuse.

A 12-week pilot study focused on a worksite wellness program measuring health behaviors and biometrics (blood pressure, anthropometric, and hematologic) found positive changes in participants (Stoler et al., 2006). The program offered 12 weekly sessions on exercise, nutrition, and health behavior modifications. The researchers took anthropometric and hematologic measures in weeks one and twelve. There were significant changes in body weight, body mass index, waist circumference, waist-hip ratio, cholesterol, and blood pressure, with decreases but nonsignificant changes in blood glucose levels and body fat percentages (Stoler et al., 2006).

Employee participation in effective WWPs produces benefits that significantly outweigh the costs associated with operating a program. Loeppke, Edington, Bender, and Reynolds (2013) conducted a large study with 15 organizations, obtaining participation from 7,804 employees over a 2-year period. The intervention included a personalized prevention plan that integrated both primary and secondary prevention strategies as well as a tertiary strategy that included early intervention and evidence-based chronic condition management. The timeframe allowed the researchers to compare participants' baseline HRA data at the first-year mark and then again at the second-year mark. The study researchers collected biometric information as well as risk factors related to alcohol use, physical activity, and tobacco use during all three HRA screenings. The findings revealed that 24% of the participants (1,795) significantly reduced their health risks at the second year HRA.

A quantitative study using an intervention called Worksite Opportunities for Wellness focused on the impact of obesity on cardiovascular disease. The study sampled employees who worked in at least one of two worksites at a medical facility located in St.

Louis, Missouri. The study lasted one year and enrolled 151 participants, with HRA data collected after initial enrollment and then again at project end. However, the researchers only included 123 employees' data in the analysis as 28 did not complete all stages of the study. The researchers randomly assigned the two groups after enrollment. Worksite A included the HRA plus the intervention, while Worksite B only included the initial HRA. Worksite A's program included a combination of HRA data collection, nutrition education, physical activity, and incentives. The findings revealed that improvements occurred at both worksites in relation to fitness, blood pressure, and cholesterol levels. The researchers found added improvements in Worksite A employees in relation to body mass index, fat mass, prevalence of a metabolic syndrome and the Framingham risk score (Racette et al., 2009).

Additional Benefits of WWPs

WWPs not only benefit employers, they benefit the employees who participate. Research has identified many benefits to organizations: (a) reductions in health-related absences (Goetzel et al., 2009; Loeppke et al., 2008); (b) reductions in medical cost (Goetzel et al., 2009; Hochart & Lange, 2011); and (c) better productivity levels (Burton et al., 2004; Gates et al., 2008); (d) reductions in overall absenteeism rates (Biron et al., 2014); and (e) positive effects on rates of presenteeism (Cancelliere et al., 2011). Likewise, research has also found multiple benefits of WWPs for employees: (a) lower prevalence rates of disease (Boshtam et al., 2010; Jung et al., 2012); (b) increased happiness levels with more organizational commitment (Fitzgerald & Danner, 2012); and (c) the overall quality of life for employees who participate (Dallat et al., 2013). The following sections cover the benefits to the aging workforce and the impact that an

effective WWP can have on the performance variables of productivity and job satisfaction.

Pitt-Catsouphes, James, and Matz-Costa (2015) state that the shifting demographics of the workforce suggest the importance of linking age, work, and health. Despite medical advances and improvements in the field of healthcare, there is still a positive relationship between age and chronic medical conditions (Lind & Noel-Miller, 2011). Through their research, Pitt-Catsouphes et al. (2015) found that over half of adults age 50 and older have hypertension, 44% have high cholesterol (Lind & Noel-Miller, 2011), and of U.S. workers between the ages of 45 and 64, 31.2% have a significant increase in body mass index measurements in comparison with workers between 18 and 29 years of age (Luckhaupt, Cohen, Li, & Calvert, 2014). Although there are challenges to participation for older individuals, the potential benefits of offering programs to aging workers can be tremendous. Research indicates that older workers engaged in their work use less healthcare resources, are absent from work less, experience less stress, and remain in the workforce longer (Gallup Organization, 2006). Additionally, Pitt-Catsouphes et al. (2015) assert that WWPs can help increase work engagement levels and productivity in workers as they age.

The Impact of WWPs on the Study's Performance Variables

The benefits of participating in a WWP extend not only into the realm of personal health for employees, but also into work performance. Pronk (2014) states that employers turn to WWPs to support increased employee health and productivity rates as well as decreased absenteeism and costs of medical care. The Automatic Data Processing Research Institute (2012) conducted a study using a 2011 survey focused on assessing

employer motivation for starting WWPs. The survey results revealed that 78% wanted to improve employee health, 71% wanted to reduce medical costs, 42% wanted improvements in productivity, and 43% wanted a reduction in absenteeism rates.

Both absenteeism and presenteeism have significant costs to organizations. However, research has demonstrated that effective WWPs help in decreasing the rates of both absenteeism (Gaoshan, 2014) and presenteeism (Cancelliere et al., 2011). While absenteeism is apparent and reflected in weekly timesheets, Ammendolia et al. (2016) state that presenteeism is a hidden cost since the employee is present in the workplace but unable to effectively perform tasks. Goetzel et al. (2004) assert that presenteeism costs outweigh healthcare costs and account for between 18% and 60% of the costs associated with both physical and mental health problems. Findings from their research indicate that presenteeism costs in the United States exceed $180 billion per year while absenteeism only accounts for approximately $118 billion.

WWPs programs have demonstrated their effectiveness in increasing productivity over time. Burton et al. (2004) and Dallat et al. (2013) both found results indicating that productivity levels increase when employers implement effective WWPs. Burton et al. (2004) used absenteeism rates to calculate productivity levels, while Dallat et al. (2013) compared absenteeism rates with physical activity and quality of life to determine if productivity levels increased or decreased due to the wellness interventions implemented. Burton et al. (2004) asserted that the indirect costs associated with an employee's absence because of illness relates to a loss of productivity. Other research focused on WWPs has used both absenteeism and presenteeism to determine productivity rates. Driver et al. (2015) reported research findings focused on associations between cardiovascular health

and productivity. The researchers measured both absenteeism (due to sickness) and presenteeism rates to determine productivity rates. They found a positive correlation between high cardiovascular health and lower absenteeism and presenteeism.

Fitzgerald and Danner (2012) found increases in happiness levels and organizational commitment for employees who participate in WWPs. Abdullah and Lee (2012) found that job satisfaction was greater for participants of WWPs than those who did not participate. Study findings indicated that stress levels and absenteeism both decreased as a result. Additionally, Dallat et al. (2013) found increases in the overall quality of life for participants. Research indicates that WWPs are valuable strategies for the mental health and satisfaction levels of employees.

Barriers to Participation in Workplace Wellness Programs

DeVries (2010) states that employers are overcoming participation challenges due to a combination of new WWP architectures, technology, and incentives. However, multiple studies and findings reveal common challenges preventing employees from participating in wellness programs. Common barriers to employee participation are time, convenience, and location (Chesky, 2015; McManamy, 2016; Person et al., 2010; PWC, 2014; RAND, 2013). Haines et al. (2007) identified lack of motivation as a barrier, while Person et al. (2010) identified health beliefs as another source of resistance to participation. Person et al. (2010) adds that despite there being commonly identified barriers, researchers suggest that barriers will vary for different groups.

Scherrer, Sheridan, Sibson, Ryan, and Henley (2010) conducted a qualitative study in Australia focused on data collection from employee journals where participants recorded their thoughts and feelings about their participation through a guided

introspection technique. A total of 27 out of 56 employees agreed to participate in at least one of the journaling rounds (out of four), which allowed for the researchers to collect a sound amount of information. The study results determined that time is a major barrier to participation. Another barrier noted was team structure as the program assigned employees to teams so that participants could engage in healthy competition.

Bangum, Orsak, and Chng (1996) used a 67-item questionnaire to determine common barriers to participation. The study focused on a large company in north Texas. The research noted that 1,500 employees with the company participate in the wellness program. The researchers randomly sent questionnaires to 300 participants of the wellness program and to 600 non-wellness program participants. The research identified time, inconvenience, and a lack of motivation as being the most common barriers, even though perceptions of time and inconvenience varied by subgroup.

Person et al. (2010) conducted a study in a university setting, focused on a wellness program in which faculty and staff members were welcome to participate in addition to students. The sample only included faculty and staff members, which consisted of a racially and professionally diverse population. The program was prevention-focused as it heavily focused on lifestyle concepts and less on screening and disease management. The study findings revealed that time, inconvenience, location, lack of motivation, lack of awareness (marketing), insufficient incentives, and health beliefs were significant barriers to participation. Health beliefs ranged from believing that employees felt they knew enough about their health to feeling as if their health was none of their employer's business. Although not as significant, employees in other

settings have identified support from leadership as another barrier to employee participation (Bangum et al., 1996; Mattke et al., 2013).

To account for these barriers, program managers must consider challenges during the design phase of a program and prior to implementation. Berry et al. (2010) identified six pillars for a strategically designed and successful wellness program: (a) multilevel leadership; (b) alignment; (c) scope, relevance, and quality; (d) accessibility; (e) partnerships; and (f) communications. In addition, Grawitch, Ledford, Ballard, and Barber (2009) suggest that employers should consider the use of employee involvement when designing, implementing, and modifying wellness program dynamics.

The Relevance of Technology in Workplace Wellness Programs

Because the popularity of WWPs has grown with time, employers are now designing WWPs with more creativity to ensure that programs are cost-effective and comprehensive enough to fit the needs of the company. Wireless technology is among one of the most valuable and evolving tools that is increasing the capabilities of WWPs (DeVries, 2010). The author accounted for wireless technology that allows for health information tracking without the need for face-to-face monitoring or the manual entry of data into a log book or on a website. The wireless accelerometer, a device designed to clip to one's shoes for tracking steps, tracks the length and intensity of an activity, the distance, and the number of calories burned. DeVries (2010) asserts that combination of technology and new program architectures, which include integrated wellness solutions, tele-health coaching, more robust programs, meaningful incentives, and expanded program structures, is helping with better employee health outcomes and increased participation rates.

Since DeVries' 2010 article, innovators have created newer wireless technology devices that are now helpful in tracking health information. Fitbit, an American company focused on wireless tracking devices, published a press release with results from two organizational studies where employer costs significantly decreased, while employee health outcomes significantly increased (Fitbit, 2016). Company A's (Dayton Regional Transit Authority) primary focus was to save on healthcare costs. The company implemented a pilot program that included the company offering the Fitbit device to all 600 employees, the screening of biometrics, health coaching, incentives, and goal setting and monitoring. Company A found a $2.3 million cost savings to the employer and increases in employee health outcomes such as significant decreases in cholesterol and blood glucose levels. The study lasted for one year (Fitbit, 2016). Company B (Springbuk) conducted a study of their Fitbit program over a 3-year period, with the company establishing a baseline over the first year and program dynamics lasting for two years. The study included a sample of 2,689 out of 20,000 employees. The researchers measured biometrics and healthcare costs over the period of the study to find that 866 of the individuals from the sample had significantly lower healthcare costs ($1,292 less) on average than employees in the control. The two studies' findings indicate that wireless technology devices can enhance a WWP's dynamics. In addition, the study identified a positive correlation between the number of steps taken by participants and the cost savings in relation to health care (Fitbit, 2016). Landi (2016) states that despite wireless technology devices' ability to improve the quality of and participation in WWPs, other researchers noted that wearable devices may not offer advantages for standard weight loss approaches.

A 3-year Finnish study focused on the use of information and communication technology for collecting and monitoring health data in a primary prevention WWP (Nikayin, Heikkila, Reuver & Solaimani, 2014). The authors noted that information and communication technology allows for data collection by sensors in watches, necklaces, and even smartphones. The study involved the use of mobile apps and social media that encouraged ongoing exercise and appropriate sleep patterns as well as a web-based platform for the collection and storage of health data. Participants first received a medical evaluation with a Medical Doctor, who also prescribed physical exercise. Then, the participants met with a pharmacist who explained the information every three months during check-ups. The doctor conducted annual evaluations for participants to observe progress. The study was qualitative in nature, and the researchers conducted 15 interview sessions over the three years. The study found that most individuals (80%) were familiar with e-health technologies. Therefore, the researchers encouraged the use of more technology-based options. The authors also found that it may be more motivational for participants to monitor their own fitness. The use of information and communication technology was beneficial to both the participants and the doctor as both could monitor and access their biometric readings.

Asimakopoulos et al. (2017) conducted a mixed methods study aimed at determining the impact that wearable technology has on user motivation during exercise. Their study used the criteria of self-determination theory (SDT) to determine motivation and if the use of wearable technology met user needs. SDT focuses on human behavior in relation to three universal and innate psychological needs: (a) *autonomy* or self-control; (b) *competence* in completing tasks and activities; and (c) *relatedness* or

inclusion with others (Deci & Ryan, 1985, 2000). The results revealed that "user motivation and self-efficacy are highly dependent on successful data, gamification, and the content design of applications as well as the sensing content and providing appropriate motivational feedback to the user" (Asimakopoulos et al., 2017, p. 10). The results suggested that the intervention met the psychological needs of users through the monitoring of application and competition with other users. Karapanos et al. (2016) conducted a similar study and determined that wearable devices enhance feelings of autonomy and relatedness and are capable of boosting user self-esteem. Giddens et al. (2017) found that extended use of wearables can improve employee well-being and physical activity levels. However, Giddens et al. (2017) recommend research on which features of wearable technology that have the most impact on the physical activity levels and well-being of users.

The Effects of Wearable Technology on Common Barriers to Participation

As discussed previously, numerous research studies identify common barriers to employee participation in WWPs, which include a convenience, a lack of time, and location (Berry et al., 2010; McManamy 2016; RAND, 2013) and cost (Hannon et al., 2012). Even though these barriers are common, wearable technology has the potential to mitigate each of them. Ramey (2013) asserts that workplace technologies remove boundaries and save time. Wearable technologies allow individuals to monitor their progress and set their own goals while also allowing them to exercise at the time of their choice and at a convenient location (Belsi et al., 2016).

Although the features of wearable technologies can vary depending on the product or version of the wearable device used, the features of wearables provide users

with capabilities to monitor and track activities (Giddens et al., 2017). Typically, wearable users access features via the wearable device's electronic applications (Asimakopoulos et al., 2017). The Fitbit product provides features that allow for self-tracking of sleep patterns, step counts, and goal setting while promoting group competition and the ability to connect with other users (Giddens et al., 2017). Asimakopoulos et al. (2017) found that users prefer features that improve how they see their motivation and activities relate.

Among the wearable devices currently available, the Apple Watch is the top wearable product on the market (CNET, 2017). The Apple Watch provides users with the ability to track fitness and to sync the device to their phone for listening to music while exercising in addition to communication features that allow users to talk and send texts to others (CNET, 2018). However, Fitbit devices have less features but are more affordable and rank highly among fitness device products on the market today (CNET, 2017). The remainder of this section will focus on the perceived barriers of WWPs and the potential for wearable technology to overcome these barriers. Additionally, this section will include potential limits of wearable technology.

The Effects on Convenience. Kiana and Michael (2014) assert that "the purpose of wearable technology is to create constant, convenient, seamless, portable, and mostly hands-free access to electronics and computers" (para. 3). Additionally, as the number of product options has increased, research has identified convenience as a benefit of wearable technology (PWC, 2014). While convenience may seem simply like a description of circumstances, Yoon and Kim (2007) suggest that convenience in relation to technology is based on the perceptions of individuals and their ability to complete

work in a convenient time, place, and manner. However, usefulness influences the adoption of wearable technology, specifically in relation to health (Zhang, Luo, Nie, & Zhang, 2017). Zhang et al. (2017) conducted a quantitative study exploring factors that influence adoption intentions of users of healthcare wearable technology. The findings revealed convenience and credibility both positively impact adoption intentions, while usefulness influences adoption.

The Effects on Time. Because consumers continue to want faster delivery times in today's global market, effective time management is essential in meeting organizational goals (Farrell, 2017). Time is a key benefit of wearable technology, in addition to increased productivity levels, overall health improvements, and organizational efficiency (PWC, 2014). BridgeCrest Medical (2015) asserts that wearable technologies allow for real-time data-collection, mitigating the need for employees to be present for monitoring. Additionally, wearable technology helps with uninterrupted task and workflows which will add to a user's speed (Krueger, 2016).

The Effects on Location. Traditional WWPs, where the employer purchases or provides an employee with discounts on a gym membership, would require the individual to be at the location to perform the exercise. Wearable technology devices are beneficial as they do not require the individual to be at a specific location to perform an exercise or for monitoring (Belsi et al., 2016). Additionally, current wearable devices are known to provide accurate information in relation to physical movement and location allowing for employers to track employees if wanted (Aldana, 2016).

The Effects on Cost. Cost is most relevant in WWPs where employers do not have adequate resources and participation comes at a cost to the employee (Hannon et al.,

2012). Likewise, an employee who decides not to participate in a wellness program due to feeling that their employer is becoming too intrusive about their health will potentially pay more for their monthly health insurance premium due to the ACA's penalties (Pomeranz, 2015). The use of wearables can save costs for employees in these situations as the benefit of convenience may persuade the employee to participate.

Employer Limits in Using Wearable Technology

Because designers incorporate wearable technology into clothing or design them as accessories, wearable devices are oftentimes small but capable of performing many tasks (Kiana & Michael, 2014). However, research identifies two major limitations of wearable technology: (a) size in relation to task performance (Medium, 2011) and (b) the protection of health information (LaRose et al., 2017). Therefore, it is important for employers to consider limitations and how they plan to utilize wearable technology in the workplace prior to implementation.

The size of many wearables limits the number of tasks that the technology device can perform, such as communication and knowledge searches (Medium, 2011). The Apple Watch has since made it possible for individuals to communicate. However, most wearable devices still lack this capability (Crothers, 2015).

The issue of protected health information in relation to wearable devices is another limitation for employers to considered. HIPAA rules do not directly apply to employers. However, once an employer collects health information, with the intention to store and measure changes in biometric statuses, the health plan becomes a covered entity under HIPAA (Larose et al., 2017). If an employer sponsors a wellness program and collects biometric data through a wearable device, the U. S. government considers this

health information as protected (Protected Health Information, 2011). Therefore, employers implementing a WWP with the intention of collecting biometric data should take security and confidentiality precautions to ensure they remain in compliance with HIPAA.

Human Capital Theory

Researchers have defined human capital in slightly different ways over the years. Theodore Shultz (1961) referred to human capital as the acquired skills and knowledge possessed by individuals that adds value to the economy. Gary Becker defined human capital as being the skills and abilities of individuals that develops through the investment of education, on-the-job training, and health care (1962). He later discussed the development of human capital in terms of being an economic approach to human behavior (Becker, 1976), which he thoroughly covered in his 1976 publication and where he linked economics to the personal, financial, political, and professional behaviors of individuals. Ian Baptiste (2001) defined human capital as the "knowledge, attitudes, and skills that are developed and valued primarily for their economically productive potential" (p. 185).

Schultz (1961), a major contributor of human capital research prior to Becker, believed that the development of human capital requires investments. Examples of investments include "direct expenditures on education, health, and internal migration to take advantage of better job opportunities" (Shultz, 1961, p. 1) as well as "foregone earnings by mature students attending school, and by workers receiving on-the-job training" (Schultz, 1961, p. 1). Becker (1962) asserted that the many ways to invest in human capital included "schooling, on-the-job training, medical care and acquiring

information about the economic system" (p. 9). In addition, the amount of investment is relative to the actual return, or perceived return of the investor, as well as on the earnings of individuals (Becker, 1962). Both Becker and Shultz agreed that investments in health contribute to human capital.

Health as Human Capital

While the health of an individual impacts human capital (Becker, 1962), research credits education as having a significant impact on the earning potential of individuals (Becker & Chiswick, 1966). Investments in education produce greater returns later in an individual's life because educational costs typically come earlier in life and returns increase at later ages. Therefore, the return on educational investments increases when individuals live longer (Becker, 1962, 1993). Becker (2007) later noted that increases in health and longevity will cause greater investments in education because the returns on education will be greater. Becker (2007) also asserted that there are three interrelated developments that contribute to the study of health in relation to human capital:

1. The analysis of optimal investments in health by individuals, drug companies, and to a lesser extent by governments;
2. The value of life literature that analyzes how much people are willing to pay for their improvements in their probabilities of surviving different ages; and
3. The importance of complementarities in linking health to education and other types of human capital investments, and in linking investments in health to discount rates, to fighting diseases, and to other changes in survivorship rates. (p. 379-380)

Increases in survivorship contribute to more investment in goods, specifically goods that contribute to healthy habits and discourage unhealthy ones (Becker, 2007). Becker (2007) asserts that good habits and education correlate with a longer life. Additionally, the likelihood of surviving a disease increases the likelihood of overcoming other diseases (Becker, 2007).

Hokayem and Ziliak (2014) assert that if the health of an individual impacts the number of days worked, and the time spent working influences the skills gained from a job, different levels of health will influence human capital levels. Their assertion aligns with past research as Becker (1962, 2007) and Mushkin (1962) both emphasized the importance of health as human capital in their research. Although researchers have produced more literature focused on the value of health in human capital over the past 10 years, it is still imperative that organizations understand the benefits of investing in employee health so that employers make strategic investments in employees (SHRM, 2017).

Hokayem and Ziliak (2014) state that both spending on medical costs as well as leisure time, which is oftentimes (or a small portion) spent doing exercise and other activities that promote health, are investments in human capital. Through their research and analysis, and as hypothesized initially, the level of an individual's health has a direct impact on sick time (Hokayem & Ziliak, 2014). In addition, future wages increased at a decreasing rate due to declining health. These findings align with Becker (1962) who stated that, with age, earnings increase at a decreasing rate, with a positive correlation to a level of skill the individual possesses.

Graff-Zivian and Neidell (2013) refer to the importance of health and human capital as an "engine for economic growth" (p. 689). While research has determined that health conditions, both physical and mental, can affect the acquisition of human capital (Currie & Stabile, 2006), more recent research indicates that health status directly impacts the productivity levels, labor supply, and the cognitive abilities of employees (Graff-Zivian & Neidell, 2012). Other research indicates similar associations. Orhnberger, Fichera, and Sutton (2017) found strong connections between the physical and mental health of individuals. Increased physical health correlates with higher physical activity levels, as well as social connections, and past levels of physical health effect the present mental health of an individual (Orhnberger et al., 2017). Additionally, research findings showed a positive correlation between past mental health and present physical health.

Self-Determination Theory

Self-Determination Theory (SDT) is a macro theory that research shows has "differentiated the concept of goal-directed behavior" (Deci & Ryan, 2000, p. 227), and researchers have applied SDT to different topics, including healthcare, education, and physical activity (Deci & Ryan, 2000; Williams & Deci, 1996). Even though SDT has evolved over time through decades of research (Deci & Ryan, 2000), the core constructs remain the same. SDT views human behavior and functioning in relation to three universal and innate psychological needs: (a) *autonomy* or self-control; (b) *competence* in completing tasks and activities; and (c) *relatedness* or inclusion with others (Deci & Ryan, 1985, 2000). While psychological needs are important components in SDT, the theory focuses on individual motivation in terms of three types: (a) Intrinsic motivation

or doing something because it is enjoyable, challenging, or pleasing; (b) extrinsic motivation or doing something because it leads to rewards or shows compliance; and (c) amotivation or a state of not acting to produce change (Chen & Jang, 2010; Deci & Ryan, 1985). The following sections will discuss the three psychological needs of individuals as well as the three forms of motivation. Three sub-theories of SDT, including basic psychological needs theory, cognitive evaluation theory, and organismic integration theory, will assist in explaining the functions of psychological needs and motivation types in relation to health behavior.

Basic Psychological Needs Theory

Basic psychological needs theory (Deci & Ryan, 2002) asserts that humans have universal and cross-developmental psychological needs for autonomy, competence, and relatedness. *Autonomy* refers to the ability to self-govern, or have self-control over, one's actions; *Competence* refers to one feeling confident in completing tasks; and *Relatedness* refers to one feeling as if they are making meaningful connections with others (Deci & Ryan, 1985). Basic psychological needs theory states that psychological needs, when satisfied, contribute to "health and well-being" (p. 74). However, when the psychological needs are unsatisfied, the effects contribute to "pathology and ill-being" (Deci & Ryan, 1985, p. 74).

Autonomy is one of three innate psychological needs required in human motivation (Deci & Ryan, 2000). While change can occur due to autonomous motivation, Ryan, Patrick, Deci, and Williams (2008) state that individuals must value changes in behaviors if they are going to continue outside of a clinical setting. Many people change health-related behaviors due to *controlled motivation*, which Deci and

Ryan (2000) identify as being an external regulation, which means that the behavior changes are due to external rewards to circumvent a negative consequence, or to remain complicit with social norms. In addition, Deci and Ryan (1985) state that extrinsic rewards can impact intrinsic motivation. When extrinsic rewards are contingent on task performance, intrinsic motivation decreases (Deci & Ryan, 2000). However, intrinsic motivation increases when leaders and supervisors support autonomy (Deci & Ryan, 1985, 2000).

Competence occurs when leaders and supervisors provide individuals with tools for change and do not overly-challenge them when they are attempting to master a skill or change behavior (Ryan et al., 2008). Ryan et al. (2008) found that determination requires an individual to experience confidence and competence, in addition to autonomy. When supervisors are supportive of autonomy and employees perceive that their supervisor is supportive, the satisfaction of psychological needs increases (Deci, Olafsen, & Ryan, 2017).

Relatedness refers to the need for individuals to connect to others (Deci & Ryan, 1985, 2000). Deci and Ryan (2000) state that relatedness is another important psychological need of individuals, although its influence on motivation is less powerful than of autonomy and competence as the role of relatedness in SDT mostly assists in maintaining intrinsic motivation. However, Deci and Ryan (2000) assert that social support may not be necessary to maintain intrinsic motivation. Additionally, individuals do not have to sacrifice autonomy to maintain relatedness (Ryan et al., 2009).

Cognitive Evaluation Theory

Cognitive evaluation theory, developed in 1985 by Deci and Ryan, aims to explain variations of intrinsic motivation. Deci and Ryan (2000) state that cognitive evaluation theory considers social and environmental factors that promote intrinsic motivation. While cognitive evaluation theory focuses on two of the psychological needs of autonomy and competence, the theory argues that "social-contextual events (i.e. feedback, communication, rewards) that conduce towards feeling of competence during action can enhance intrinsic motivation for that action" (Deci & Ryan, 2000, p. 70). However, research demonstrates that competence on its own is insufficient in maintaining intrinsic motivation. An individual must also have a feeling of autonomy (Ryan, 1982; Deci & Ryan, 2000). Cognitive evaluation theory states that in addition to a feeling of competence, the individual must experience their behavior as self-determined to show evidence of intrinsic motivation (Deci & Ryan, 2000).

Cognitive evaluation theory further states that autonomy also promotes internalization and is critical for integration to occur (Deci & Ryan, 2000). Deci and Ryan (2000) refer to internalization as "taking in of a value or regulation" (p. 71), while they define integration as a "further transformation of that regulation into their own so that it will emanate from their sense of self" (p. 71). However, even when autonomy and competence supports are apparent, relatedness also has influence in intrinsic motivation levels (Deci & Ryan, 2000). In addition, individuals are more likely to flourish, or demonstrate more creativity in settings when feelings of security and relatedness occur (Hon, 2012).

Deci and Ryan (1980) state that "intrinsically motivated behaviors are those behaviors that are motivated by the underlying need for competence and self-determination" (p. 42). Therefore, behaviors categorized as intrinsically motivated are those that do not require an external reward. Intrinsic motivation relates to the act of completing a task or doing something purely for the enjoyment or the challenge of doing it (Deci & Ryan, 1985; 2000; Deci et al., 2017). In relation to physical activity and health, Ryan et al. (2008) state that most health-related activities, such as physical activity, are "not intrinsically motivated" (p. 3). However, intrinsic motivation has predicted adherence to exercise routines and other health behaviors. Teixeira, Carraca, Markland, Silva, and Ryan (2012) conducted a review of 66 empirical studies focused on exercise motivation. Their findings revealed that intrinsic motivation is, in fact, predictive of long-term adherence to exercise routines. In addition, the review found a positive relationship between autonomous forms of motivation and exercise as well as theory consistency where competence satisfaction in combination with intrinsic motives positively predicts participation in exercise.

As found in most group activities, extrinsic motivation contributes to perceptions of competence (Deci & Ryan, 2000). Deci and Ryan (1985), however, state that extrinsic rewards can decrease intrinsic motivation levels. Additionally, tangible rewards that are contingent on performing a task diminish intrinsic motivation levels. In contrast, when leaders and supervisors give individuals a choice, allow them to acknowledge their feelings, and give them an opportunity to self-direct, intrinsic motivation levels increase (Deci et al., 2017; Deci & Ryan, 1985, 2000).

Organismic Integration Theory

Organismic integration theory, developed by Deci and Ryan as a sub-theory of SDT, characterizes humans, in relation to behavioral regulations, in two ways: (a) they are "developmentally and organismically prone to internalize and integrate ambient values and practices;" (Ryan et al., 2009, p. 112) and (b) "the regulation of such adopted practices and values thus varies in its relative regulation to the self" (Ryan et al., 2009, p. 112). Organismic integration theory refers to autonomy as being the antecedent to the variations in behavior, with autonomy being the foundation for extrinsic motivation (Ryan et al., 2009). Organismic integration theory views autonomy as being on a continuum that ranges from non-autonomous to increased levels of autonomy. However, levels of autonomy determine the category of regulation experienced by the person in relation to their perceived awareness of their motivation, or locus of causality (Ryan et al., 2009).

Regulation in the realm of extrinsic motivation is described in four types: (a) external regulation, or external control, meaning that the person lacks autonomy and actions are guided by external rewards and consequences; (b) introjected regulation, meaning that the person engages in behavior to avoid feelings of shame or to improve self-esteem with only minimal progress in reaching introjection; (c) identified regulation, meaning that the person values or starts to accept a behavior and levels of autonomy and competence increase; and (d) integrated regulation, meaning that the person has reached the highest level of autonomy in relation to external regulation, and regulation is aligned with a person's goals and values (Ryan et al., 2009). Research indicates that levels of autonomy during integrated regulation mirror that of intrinsic motivation. However,

organismic integration theory labels integrated regulation as a form of autonomous extrinsic motivation that does not become intrinsic motivation (Gagné & Deci, 2005).

Deci and Ryan (1985, 2000) describe extrinsic motivation as a person engaging in an activity to obtain an extrinsic reward, tangible or intangible, such as an incentive or recognition. On a spectrum that ranges from non-self-determined to self-determined behavior, extrinsic motivation lies between amotivation and intrinsic motivation (Deci & Ryan, 1985, 2000). Research indicates that amotivation produces negative outcomes, and intrinsic motivation provides spontaneous rewards. However, extrinsically motivated goal-directed behavior produces positive outcomes when experienced in combination with high levels of autonomy (Ryan et al., 2009). Deci et al. (2017) assert that even though intrinsic motivation promotes feelings of enjoyment purely for the sake of performing a behavior or task, extrinsic rewards "can have different significances that lead to enhancements, diminishments, or no effects on intrinsic motivation" (p. 21).

Ryan et al. (2009) found that most physical activities, including exercise, are extrinsically motivated. However, most physical activities require a combination of both intrinsic and extrinsic motivation, where some physical activities may be enjoyable while doing them and some require motivation by outside rewards or consequences. The extrinsic rewards provided from exercise range from improving one's health, their body, or to improve endurance that allows one to perform a specific task or activity (Ryan et al., 2009).

Research indicates that behavior-contingent incentives increase the likelihood that a person will perform and maintain healthier behaviors, including improving nutrition, exercise, or reducing tobacco use (Ryan et al., 2009). However, Kullgren et al. (2016)

conducted a review of literature and determined that incentives improve short-term behavior changes but are less effective in promoting long-term health behaviors. In fact, financial incentives provide a greater impact than other incentives. The study determined that financial incentives could have a stronger impact on autonomous motivation that start healthy behaviors and sustain them after the removal of incentives.

The Target Population's Need for a Workplace Wellness Program

Employees who engage in human service work (i.e. social services, education, and healthcare) have a higher chance of developing symptoms of burnout (Maslach & Leiter, 2016). Research indicates that the primary reasons for this increased likelihood relate to the routine expectation for human service employees to repress and regulate their emotions as well as the habitual use of empathy when engaging clients, students, or patients (Maslach, Schaufeli, & Leiter, 2001). Even though there is over 30 years of literature devoted to the effects, the burnout phenomenon continues to affect workers despite human service employers suggesting and teaching self-care strategies (Maslach & Leiter, 2016).

Exercise, adequate sleep, and healthy nutrition are basic self-care strategies proven to effectively combat the effects of burnout (Zimering, Monroe, & Gulliver, 2003). However, the consistent, high level of burnout in social services (Newell & MacNiel, 2010; Maslach & Leiter, 2016) indicates that these employees are not effectively applying self-care strategies. Exercise and health education, as a part of a WWP, are specifically of interest in this study. Therefore, this section will focus on the physical and mental state of the social service workforce as well as the effects and dynamics of burnout and other psychological stressors. The researcher intends to utilize

this section as justification for why the setting for this study is a nonprofit social service organization.

The Social Work Policy Institute (2011) states that social workers and other social service employees in the United States provide services to individuals with an array of problems, including health, economic, psychological, and sociological issues. Managers, administrators, and even the National Association of Social Workers expect the social service workforce to manage their workloads and to keep the bottom line in mind while maintaining their ability to empathize and be compassionate (Social Work Policy Institute, 2011). However, social service employees with chronic exposure to work with vulnerable, suffering populations may over-empathize about their clients' situations, which can, over time, lead to burnout (Newell & MacNeil, 2010). Past and present research has determined that social service employees are especially susceptible to experiencing symptoms of burnout (Maslach & Leiter, 2016). Research has identified multiple symptoms of burnout that not only affect one's physical health, but also their mental health: (a) depersonalization, (b) emotional exhaustion, (c) insomnia, (d) irritability, and (f) cynicism (Maslach, Jackson, & Leiter, 1996), (g) depression, and (h) gastrointestinal issues (Mohren et al., 2003). Kahill (1988) found associations between burnout and problems in job performance, absenteeism, and increases in turnover rates. Likewise, Maslach and Leiter (1997) found associations between burnout and organizational commitment as well as drops in productivity levels. Other research links burnout to presenteeism, which occurs when one is sick but still attends work (Knani, 2013). Other past research suggests that job-related stressors can also lead to substance abuse and less physical exercise (Johansson, Johnson, & Hall, 1991).

Research has established cognitive-behavioral approaches for treating burnout that work, including training and education, the development of skills, social support, and improving coping strategies, (Awa, Plaumann, & Walker, 2010). Zimering et al. (2003) suggest other self-care strategies that treat burnout, which include exercise, adequate sleep, and nutrition (Zimering et al., 2003). Additionally, Awa et al. (2010) assert that using a combination of both organizational and personal improvement approaches is effective and can have long-term effects. Determining the most effective approaches for the target population is especially important as social work research advocates for more investments in the social service workforce to promote individual, family, and community wellbeing (Social Work Policy Institute, 2011). Due to the probability of burnout, the social service workforce needs more investment in relation to workers' long-term health behaviors that improve physical health and mental health statuses.

Summary

This chapter presents literature focused on types of WWPs, the benefits and challenges of employee participation in a WWP, legislation focused on WWPs, the relevance of wearable technology in relation to the proposed intervention, theoretical perspectives that support the proposed study, and the target population's need for a WWP. The ACA (2010) currently provides legislation surrounding WWPs and an employer's ability to provide incentives to employees for participating. The same legislation allows tax deductions to employers, given that they operate within specified guidelines. Due to increases in allowable incentives under the ACA (2010) and the continued rising costs associated with chronic conditions, many employers are now designing their own WWPs that reflect the resources, interests, and needs of their

organization (Mattke et al., 2013). The CDC (2017a) states that most noncommunicable and chronic conditions, such as heart disease, stroke, cancer, diabetes, obesity, and arthritis, are preventable. Therefore, disease prevention WWPs are the most popular types of programs (Mattke et al., 2013).

CHAPTER III – METHODOLOGY

Researchers estimated that in 2012 approximately 117 million adults in the United States had at least one chronic health condition (Ward, Schiller & Goodman, 2014). The annual cost of productivity losses due to employee health-related absences alone is approximately $225 billion (CDC, 2016b). Additionally, the annual cost of medical care in relation to obesity is approximately $167 billion (CDC, 2017a). The rising costs of medical care are causing employers to pay more attention to health in the workplace. Therefore, employer investments in workplace health and benefits are increasing (Mattke et al., 2013; Troy & Jones, 2016).

WWPs have become a popular choice for employers aimed at improving employee health (Mattke et al., 2014). Research indicates that employees who participate in WWPs can significantly reduce their health risks (Loeppke et al., 2013), and employers are free to design programs based on organizational resources and employee needs, given that program structures fall within the Federal regulations (ACA, 2010). Because the health of employees plays a vital role in the development of their human capital (Bleakley, 2013), employers need health improvement strategies in the workplace. The benefits of implementing a WWP reduce costs for organizations and increase productivity and the overall quality of life for employees who participate (Dallat et al., 2013).

This study evaluated the relationships between the level of physical activity of participants and their rates of absenteeism and presenteeism, both of which reduce productivity levels (Driver et al., 2015). Additionally, using an embedded mixed methods design, a phase of qualitative research determined participant perceptions of

using the wearable technology device in relation to their physical activity levels and well-being. The first phase included a quantitative, non-experimental design and used a correlational analysis. The qualitative phase consisted of an embedded qualitative journaling technique, which the study assigned to six voluntary study participants. The study conducted a follow-up focus group to clarify information from the journal entries. A wearable technology device tracked the level of physical activity, in number of steps taken, of each participant.

Chapter III begins with the restatement of the research questions and objectives. Next, the chapter explains the research design, the population and sampling methods, the instrumentation used, the procedures, the data collection plan, and the data analysis methods used. Finally, the chapter restates the limitations of the study and concludes with a summary of the methodology closes the chapter.

Research Questions and Objectives

Two research questions guided the study: (a) What is the relationship between levels of physical activity and employee work productivity? (b) Which features of the wearable technology device have the most impact on physical activity and well-being? Additionally, the study addressed four research objectives:

RO1 – Describe WWP participants by identifying their age, gender, role in the organization, education levels, marital status, number of children, and annual household income.

RO2 – Determine if there is a relationship between the number of steps taken by participants and their rate of health-related absenteeism.

RO3 – Determine if there is a relationship between the number of steps taken by participants and their rate of presenteeism.

RO4 – Determine which features of the wearable technology device have the most impact on physical activity and well-being.

Research objective 1 (RO1) aimed to obtain the demographic data of participants. The data consisted of each employee's age, gender, role in the organization, education levels, marital status, number of children, and annual household income. Research Objectives 2 and 3 intended to determine if there is a significant relationship between the number of steps taken by participants and the performance variables of absenteeism and presenteeism, both of which contribute to productivity losses (Driver et al., 2015). RO4 aimed to determine the perceptions of participants in relation to using a wearable device during the WWP.

Research Design

This section outlines the research design used for this study as well as the procedures for completing the research. The study employed two types of research and included two distinct phases of data collection and analysis. The study used an embedded mixed methods design to conduct the study. The embedded design consists of quantitative and qualitative research methods (Creswell & Plano Clark, 2011). The next section further explains the appropriateness and details of using the embedded mixed methods design for this study.

Creswell and Plano Clark (2011) suggest that the combination of quantitative and qualitative research approaches provides an increased understanding of a research problem. Researchers use the embedded mixed methods design when the researcher

needs qualitative data to answer a secondary research question within a study that primarily used quantitative methods (Creswell & Plano Clark, 2011, p. 91). The study includes a secondary research question related to the use of a wearable device as a part of the intervention. The embedded design helps to enhance a traditional research method, regardless if the primary method is quantitative or qualitative (Creswell & Plano Clark, 2011). In fact, researchers typically use the assumptions established by the primary approach utilized in an embedded design, and the secondary data set "is subservient within the methodology" (Creswell & Plano Clark, 2011, p. 92). If the primary design is correlational, as is the case in this study, the researcher typically uses a postpositivist lens (Creswell & Plano Clark, 2011). Postpositivist thinking recognizes "that we cannot be positive about our claims of knowledge when studying the behaviors and actions of humans" (Creswell, 2003, p. 7). Additionally, Creswell (2003) states that postpositivist views "reflect a philosophy in which causes probably determine effects or outcomes" (p. 7). Postpositivist worldviews are associated with quantitative research methods (Creswell & Plano Clark, 2011).

Swanson and Holton (2005) assert that researchers execute quantitative methods by conducting five types of research: (a) experimental; (b) quasi-experimental; (c) non-experimental; (d) correlational; or (e) descriptive. They state that "Correlational research aims to determine relationships among two or more variables without necessarily inferring causality" (Swanson & Holton, 2005, p. 33). The study conducted a correlational analysis to determine if, or to what degree, relationships exist between participant levels of physical activity and their rates of absenteeism and presenteeism, both of which contribute to losses in productivity (Driver et al., 2015). The study

intervention included the implementation of a WWP, which consisted of a combination of walking challenges, health education and promotion, and incentives. The study used a wearable technology device, the Fitbit, to track physical activity levels via the number of steps taken by participants.

The quantitative approach for this study consisted of a single-group, pretest-posttest design with intervention that lasted for 8 weeks. Creswell and Plano Clark (2011) state that researchers can embed the secondary method and data before, during, or after the primary method. The study included a second, qualitative research approach. Qualitative approaches help with understanding phenomena, which develops through the subjective views of participants (Creswell & Plano Clark, 2011). The researcher's use of qualitative data in this study helped to answer a secondary research question: Which features of the wearable technology device have the most impact on physical activity and well-being?

Population

The study targeted employees of a nonprofit social service organization headquartered in Birmingham, Alabama. AIDS Alabama has offices in Birmingham and in Mobile, Alabama. AIDS Alabama's mission targets HIV-positive individuals in need of social service, housing, and medical assistance. At the time of the study, the organization consisted of 105 employees, with 95 located in Birmingham and 10 located in Mobile, each of whom work in one of six departments: (a) Programs; (b) Prevention; (c) Development; (d) Advocacy; (e) Housing; and (f) Executive. Eighty-two percent (82%) of the organization's staff members were full-time employees and eighteen percent were part-time or contracted employees. The demographic make-up of the organization

included 18 males and 87 females, with racial demographics consisting of African-American (77.2% or 81 employees); Caucasian (20.9% or 22 employees); and Hispanic (1.9% or 2 employees) (D. O. Bark, personal communication, June 18, 2018). Appendix A contains permission for the researcher to conduct research at the organization.

Reason for Choosing the Population

The researcher chose the target population due to the health risks that face social service employees. While the health of employees should be important to any employer, employees in the field of human service work (i.e. nursing, healthcare, social services) generally have a higher risk of developing symptoms of burnout (Maslach & Leiter, 1997). Burnout is a stress-related phenomenon that can negatively affect both the physical and mental health of employees (Maslach et al., 1996). Kahill (1988) found associations between burnout and problems in job performance, absenteeism, and increases in turnover rates. Additionally, Aronsson, Gustafsson, and Dallner (2000) assert that individuals who work in the public sector, and especially in the fields of education and social services, have a higher risk of presenteeism. Knani (2013) found that presenteeism, in relation to burnout, is a contributing factor when employees are sick but feel the demands to be at work when they are unwell. Presenteeism equates to losses in productivity and costs to organizations (Goetzel et al., 2004).

Newell and MacNeil (2010) suggest that social service employers should implement interventions aimed at decreasing burnout rates. Investing in employee health is now a popular choice among employers as research indicates that health-based programming yields economic and productivity improvements (Mattke et al., 2013). Recent literature cites that increases in exercise, sleep patterns, and nutrition decrease

burnout symptoms and have the potential to increase employee engagement (Maslach & Leiter, 2016). If social service organizations are going to increase their capacity and resources, effective strategies aimed at employee health are necessary.

Participation and Reporting

Participation was dependent on the employees volunteering for the study. Employees who qualified for the study were required to meet three criterion: (a) have full-time employment status; (b) be able to complete the physical tasks encouraged during the study period; and (c) have access to a smart phone or other mobile technology device. Each volunteer signed the participant contract stating that they agreed to four responsibilities: (a) to participate in walking challenges during the 8-week intervention period; (b) to use the wearable device as intended; (c) to participate in weekly education sessions administered to them online; and (d) to complete written questionnaires during pre-test and posttest stages; and (e) to report their physical activity levels weekly using an electronic tracking form.

The study aimed to recruit participants who possessed diverse characteristics in relation to age, gender, and the type of position held in the organization. Creswell and Plano Clark (2011) and Phillips et al. (2013) recognize the importance of diversity in a target population when selecting participants. Therefore, the study was open to all employees of the organization who were full-time employees and who met the criteria of being capable of participating in the walking challenges and monitoring steps using a computer or other mobile device.

Sampling

Participants volunteered for the study by responding to a participation invitation email (Appendix B). The study applied a convenient sampling technique for the quantitative portion of this study, meaning that employees qualified based on their readiness and availability (Fink, 2003b). Additionally, Fink (2003b) states that those who volunteer may be inherently more verbal than those who do not volunteer. However, convenience samples increase bias, so findings may only apply to other individuals of similar demographics (Fink, 2003b). Swanson and Holton (2005) do argue that convenience sampling is the least useful strategy for generalizability efforts. However, this sampling technique was appropriate as research indicates that, in general, less than 50% of employees opt to participate in WWPs (Mattke et al., 2013; Person et al., 2010).

The study had the capacity for 40 participants in the study. Sampling reaches a normal distribution when the sample consists of 30 or more participants (Fink, 2003b). The study intended to include 10 additional participants in case one of two confounding variables occurred, which can affect internal validity: (a) mortality, or loss of sample members; or (b) maturity, or changes in attitudes about the project (Swanson & Holton, 2005). Due to more interest than expected, the study began with 41 intervention participants. However, only 38 completed the study. Two dropped out of the study, and one participant no longer felt comfortable participating in the walking challenges where others could view their number steps via the Fitbit app after the third week.

The study purposefully selected 6 individuals from the intervention pool of participants to additionally participate in the qualitative portion of the study, which

consisted of writing and emailing weekly journal entries and participating in a post-intervention focus group. The study selected participants for these tasks based on the need for diversity and participant demonstration of willingness. The study inquired about participant willingness in the participation invitation email, and participants indicated their willingness to participate in their response email. Because the target organization has two locations in Alabama, one in Birmingham and one in Mobile, the study required all qualitative participants to be present at the Birmingham location to participate in the post-intervention focus group.

Intervention

While this study does have potential implications for the American workforce, the intervention included a combination of walking challenges, health education and promotion, and incentives designed to demonstrate tangible and meaningful results for the target population and the targeted organization. A review of the literature focused on WWPs helps identify components and best practices for the intervention. The following sections outline the components of the intervention and the procedures for each of the three components.

The ODPHP (2008) categorizes physical activity into four levels: (a) inactive; (b) low activity; (c) medium activity; and (d) high activity. Inactivity includes adults not engaging in physical activity outside of normal activities or what is necessary to get through each day, which is unhealthy (ODPHP, 2008). ODPHP (2008) recommends that adults at least engage in 150 minutes of physical activity per week, or medium activity standards. Medium activity standards include a range of 150 to 300 minutes of physical activity outside of normal activities per week. Adults who engage in less than 150

minutes of physical activity per week fit into the low activity category, and those who engage in more than 300 minutes per week meet high activity standards (ODPHP, 2008).

The exercise portion of the study intervention included walking challenges each day of the week, with optional walking on the weekends. The researcher encouraged participants to walk during breaks, to walk before or after work, and to walk on weekends. The walking challenges designed for this intervention (Appendix C) remained under the ODPHP's 150 minutes of suggested physical activity for the first three weeks, which kept them in the low activity category in case participants needed time to adjust. Weeks 4 through 8 placed participants in the medium activity category during the week, with additional options to engage in activity over the weekends.

Each participant received a wearable technology device, the Fitbit, which was specifically for the project's use until completion of the 8-week intervention. Participants reported their tracking number and daily steps by writing or typing the number of steps into the weekly tracking form (Appendix D), which participants emailed to the researcher each Monday starting on Week 2 and ending on Week 9. Additionally, the researcher verified daily steps by monitoring participant steps using the Fitbit application. Participants accepted invitations to participate in walking challenges via the Fitbit app (Workweek Hustle from Monday through Friday and Weekend Warrior on weekends). Walking challenge groups can hold no more than 10 group members per challenge, so the study grouped participants into five group walking challenges each week. Upon successful completion of the study, from pretest to posttest stages and by fulfilling the terms of the participant contract, participants kept their Fitbit device. The researcher purchased five additional Fitbit devices as replacements in case a participant lost,

damaged, or broken their device. The researcher issued three of the five additional devices due to participants losing their device.

Mattke et al. (2013) suggests that most disease prevention WWPs include health education information, which can include the provision of information on nutrition, healthy lifestyle, smoking cessation, the effects of substance abuse, and the benefits of exercise. Studies and best practice information indicate that project managers typically provide health information through coaching, class sessions, and the hanging of posters and flyers (Mattke et al., 2012; Mattke et al., 2013). However, researchers and employers are using technology more frequently to deliver information. Thompson and Rew (2015) distributed weekly health information via email and used posters and flyers to promote health in a study of a WWP and its impact on germ transmission, absenteeism, and infection-related illnesses.

The health education and promotion component consisted of brief health education videos and the hanging of posters and flyers (Appendices E & F). The researcher emailed the videos to participants on Monday and, if there was more than one video in a week, Tuesday of each week. Additionally, the researcher posted health promotion posters and flyers around the office to demonstrate that leadership supported the initiative to mitigate lack of support by leadership as a barrier (Bangum et al., 1996; Mattke et al., 2013).

Even though the ACA (2010) outlines restrictions around the incentives that an employer can provide in qualified WWPs, research has demonstrated that incentives are effective in enhancing program effectiveness (Dallat et al., 2013; DeVries, 2010). In fact, Person et al. (2010) found that insufficient incentives contribute to declines in WWP

participation rates. Researchers have found that financial incentives strengthen motivation (Dallat et al., 2013; Finkelstein et al., 2007; Fronstin & Roebuck, 2015). Kullgren et al. (2016) determined that financial incentives could have a greater impact on participation and in increasing autonomous motivation, at least for short-term behavior change. Therefore, the study provided incentives to participants in the program, one of which was contingent on goal completion.

Participant received a Fitbit device, which they were able to keep after successful completion of the intervention and the completion of pretest and posttest surveys. Core Health Technologies identifies wearable devices as a tangible incentive that employers can provide to employees to increase motivation for physical activity (Danielson, 2017). Additionally, those who successfully completed the goal of walking 150 miles during the 8-week period will be eligible to win one of four $50 gift cards, or cash, which the study raffled off after the eighth week. A study conducted at Stanford University revealed that the average American takes 4,774 steps each day (Althoff et al., 2017), which is approximately 2 miles depending on the height and stride of an individual (Hoeger, Bond, Randsdell, Shimon, & Merugu, n.d.). Based on these estimates, each participant will walk at least 2 miles per day within normal day-to-day activities, which made the overall goal of walking 150 miles over an 8-week period easily attainable. Additionally, the study provided each of the 6 qualitative participants with a $25 gift cards after completing their journaling activities over the 8-week period and after participating in the focus group following the intervention.

Instrumentation

This study used the Health and Work Performance Questionnaire Clinical Trials 28-day version (HPQ; WHO, 2002) as the quantitative survey instrument. The HPQ (Appendix L) measures losses in absenteeism and presenteeism, allowing researchers and employers to determine productivity loss. The HPQ's purpose is to ask questions about participants' recall of presenteeism, absenteeism, and performance during their previous 28 days. The HPQ includes a demographic section that allowed the study to accomplish RO1. The survey instrument collects ordinal, nominal, and ratio level data. The study assigned a journaling technique to participants selected for the qualitative portion of the study. This section outlines the instrumentation used in the study.

The Health and Work Performance Questionnaire

This study used Section B of the HPQ (Appendix L) to retrieve demographic information. Data collection in relation to age consisted of ratio-level data. Section B also consisted of nominal-level data collection in five areas: (a) gender; (b) marital status; (c) children in the household; (d) education level; and (e) annual income. The study made two changes to the demographic questionnaire: (a) the questionnaire did not ask for height and weight information to avoid the collection of biometric data; and (b) the questionnaire did ask for the participants overall household income as opposed to the income received from employment. The first change was preferable as the study focused on the relationships between participant levels of physical activity and levels of productivity. Therefore, the collection of biometric data was unnecessary. The second change aligns with research in terms of the correlation between health risk factors and

household income. Research indicates that income levels influences health risks (Harris et al., 2011).

The HPQ collects information relating to both absenteeism and presenteeism. The instrument provides documentation to gather baseline and follow-up data and refers to the participant's recollection of performance over the past 28 days. The HPQ asks for information in the form of ratio, ordinal, and nominal data, and results scored based on participant responses. Absenteeism scores consisted of data collection using ratio-level data, based on the number of days worked over the past 28 days. Presenteeism scores consisted of data collected from ordinal scales used in specific equations. The researcher scored results after data collection to compare pretest and posttest responses to determine levels of absenteeism and presenteeism. The instrument allowed for the calculation of absolute and relative measures of absenteeism and presenteeism. In this study, absolute scores of absenteeism and presenteeism were of interest. The instrument also allows researchers to only include health-related absences in the study as specific questions ask for absences in relation to a health problem. Kessler (2003) states that when calculating absenteeism scores, "a decision is needed as to whether only days defined as sickness-absence days should be counted as being missed or if all days missed from work should be counted" (p. 2). Health-related absenteeism was of the most interest in the current study. Therefore, the study only used absolute absenteeism scores using health-related absences to determine the relationship between physical activity and absenteeism.

The study calculated both absolute and relative scores of presenteeism, by hand, and used scores to determine if rates of presenteeism changed over the intervention period. For absolute presenteeism, the HPQ asked participants to rate their overall

performance on a scale ranging from scores of 0, indicating worst performance, to 10, indicating top performance (WHO, 2002). For relative presenteeism, Relative presenteeism score calculations consisted of participants rating their performance during the prior 28 days on a scale from 0 to 10, with 0 indicating the worst performance and 10 indicating the top performance, and then dividing the value by the value of how participant rated other workers who perform the same job on the same scale (WHO, 2002). The study only used absolute presenteeism scores using health-related to determine the relationship between physical activity and presenteeism.

Kessler (2003) outlines how to calculate absolute and relative scores of absenteeism and presenteeism on the last page of HPQ instrument for pretest and posttest measures. The HPQ uses the same formulas for pretest (baseline) and posttest (follow-up) measures for absolute absenteeism, absolute presenteeism, and relative presenteeism:

1. Absolute Absenteeism = 4 times the number of work hours expected by the participant's employer in a typical 7-day week minus the actual hours the employee worked over the past 28 days, calculated using ratio data (4*A5 – A7).
2. Absolute Presenteeism = 10 times how the participant rates their own performance during the last 28 days. Ratings are on a scale of interval values, ranging from 1 through 10. Scores ranged between 0 and 100 (10*A12).
3. Relative Presenteeism = The value of how the participant rates their performance during the last 28 days divided by the value of how the participant rated co-workers who perform the same job. Scores ranged between 0 and 10 (A12/A10).

The HPQ provided the calculations used (WHO, 2002). Table 1 demonstrates the type of data that the HPQ collected in relation to the participants' demographics, absenteeism, and presenteeism.

Table 1

The Health and Work Performance Questionnaire

Research Objective	Information Type	Data Collected	Data Type
RO1	Demographics	Age	Ratio
		Gender	Nominal
		Marital Status	Nominal
		Children in Household	Nominal
		Education Level	Nominal
		Annual Income	Nominal
RO2	Absenteeism	Work Hours (Expected)	Ratio
		Work Hours (Actual)	Ratio
RO3	Presenteeism	Work Performance (Self)	Ordinal
		Work Performance (Co-Workers)	Ordinal

Participant Journals

Diaries, or journals, give participants more autonomy to share their knowledge (Meth, 2003). Participant journals can be unsolicited, which allow participants to write whatever they want to write, or solicited, which are written reflections on topics of interest to a researcher (Elliott, 1977; Jacelon & Imperio, 2005). Journals can provide the researcher with information related to their perceptions of the importance of an event and their attitudes about those events, which the researcher can then "explore using various methods of participant checking" (Jacelon & Imperio, 2005, p. 992). In this case, the study used a solicited journal technique in completing the qualitative portion of this study. Participants received a journaling assignment, which consisted of one question per

week, to respond to in relation to their experiences using a wearable technology device during the intervention.

Participants received instructions for keeping a weekly journal in which they will provide reflections on their use of a wearable technology device during the intervention. The study covered three topics in the questions: (a) their satisfaction in using the device, and specifically on which features were the most helpful to them; (b) the common barriers to participation in traditional WWPs (Chesky, 2015; Person et al., 2010); and the well-being of participants in relation to using the wearable device as found in the literature on SDT (Deci & Ryan, 1985). Giddens et al. (2017) suggest that future research focus on exploring which features have the highest impact on physical activity and well-being. The study allowed participants in the qualitative portion to write narratives on their satisfaction needs and their psychological needs of competence, autonomy, and relatedness as found in SDT (Deci & Ryan, 1985). The study explored the schedule needs of participants by asking participants to write their thoughts on how the wearable device relates to the common barriers to participation in traditional WWPs: (a) time; (b) convenience; and (c) location. Appendix L contains the guidelines and list of questions for participants completing weekly journals.

The study asked participants to journal about their experiences and perceptions of using the wearable device during the intervention at least once per week. Participants reflected on their experiences during the week and attempted to make each weekly entry meaningful and unique from their other entries. The six participants used electronic mail to forward their weekly journal entries to the researcher as soon as they completed the entry. The researcher transcribed journal entries each week and compiled the information

into a single document for analysis. Participants discussed the information during the follow-up focus group following the 8-week intervention.

Validity and Reliability

Phillips et al. (2013) state that "to be an effective data collection instrument, the survey should provide consistent results over time (reliability) and measure what it is intended to measure (validity)" (p. 123). The survey instrument chosen for this study, the HPQ (WHO, 2002), passed piloting, testing, and retesting to ensure both reliability and validity. In developing the HPQ, Kessler et al. (2003) reviewed other measurable scales, used pilot interviews, and evaluated and refined questions during their process of validating the instrument. The process of ensuring reliability and validity is important and takes time as there are different types of reliability and validity to consider.

Reliability of the HPQ

Reliability refers to the extent to which an instrument consistently produces approximate or the same results in over time (Phillips et al., 2013). Fink (2003a) states that the assessment of reliability can occur in four ways: (a) test/retest reliability; (b) alternate form reliability; (c) internal consistency reliability; and (d) interobserver reliability. Researchers test/retest an instrument by administering a survey to the same group at two different times to determine if the stability of their responses and scores (Fink, 2003a). Kessler et al. (2003) tested and retested the instrument to remove any ambiguous language from HPQ items. Alternate form reliability refers to the development of two similar instruments and administering them to groups at the same time to determine the relationship between the two scores (Phillips et al., 2013). The researchers administered pilot surveys to four groups to determine the questioning around

the effects of different chronic conditions before narrowing the items down to the final HPQ (Kesser et al., 2003). Internal consistency reliability refers to the consistency that items measure the same topic (Fink, 2003a). Kesser et al. (2003) reviewed previously validated measures of work performance to ensure the internal consistency reliability of HPQ items.

Inter-observer reliability refers to how well multiple evaluators, of subjective content, agree on the evaluation of a variable (Fink, 2003a). The developer of the instrument then looks for a correlation between the responses of the three evaluators. Kessler et al. (2003) used two methods to test for inter-observer reliability: (a) a comparison of payroll records against the responses of two of the groups; and (b) using a logistical regression to compare the responses of the other two groups. The findings revealed that respondents consistently overestimate hours worked and consistently underestimate hours missed. However, the information is still useful but may only vary by occupation (Kessler et al., 2003).

Validity of the HPQ

Phillips et al. (2013) states that validity of an instrument refers to the its ability to measure the information intended based on the researcher's research objectives. A developer should test an instrument for four types of validity: (a) face validity; (b) content; (c) criterion; and (d) construct (Fink, 2003a). Face validity refers to a review of items by individuals or groups not trained on the instrument to assess their perspective on the content (Fink, 2003a). Kessler et al. (2003) piloted the instrument and then conducted additional pilot interviews that included cognitive debriefing techniques to determine any ambiguous language from the items. Content validity refers to the

appropriateness of the items in the survey instrument to measure the information intended for the target population (Fink, 2003a). The developers of the HPQ conducted thorough literature reviews and determined the most appropriate measures of work performance and, then, tested and retested the instrument with four different groups from different occupations to assess content validity (Kessler et al., 2003).

Criterion validity refers to the extent that an instrument performs in comparison to another instrument (Fink, 2003a). Fink (2003a) divides criterion validity into two components: (a) concurrent validity, or comparing an instrument to another method that is the authority on the same measures; and (b) predictive validity, or the instruments ability to predict "future events, behaviors, attitudes, or outcomes" (p. 37). Kessler et al. (2003) reviewed other reviews and literature identifying widely used work performance measures to compare their instrument. The developers incorporated global scales (from 1 to 10) into the instrument, which acted as predictors of work performance. The developers tested and retested the scales (Kessler et al., 2003). Construct validity refers to a survey instruments meaningfulness in measuring the information intended over time (Fink, 2003a). The developers conducted calibration surveys with four occupations and compared results with archived data in relation to absenteeism and presenteeism to ensure construct validity (Kessler et al., 2003).

Procedures

The study held an initial meeting with employees interested in participating in the study at the target organization's main office in Birmingham, Alabama. The intention of the first meeting was to explain the dynamics of the research study and to gauge interest in participation in both the quantitative and qualitative portions of the study. The

researcher met with employees in the Mobile office the following Monday morning. Once the researcher selected participants for the study, the researcher organized meetings with individuals interested based on their availability.

Due to the availability of participants, there were three separate training groups in the Birmingham office focused on the quantitative portion of the study. A fourth and final meeting in the Birmingham office was a meeting for all participants who volunteered for the qualitative portion of the study. During each training group, the researcher orally discussed the dynamics of the study including the walking challenges, the weekly health education videos, the contract, informed consent forms, and how to use the wearable device. The researcher charged all devices prior to the meetings so that participants could sync the device to their preferred mobile device, all of which were smart phones. The researcher attached a tracking number to each device in the study, and participants drew their device to determine their tracking number. Participants received instructions on the walking challenges they would receive for the study intervention (i.e. Workweek Hustle and Weekend Warrior), and the researcher informed participants of their responsibility in accepting walking challenges for the 8-week period.

All quantitative participants signed an informed consent form (Appendix H) to ensure that they understand the study dynamics and that they consent to the terms of the intervention and their responsibilities. Additionally, each participant signed a contract (Appendix I) ensuring that they agreed to use the wearable device as intended and to complete both pretest and posttest survey questionnaires. All qualitative participants signed a separate informed consent form for their participation in the qualitative portion (Appendix H) during a follow-up meeting. The researcher then informed the participants

about the inclusion of a wearable device, their responsibilities in relation to its use, and how they will monitor their physical activity.

Data Collection

Once IRB and dissertation committee approval occurred, the study procedures and data collection schedule began. Because the study involved human subjects, IRB approval was necessary. According to Mauch and Park (2003), "the IRB has two purposes: (a) to ensure that a system of continual review and safeguards will be maintained; and (b) to ensure that responsibilities will be discharged for protecting the rights and welfare of human subjects of research conducted at or by the institution, regardless of the source of funding" (p. 223). According to Roberts (2010), researchers can request either an expedited review or a full review when requesting IRB approval. When the researcher requests and expedited review, the researcher asserts that there are minimal risks to the participants in terms of their psychological, social, and physical well-being (Roberts, 2010). The study posed minimal risks to the participants.

This embedded mixed methods study included the collection of data via multiple sources: (a) the distribution of paper surveys to participants; (b) weekly reports from participants on the number of steps taken via the wearable device provided; (c) weekly emails from the six participants included in the qualitative portion of the study; and (d) new information gathered during the focus group following the intervention. This section outlines the data collection plans for the quantitative and qualitative portions of the study.

Quantitative Data Collection

Using a non-experimental approach (Shadish, Cook, & Campbell, 2002), survey data collection occurred three days prior to the intervention started and three days after

the intervention ended as the intervention started on a Monday and ended on a Friday. The study included the use of one survey instrument, the HPQ (WHO, 2002), which collected information for RO1, RO2, and RO3. Each participant filled out a tracking form each week (Appendix E) and emailed it to the researcher. Weekly reminders occurred via email, and for some, multiple emails sent to obtain the information. The researcher recorded physical activity information using the tracking forms and compared to numbers provided via the Fitbit mobile app. The participant tracking forms intended to allow participants the opportunity to report their progress and to reinforce accountability during the project. According to Oussedik et al. (2017), autonomous accountability, defined as an "autonomous internal desire to please" (p. 1,287), contributes to health behavioral change and benefits the new behavior. However, controlled accountability, or reporting something against one's will, is less effective and less motivational. Additionally, the researcher used the wearable technology application to retrieve weekly step counts not reported after sending weekly reminders. The study embedded the qualitative journaling activities during the intervention period. RO1 focused on the demographics of participants, RO2 focused on absenteeism rates of participants, and RO3 focused on presenteeism rates of participants.

Qualitative Data Collection

The qualitative data collection portion of this study consisted of the researcher collecting weekly journal entries from each of the six participants selected for the qualitative portion and through clarification and the collection of any new information during a focus group following the 8-week intervention. The study provided weekly reminders to the six participants and asked that they submit their weekly entry to the

researcher via electronic mail. The study instructed participants to email their journal entries by each Friday of the intervention period, so data collection via journal entries will occur during weeks one through eight. Appendix M includes the journal guidelines.

Protocols for Data Collection

Data collection consisted of quantitative and qualitative data using different reporting methods. Quantitative data collection began with the researcher assigning a tracking number to each of the wearable devices, which the participants drew during the second meeting. All quantitative participants used their tracking number when completing the HPQ during pretest and posttest phases as well as when completing weekly tracking forms indicating their daily number of steps and whether they viewed the brief health educational video(s) each week. The study administered the HPQ using paper forms and asked that participants complete the questionnaire, which occurred prior to the interventions starting. The researcher instructed participants in the Mobile office to scan and email their fully completed questionnaires directly to the researcher's University of Southern Mississippi (USM) email address at mitchell.tarver@usm.edu. All Birmingham participants completed their questionnaires prior to the intervention starting. Because the schedules of participants varied, participants completed questionnaires on a Wednesday, Thursday, and Friday prior to the intervention starting. The researcher met with participants in the Mobile office at 8:00 a.m. the morning that the intervention began to ensure that they had all information and that they could begin their walking challenges immediately following. All participants in the Birmingham office completed their questionnaires three days after the intervention ends. Participants in the Mobile office

completed their HPQ the same day and scanned them to the researcher's USM email address.

Quantitative data collection of the weekly tracking forms (Appendix E) included each participant scanning and emailing their tracking form using the researcher's USM email address at mitchell.tarver@usm.edu. Because volunteers for the study did not all have access to email because of their job role, the researcher instructed participants that they had the option to scan their tracking form directly to the researcher's USM email address or place a hard copy in an agency mailbox set up for the research. The researcher sent weekly email reminders to each participant via email. If email was not applicable, the researcher called participants to remind to send their weekly tracking form.

Qualitative data collection consisted of six participants emailing weekly journal entries to the researcher's USM email address. Each participant signed a second informed consent form to acknowledge and agree to participation in the qualitative portion of the study. The study required qualitative participants to have access to email so that they could record their journal entries and email them to the researcher each Friday of the intervention period.

The study implemented 6 focus group protocols for the collection of additional data:

1. The researcher generated a list of questions to ask participants based on information found in the journal entries. The researcher reviewed the journal entries several times, looking for any unclear information that needed to clarification.

2. During the focus group, the participants discussed questions the researcher posed, which was based on any unclear information found in the journal entries.
3. The researcher encouraged open discussion about the questions to collect data.
4. The researcher focused on the specific questions. However, if new information stemmed from the discussion, the researcher documented the information as potential qualitative data relevant to the qualitative portion of the study.
5. The focus group was video recorded.
6. The researcher took notes and reviewed the video to document the discussion.

The study ensured participants that responses and opinions would remain confidential and kept data from all data collection sources in password protected documents on the researcher's computer. The only information that was not confidential was level of physical activity as participants could view other participants' daily steps using the Fitbit mobile app. The use of names in the mobile app was important, as researchers have found that wearable devices provide features that allow for self-tracking of step counts and goal setting while promoting group competition and the ability to connect with other users (Giddens et al., 2017; Karapanos et al., 2016).

Finally, the researcher stored all documentation obtained in a password protected file on the researcher's computer. To ensure proper storage, the researcher scanned all documents to electronic form for storage. The researcher shredded all hard copies. In addition, the researcher recorded quantitative responses in a Microsoft Excel document. The researcher recorded all qualitative responses in a Microsoft Word document. However, the researcher transferred qualitative responses in a Microsoft Excel spreadsheet for the qualitative analysis. The use of an Excel spreadsheet allowed for a

thorough analysis of the data collected as well as the creation of the thematic map. The researcher will keep information store on the computer for five years.

Protocols for Non-Responses

The researcher informed all participants of their responsibilities during the intervention period and, if applicable, their responsibilities for the qualitative portion of the study. However, if participants did not email weekly tracking forms or journal entries to the researcher, or determine an alternate way of providing the information, the researcher reached out to the participants. If a participant did not email their weekly tracking form or journal entry three times, the researcher would meet with the participant to determine if the participant is still a good fit for the study. If the researcher and participant decide that the participant was no longer a good fit for the study, meaning that an alternate method of data collection could not be agreed upon, the participant would have to return the Fitbit device and the researcher would extract the participant's data from the study. Table 2 outlines the quantitative and qualitative data collection plan.

Table 2

Data Collection Plan

Week Number	Quantitative Data	Method	Qualitative Data	Method
IRB Approval				
Week prior to intervention	Pre-Test data collection by Friday	HPQ (WHO, 2002)		
Week 1 (Intervention starts Monday)		Tracking Form, Monitor Activity	Collection of Data from participants on Friday	Journal Entries via Email

Table 2 (continued)

Week Number	Quantitative Data	Method	Qualitative Data	Method
Week 2	Collection of steps taken by participants during week 1 on Monday	Tracking Form, Monitor Activity	Collection of Data from participants on Friday	Journal Entries via Email
Week 3	Collection of steps taken by participants during week 2 on Monday	Tracking Form, Monitor Activity	Collection of Data from participants on Friday	Journal Entries via Email
Week 4	Collection of steps taken by participants during week 3 on Monday	Tracking Form, Monitor Activity	Collection of Data from participants on Friday	Journal Entries via Email
Week 5	Collection of steps taken by participants during week 4 on Monday	Tracking Form, Monitor Activity	Collection of Data from participants on Friday	Journal Entries via Email
Week 6	Collection of steps taken by participants during week 5 on Monday	Tracking Form, Monitor Activity	Collection of Data from participants on Friday	Journal Entries via Email
Week 7	Collection of steps taken by participants during week 6 on Monday	Tracking Form, Monitor Activity	Collection of Data from participants on Friday	Journal Entries via Email

Table 2 (continued)

Week Number	Quantitative Data	Method	Qualitative Data	Method
Week 8 (Intervention Ends)	Collection of steps taken by participants during week 7 on Monday	Tracking Form, Monitor Activity	Collection of Data from participants on Friday	Journal Entries via Email
Week 9	Collection of steps on Monday Post-Test data collection by Monday	HPQ (WHO, 2002)	Collection of Data on Friday	Focus Group

Data Analysis

There were two phases of data analysis. The researcher conducted data analyses for the quantitative and qualitative phases separately as there were two separate research questions to answer. RO2 and RO3 intended to assist the researcher in answering RQ1, and RO4 aimed to answer RQ2. This section demonstrates the data analyses that the researcher used for the quantitative and qualitative phases of the study.

Quantitative Analysis

The study used descriptive statistics to demonstrate the demographic data captured from the survey instrument (RO1). Swanson and Holton (2009) state that most studies at least intend to describe the characteristics of the group(s) who participate. The study used descriptive statistics to complete RO1, which required that the researcher obtain demographic data including age, gender, role in the organization, education levels, marital status, number of children, and annual household income.

The study obtained RO2 and RO3 data from the survey instrument, the HPQ (WHO, 2002), and through self-reported tracking forms, which participants completed weekly. However, the study conducted two separate analyses to determine if there is a relationship between the number of steps taken by participants and absenteeism (RO2), and the number of steps taken by participants and presenteeism (RO3). The study conducted a simple linear regression analysis to obtain results for RO2 and a second simple linear regression analysis to obtain results for RO3. A linear model helps to demonstrate that a predictor variable (steps taken) predicts an outcome variable (absenteeism or presenteeism) (Field, 2013). In addition, linear models demonstrate the "parameter associated with the predictor variable that quantifies the relationship it has with the outcome variable" (Field, 2003, p. 294).

According to Laerd Statistics (2013), it is appropriate to conduct a linear regression analysis when the data used passes six assumptions:

1. The researcher is using data measured at the continuous level (i.e. interval or ratio data).
2. The two variables used have a linear relationship.
3. There are no significant outliers in the data used by the researcher.
4. The researcher should have "*independence of observations*."
5. The data used should show "*homoscedasticity*."
6. The residuals (errors) should be normally distributed, approximately (Laerd Statistics, 2013).

The study tested the assumptions prior to analysis. The study explored the absenteeism and physical activity data using SPSS to determine if any outliers existed as

assumptions of the simple linear regression analysis indicate that there should be no significant outliers (Laerd Statistics, 2013). Because there was a significant outlier, the study provided a narrative to provide a description of the outlier and any understanding circumstances for the outlier occurring. Additionally, the researcher used a histogram to spot any outliers and investigated (Field, 2013).

The study used the Cook's distance test to determine the effect of any participant cases involved. Field (2013) states that "Cook's distance test is a measure of the overall influence of a case on the model" (p. 306). The study then conducted the analysis twice. One of the analyses included the outlier, and the second analyses did not include the outlier to help explain the influence and any discrepancies in the results. The researcher used the Statistical Packages for the Social Sciences (SPSS; Version 25) software to conduct all statistical tests and analyses. Table 3 outlines the statistical analyses used to accomplish the research objectives.

Qualitative Analysis

The researcher used a narrative analysis technique to analyze data collected from the qualitative portion of the study, which helped to complete RO4. Reissman (2005) states that narrative analysis "refers to a family of approaches to diverse kinds of text, which have in common a storied form" (p. 1). Specifically, a thematic analysis will help in finding common themes in their reports (Reissman, 2005). Thematic analysis is a form of narrative analysis and often used to analyze data in qualitative studies (Thomas & Hardin, 2007). Braun and Clarke (2006) state that thematic analysis consists of five phases of analysis: (a) data familiarization where the researcher immerses in the data; (b)

code generation; (c) theme search; (d) theme revision; and (e) theme definition. The researcher will perform the thematic analysis by hand.

The thematic analysis consisted of five phases in the analysis process, as suggested by Braun and Clarke (2006). First, the process called for a completed transcript. Then, the study completed phase 1, data familiarization, by reading the transcript multiple times, making detailed notes. Braun and Clarke (2006) articulate phase 2 as coding interesting features of the data, which will be different from the themes that emerge. The study coded specific parts of the data set, including information relating to the satisfaction of participants in relation to the features of the wearable device that are most useful, and the basic psychological needs of competence, autonomy, and relatedness as found in SDT (Deci & Ryan, 1985). The next step was to complete phase 3 by reviewing the list of codes, searching for potential themes in the codes (Braun & Clarke, 2006). Braun and Clarke (2006) suggest that this process includes reviewing the codes and considering "how codes combine to form an overarching theme" (p. 19). The study used Microsoft Excel spreadsheets to organize the information so that the researcher saw all categories and was able to group them into theme clusters (Braun & Clarke, 2006). Then, the study began analyzing the relationships between the codes to determine which themes were overarching and which ones were subthemes. Braun and Clarke (2006) state that the researcher may discard some themes or label some as miscellaneous if they do not fit into the main or subthemes.

Phase 4 included reviewing themes, which consists of two levels: (a) refining themes found in phase 3; and (b) rereading the entire data set to determine if the themes are accurate while considering the validity of the themes. Braun and Clarke (2006) state

that in level 1 the researcher will notice that some themes found prior are not themes while the researcher may need to explore other themes to determine if they are a main theme or if the researcher should break them down into subthemes. The protocol then called for the creation of a thematic map to demonstrate the themes and subthemes found up until this point. The study then completed level 2 by rereading the entire data set to determine if the themes work and coding any additional information data that the researcher may have missed prior. Because the thematic map appeared accurate, the researcher then moved to phase 5, defining the themes (Braun & Clarke, 2006).

Braun and Clarke (2006) states that phase 5 begins when the researcher has established an accurate thematic map. The study defined and further refined the themes and emphasized what each theme was about and the information that each theme represented (Braun & Clarke, 2006). Braun and Clarke (2006) states that "it is important not to try and get a theme to do too much, or to be too diverse and complex" (p. 22). A narrative of the extracted themes and organized accounts will explain the findings (Braun & Clarke, 2006). Table 3 demonstrates the analyses used to determine the results for each of the 4 research objectives.

Table 3

Statistical Analyses

Research Objective	Statistical Analysis
1. Describe WWP participants by identifying their age, gender, role in the organization, education levels, marital status, number of children, and annual household income.	Descriptive Statistics

Table 3 (continued)

Research Objective	Statistical Analysis
2. Determine the relationship between the number of steps taken by participants and their rate of absenteeism.	Simple Linear Regression Predictor Variable = Number of Steps Taken Outcome Variable = Absenteeism Rate
3. Determine the relationship between the number of steps taken by participants and their rate of presenteeism.	Simple Linear Regression Predictor Variable = Number of Steps Taken Outcome Variable = Presenteeism Rate
4. Determine which features have the most impact on physical activity and well-being.	Thematic Analysis

Summary

This embedded mixed methods study is quantitative and qualitative in nature and seeks to demonstrate two outcomes: (a) the relationship between employee physical activity levels and productivity; and (b) the perceptions of participants in relation to their experiences in using the wearable device during the intervention. The study will explore the recollection and perception of participants in relation to their rates of absenteeism and presenteeism rates while implementing an intervention aimed at improving their physical health. Understanding the effectiveness of a WWP in a work setting like the one chosen for the study can assist in increasing productivity rates, the health of employees, and the overall quality of life. This pilot study intends to provide leaders and researchers a look at the types of investments they are willing to contribute in relation to their employees' health and overall job satisfaction. This chapter includes the overarching research question, the hypotheses for the study, the research objectives, research design, the target population, information about the survey instrument, the intervention and procedures,

data collection procedures and scheduling, and the final data analysis procedures that the researcher will use. The next chapter focuses on the results of the study.

CHAPTER IV – RESULTS

Research shows WWPs produce positive results in relation to employee health and productivity levels (Mattke et al., 2014). Additionally, the use of wearable technology continues to increase as it mitigates barriers to participation in traditional WWPs (Chesky, 2015; DeVries, 2010). This study focused on accomplishing two purposes: (a) to explain the relationship between the physical activity and productivity levels of participants; and (b) to explore the perceptions of select participants in relation to the wearable technology device provided for the study. An embedded mixed methods design was employed to conduct the study and to determine results. The quantitative portion consisted of a single-group, pretest-posttest design with intervention that lasted for eight weeks. The qualitative portion consisted of an embedded journaling technique assigned to six select participants, which also included a focus group following the intervention.

This section presents the analysis and results for the research objectives of the study. The first, second, and third research objectives focused on the quantitative portion of the study, and the fourth research objective pertained to the qualitative portion. Both the quantitative and qualitative results will include a combination of narratives and tables.

Research Objective One Results

The study began with 41 intervention participants. However, only 38 completed the study. Two participants dropped out due to an inability to fulfill the obligations of the contract, and the other participant no longer felt comfortable participating in the walking challenges after the third week because others could view the number of their steps via the electronic Fitbit application. Table 4 and Table 5 provide demographic information

as illustrated in RO1: *Describe WWP participants by identifying their age, gender, role in the organization, education levels, marital status, number of children, and annual household income.* Table 4 displays basic demographic information, and Table 5 provides socioeconomic demographic information in relation to role in the organization, education levels, marital status, number of children, and annual household income.

All participants were full-time employees of the target organization and participated in the study from pretest to post-test stages. Of the 38 participants who completed the intervention, most were women (n = 29). Participant demographics revealed that the participants occupied all age groups, with one participant identifying as being 65 years of age or older.

Table 4

Age of Participants

	Male		Female	
Age	*n*	%	*n*	%
20 - 24	0	0%	2	5.3%
25 - 34	2	5.3%	11	28.9%
35 - 44	3	7.9%	7	18.4%
45 - 54	3	7.9%	6	15.8%
55 - 64	1	2.6%	2	5.3%
65 or Older	0	0%	1	2.6%
Total	9	23.7%	29	76.3%

Creswell and Plano Clark (2011) and Phillips et al. (2013) recognize the importance of diversity in a target population when selecting participants. The first

column in Table 5 describes the socioeconomic characteristics of participants, and the second column provides the categories for the demographic characteristics. Participant positions in the organization were diverse, with most being from the professional category (n = 25), some being clerical or administrative (n = 8), and some were members of senior management (n = 5). Only one participant identified with only a high school diploma or GED, six identified with having some college or a 2-year degree, 15 reported to have at least a 4-year degree, and 16 reported having more than a 4-year degree.

In relation to marital status, many participants reported being married or cohabitating (n = 17), six reported as divorced, and 15 reported to have never been married. Regarding children, the largest number of participants reported having no children (n = 17), while some identified having one child (n = 4), two children (n = 10), three children (n = 3), and four or more children (n = 4). Finally, household income levels for most participants were higher than $35,000 per year ($n$ = 33), with only some reporting earnings less than $35,000 per year ($n$ = 5).

Table 5

Socioeconomic Characteristics of Participants

Socioeconomic Demographics	*n*	%
Job Role		
Senior Management	5	13.2%
Professional	25	65.8%
Clerical/Administrative	8	21.0%
Education Level		
HS Diploma or GED	1	2.6%
Some College/2-Year Degree	6	15.8%
4-Year College Degree	15	39.5%
More than a 4-Year Degree	16	42.1%

Table 5 (continued)

Socioeconomic Demographics	*n*	%
Marital Status		
Married or Cohabitating	17	44.7%
Divorced	6	15.8%
Never Married	15	39.5%
Children in Household		
None	17	44.78%
One	4	10.5%
Two	10	26.3%
Three	3	7.9%
Four or More	4	10.5%
Household Income		
$35K or More Per Year	33	86.8%
$35K or Less Per Year	5	13.2%

Research Objective Two Results

The study used a simple linear regression analysis to accomplish RO2: *Determine if a relationship exists between the physical activity levels of participants and their rates of health-related absenteeism.* Kessler (2003) states that when calculating absenteeism scores, "a decision is needed as to whether only days defined as sickness-absence days should be counted as being missed or if all days missed from work should be counted" (p. 2). The study calculated all absenteeism scores by using only the health-related absences reported by participants.

The Relationship between Physical Activity and Health-Related Absenteeism

The study used SPSS (Version 25) to analyze data collected for physical activity, measured in steps taken, and health-related absenteeism (WHO, 2002). The regression analysis generated three tables in SPSS: (a) a Model Summary table; (b) an Analysis of Variance (ANOVA) table; and (c) a Coefficients table. The ANOVA table indicated how

well the independent variable predicts the dependent variable. For this analysis, the independent, or predictor, variable was physical activity, and the dependent, or outcome, variable was absenteeism. The *p* value determines the level of confidence that the independent variable predicted the dependent variable. Finally, the Coefficients table contained the *B* value, which is the value for the regression for predicting the dependent variable, as well as the standard error and the standardized coefficients (β). If the *p* value is .05 or less, the results are significant (Laerd Statistics, 2013).

The study used a simple linear regression to calculate results using the physical activity of participants, measured in steps taken, and health-related absenteeism. However, the study first explored the absenteeism and physical activity data using SPSS to determine if any outliers existed. According to Laerd Statistics (2013), assumptions of the simple linear regression analysis indicate that there should be no significant outliers. Field (2013) suggests generating a boxplot to identify outliers in a dataset. Therefore, the researcher generated a boxplot using the graphs tool in SPSS. The boxplot demonstrated that one significant outlier existed in the absenteeism data. The researcher removed the data for the indicated participant to perform the regression analysis. A participant experienced a traumatic event during the study period and was not at work for over 2 weeks during the last 28 days, which caused an extreme value in comparison to the other participants who finished. Martin (2018) states that if removing an outlier affects assumptions without affecting results, it is acceptable. In this case, it was appropriate to remove the outlier.

The results of the simple linear regression analysis indicated that there was not a significant relationship between physical activity levels and rates of absenteeism scores,

using health-related absences, for the participants, $F(1,36) = 3.775$, $p = .06$, $R^2 = .095$. The R^2, or coefficient of determination, indicates that the predictor variable (physical activity) accounted for 9.5% of the variability in absenteeism. Additionally, the *p* value is greater than .05, meaning that there was not a statistically significant relationship between the variables of physical activity and health-related absenteeism. Table 6 demonstrates the results from the simple linear regression analysis conducted to accomplish RO2.

Table 6

Linear Regression Analysis Comparing Physical Activity to Absenteeism

Outcome Variable	*B*	*SE*	*Standardized Coefficients* *Beta*	*Sig.*
Absenteeism	399.146	10.283	-.308	.060

The scatterplot in Figure 2 demonstrates the results of the analysis, giving a visual of the relationship between physical activity levels and health-related absenteeism. The scatterplot demonstrates the physical activity of participants by their number of steps taken over the 8-week intervention period. The scatterplot demonstrates the rate of health-related absenteeism in the number of work hours missed due to health-related problems.

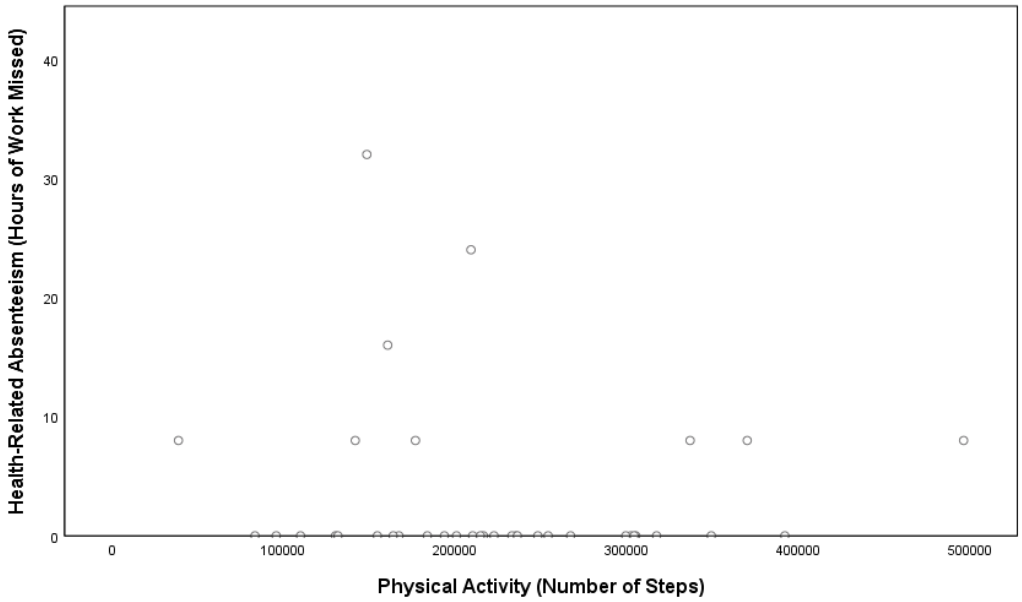


Figure 2. Scatterplot of Regression Analysis for Physical Activity & Absenteeism

Changes in Rates of Health-Related Absenteeism

The study also compared pretest and posttest absenteeism mean scores to determine if there was a change in absenteeism over the 8-week period. The results confirmed that the mean score did decrease over the intervention period, which indicated that the overall absenteeism rate decreased. The scores show that posttest data set (M = 3.24) was less than that of the pretest data set (M = 4.97). Table 7 demonstrates the change in absenteeism scores from pretest to posttest stages.

Table 7

Absenteeism Mean Scores from Pretest and Posttest Data

Data Collection Phase	*n*	*M*	*SD*
Pretest	37	4.97	6.63
Posttest	37	3.24	7.17

Research Objective Three Results

The study used a simple linear regression analysis to accomplish RO3: *Determine if a relationship exists between the physical activity levels of participants and their rates of presenteeism.* Participants rated their current performance on a scale from 0 to 10 to determine presenteeism scores. The study used absolute presenteeism scores to perform the analysis.

The Relationship between Physical Activity and Presenteeism

A simple linear regression analysis calculated the results for RO3: *Determine if there is a relationship between the number of steps taken by participants and their rate of presenteeism.* The study used the presenteeism scores from the same 37 HPQs collected during the study. For this analysis, the independent variable was physical activity (number of steps), and the dependent variable was absolute presenteeism. Scores calculated for absolute presenteeism consisted of participants rating their performance on an ordinal scale from 0 to 10 during the prior 28 days, with 0 being the worst and 10 being the top performance and multiplying that number by 10 (Kessler, 2003).

The study used a simple linear regression to calculate the results, which intended to predict presenteeism based on the physical activity levels of participants. A significant regression equation was found $F(1,35) = 4.905$, $p = .033$, $R^2 = .123$. The R^2, or coefficient of determination, indicates that the predictor variable (physical activity) accounted for 12.3% of the variability in presenteeism, with a p value of less than .05. Therefore, results indicate a statistically significant relationship between the variables of physical activity, measured in steps taken, and presenteeism in this study. Table 8

demonstrates the results from the simple linear regression analysis conducted to accomplish RO3.

Table 8

Linear Regression Analysis Comparing Physical Activity & Presenteeism

Outcome Variable	*B*	*SE*	*Standardized Coefficients Beta*	*Sig.*
Presenteeism	601.91	3.991	.351	.033

The scatterplot in Figure 3 demonstrates the results of the regression analysis, giving a visual of the relationship between physical activity levels measured in number of steps taken and presenteeism. Presenteeism data in the scatterplot consists of absolute presenteeism scores. Each point represents a participant who participated in the 8-week study.

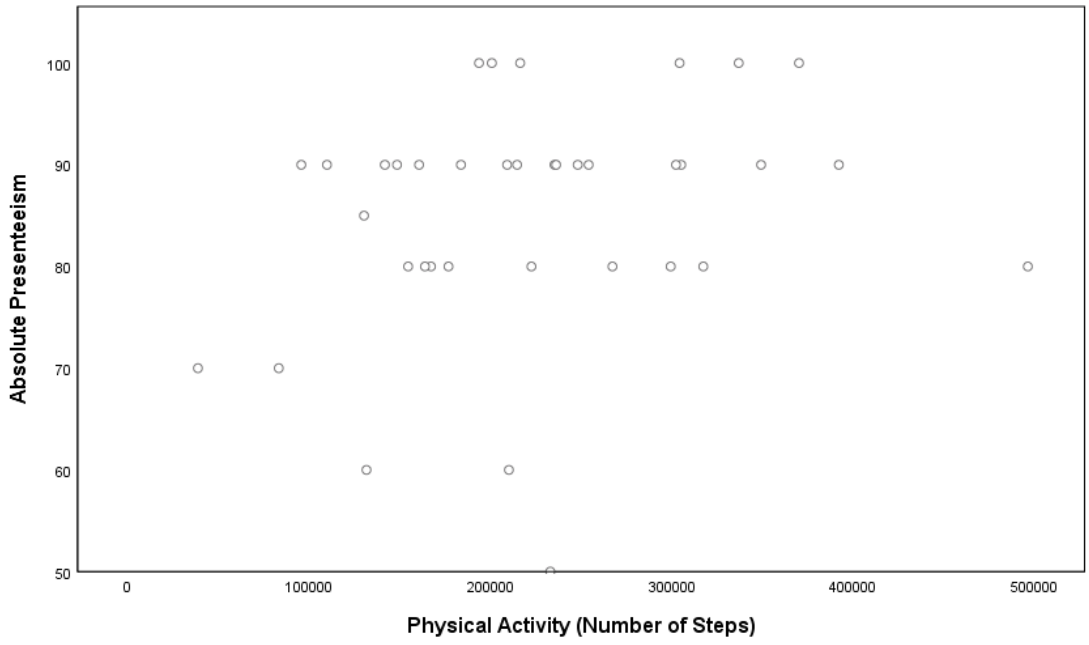


Figure 3. Scatterplot of Regression Analysis for Physical Activity & Presenteeism

Changes in Rates of Presenteeism

The study also calculated and compared changes in presenteeism scores from pretest to posttest stages using two separate calculations: (a) one using absolute presenteeism scores; and (b) one using relative presenteeism scores. The second calculation using relative presenteeism scores provides results of how participants believed they performed in comparison to coworkers working in similar roles. Using the descriptive statistics features of SPSS, the study generated a frequency distribution table to provide the results. Table 9 demonstrates the changes in presenteeism scores for absolute presenteeism. Scores calculated for absolute presenteeism consisted of participants rating their performance on a scale from 0 to 10 during the prior 28 days, with 0 being the worst and 10 being the top performance and multiplying that number by 10. Table 9 shows the change in absolute presenteeism scores, revealing that absolute presenteeism scores increased from pretest (M = 82.51) to posttest (M = 85.27) stages, which initially indicated that presenteeism rates decreased.

Table 9

Absolute Presenteeism Mean Scores from Pretest and Posttest Stages

Data Collection Phase	*n*	*M*	*SD*
Pretest	37	82.51	12.197
Posttest	37	85.27	11.663

In relation to relative presenteeism, the average score decreased from pretest to posttest stages. Relative presenteeism score calculations consisted of participants rating their performance during the prior 28 days on a scale from 0 to 10, with 0 indicating the worst

performance and 10 indicating the top performance, and then dividing the value by the value of how participant rated other workers who perform the same job on the same scale. Table 10 demonstrates the change in relative presenteeism from pretest to posttest stages. The results did not indicate an improvement in relative presenteeism scores. The pretest relative presenteeism score (M = 1.24) was higher than the posttest relative presenteeism score (M = 1.13).

Table 10

Relative Presenteeism Mean Scores from Pretest and Posttest Stages

Data Collection Phase	*n*	*M*	*SD*
Pretest	37	1.24	.685
Posttest	37	1.13	.202

Research Objective Four Results

The qualitative portion of the study consisted of six participants from the overall number of participants who volunteered for the research. Participants completed weekly journal entries focused on specific questions relating to the use of the wearable device provided for the intervention. A focus group followed the 8-week intervention, which the six participants agreed to attend when volunteering for the journaling exercise. The participants provided narrative responses to eight questions, one for each week of the study intervention period (Appendix L). The focus group allowed participants to clarify information from the weekly journal entries and to discuss any new information brought to their attention by other participants.

The study used a thematic analysis, as described by Braun and Clarke (2006), to determine the results for RO4: *Determine which features of the wearable technology device have the most impact on physical activity and well-being.* Braun and Clarke (2006) described the thematic analysis in five phases: (a) data familiarization where the researcher immerses in the data; (b) code generation; (c) theme search; (d) theme revision; and (e) theme definition. The study utilized no analysis software for the qualitative analysis. However, Microsoft Word and Excel were programs used to store and display data systematically in order to analyze the data.

The researcher conducted an initial thematic analysis of all journal entries to help in generating questions for the focus group. From the initial analysis, the researcher developed 6 questions for the focus group:

1. You all cited six features as being helpful more frequently than others: (a) sleep tracker; (b) step tracker; (c) its light weight and comfort; (d) the silent alarm; (e) the water intake feature; and (f) waterproof. Can you think of other features that were the most helpful? Why were these features most helpful to you during the study?
2. Of the features that you mentioned as most helpful, how do you feel that they contributed to your motivation levels?
3. Most participants mentioned that the wearable device contributed to other areas of their lives, but some also stated that it took away from some areas of their lives (i.e. family time, talking with friends). Do you feel that this was the case for you?
4. Some of you noted aspects of the device that were demotivating. Can you clarify for me what the demotivators were?

5. Since documenting your journal entry from Week 7, can you tell me ways that the wearable device helped you with self-control?
6. For question 8, most of you felt that the wearable device helped to bring you closer to others in the study, but some did not. Can you all help with clarifying whether you did or did not feel closer to others?

The focus group lasted for 1 hour and 6 minutes. The study used Elliot and Associates' (2005) guidelines for conducting focus groups. The researcher followed five suggestions for conducting the group: (a) open-ended, unambiguous questions; (b) ideal time of the group lasting between 45 and 90 minutes; (c) predetermined questions were generated; (d) homogeneity with all participants working in the target organization but in different departments or programs; and (e) no more than 6 to 10 participants (Elliot & Associates, 2005).

Features with the Most Impact on Physical Activity and Well-Being

Participants of the qualitative portion provided detailed journal entries for the 8 weeks of the intervention. The study collected a total of 48 journal entries, and all six participants participated in the follow-up focus group. The researcher consolidated the narratives from the 8-week period and focus group. The analysis process began with focusing on Questions 1 and 2: *Which features of the wearable device are most helpful?* and *How have those features helped you in meeting your exercise goals for the week?* The participants identified nine features to be most helpful: (a) the step tracker; (b) the Fitbit challenges/community tracker; (c) the sleep tracker; (d) the design and comfort; (e) the calorie tracker; (f) the weekly summaries; (g) the water intake tracker; (h) the silent alarms; and (j) the waterproof capabilities. All participants cited the step tracker feature

as well as the Fitbit challenge/community step tracker feature, and five of the six participants cited the sleep tracker. For the design and comfort, calorie tracker, and weekly summaries, three out of the six cited those features to be most helpful. However, only two out of the six found the water intake tracker and silent alarms to be helpful, while only one participant cited the waterproof capabilities. Table 11 provides a snapshot of the number of participants who cited each of the features during the intervention period and through focus group findings.

Table 11

Features with the Most Impact on Physical Activity and Well-Being

Feature	Number of Participants Who Cited
Step Tracker	6
Fitbit Challenges/Community Tracker	6
Sleep Tracker	5
Design/Comfort	3
Calorie Tracker	3
Weekly Summaries	3
Water Intake Tracker	2
Silent Alarms	2
Waterproof Capabilities	1

As suggested by Braun and Clarke (2006), Phase 1 of the analysis began with reading the journal entries and notes from the focus group to become familiar. Phase 2 consisted of coding information in the narratives to separate data. Participant statements

from journal entries and the focus group provided the narratives needed to code information and scan the narrative for potential themes. Phase 3 consisted of combining codes to create themes. Because Questions 1 and 2 asked for very specific information, the themes found were relevant and documented.

Because almost all participants cited the top 3 features as most helpful, the researcher focused on themes related to the reasons that participants cited those features. All participants cited the step tracker as helpful. Four themes developed from the data collected, reviewed, and coded in relation to how the feature helped participants meet exercise goals: (a) progress and goals; (b) motivation; (c) awareness; and (d) feedback. Reason 1 (Progress and Goals) referenced measuring steps and reaching goals participants created for themselves. Reason 2 (Motivation) referenced remaining engaged due to the step tracking feature. Reason 3 (Awareness) represented better understanding physical activity patterns (i.e. sedentary vs. active). Finally, Reason 4 (Feedback) related to alerts regarding participants' current physical activity. Table 12 demonstrates the number of participants that cited each reason.

Table 12

Reasons Participants Cited the Step Tracker Feature

Reasons	Number of participants who cited this reason
Progress and Goals	6
Motivation	5
Awareness	4
Feedback	3

All participants cited the Fitbit challenges and Community Step Tracker as helpful. Three themes developed from the data collected, reviewed, and coded in relation to how the feature helped participants meet exercise goals: (a) competition; (b) shared experience; and (c) face-to-face interaction with coworkers. Reason 1 (Competition) referenced participants' competitiveness with others or the perception of themselves as competitive. The 2nd reason (Shared Experience), related to the social aspect of the study, did not require physical interaction. Reason 3 (Face-to-Face interactions with coworkers) represented conversations which participants provoked or sparked from sharing progress with others via the Fitbit app. Table 13 demonstrates how many participants that cited each reason.

Table 13

Reasons Participants Cited the Fitbit Challenge/Community Tracker Feature

Reasons	Number of participants who cited this reason
Competition with Others	6
Shared Experience	4
Face-to-Face Interactions with Coworkers	3

Five out of the six qualitative participants chose the sleep tracker as the 3rd most helpful feature. Three themes developed from the data collected, reviewed, and coded in relation to how the sleep tracker feature helped participants meet exercise goals: (a) understanding sleep habits; (b) monitoring hours of sleep; and (c) comparing sleep patterns with energy levels. Reason 1 (Understanding Sleep Habits) represented using the app and comparing sleep patterns with daily activities. Reason 2 (Monitoring Hours

of Sleep) related to participants' interest in knowing the number of hours they slept. The 3rd reason (Comparing Sleep Patterns with Energy Levels) referenced days when participants met or did not meet goals in comparison with sleep patterns. Table 14 demonstrates the number of participants that cited each reason.

Table 14

Reasons Participants Cited the Sleep Tracker Feature

Reasons	Number of participants who cited this reason
Understanding Sleep Habits	5
Monitoring Hours of Sleep	4
Comparing Sleep Habits to Energy Levels	3

The analysis of data for questions 3 through 8 consisted of coding information while taking notes and then transferring the information into a Microsoft Excel spreadsheet for ease of analysis. Journal entries did not include names, only the tracking numbers of participants. The process required the researcher to review narrative responses to questions as well as information in later narrative responses and focus group notes to determine if the opinions of participants changed. Statements from journal entries and the focus group provided information that informed theme identification and revision. The study identified themes for journal entry statements based on content.

The researcher then coded initial themes by frequency to determine the number of participants who noted similar or the same information. The study required the creation of a thematic map, which helped to combine codes. Combined coded information provided refined themes. Finally, the study attempted to define themes and identify

subthemes. Although the process was lengthy, the analysis provided rich data that helped with finding the overarching themes and subthemes.

Impact on Other Areas of Life

The study then analyzed information pertaining to Question 3: *Has the wearable device helped you in other areas of your life? If so, how?* The information from the journal entries combined with focus group notes identified four initial themes: (a) concentration; (b) family; (c) sleep; and (d) self-care. After reviewing and analyzing the information further, the information indicated three final themes for the third question: (a) increased focus and concentration; (b) improved sleep habits; and (c) prioritizing for exercise and health.

The third theme (prioritizing for exercise and health) included 1 subtheme: family life affected. Three participants (Tracking #s 15, 23, and 28) noted that prioritizing for exercise called for them to increase time allotted for the planning and completion of weekly exercise activities. One study participant (Tracking #23) stated that prioritizing caused less engagement with family and friends, which provoked feelings of guilt. The other two participants (Tracking #s 15 and 28) reported with positive responses about taking more time for themselves. Even though the participants reported with mixed feelings around increasing exercise, the third theme indicated that the wearable device improved participants' desire to improve their self-care efforts. Table 15 demonstrates the number of qualitative participants who provided statements that related to the themes and the subtheme.

Table 15

How the Wearable Device Affected Other Areas of the Participants' Lives

Themes	Number of participants who referenced this theme
Focus & Concentration Increased	6
Improved Sleep Habits	4
Prioritizing for Exercise & Health	3
Subtheme: Family Life Affected	2

Impact on Time, Convenience, and Location

The study then conducted the analysis for Question 4: *Has the wearable device provided during the study saved you time? If so, how?* Each of the 6 qualitative participants stated that they could not identify a way that the wearable device saved them time through journal entry submissions. However, five out of the six (Tracking #s 23, 15, 18, 28, and 27) identified three aspects of their time that they believe had improved: (a) improved time management; (b) improved time awareness; and (c) ease of use. Four participants (Tracking #s 23, 15, 18, and 27) identified that their time management skills had improved, while three participants (Tracking #s 18, 23, and 27) identified with having an increased awareness of how they spend their time in sedentary versus active activities. Two participants (#s 15 and 28) referenced using the device as being convenient and easy in terms of maintenance. Table 16 demonstrates the number of participants who referenced at least one way that the wearable device affected their time, even though no participants identified ways that the device saved them time.

Table 16

Ways the Wearable Device Has Affected Time in Participants' Lives

Themes	Number of participants who referenced this theme
No Time Savings	6
Subtheme: Improved Time Management	5
Subtheme: Improved Time Awareness	3
Subtheme: Ease of Use	2

The question for the fifth week of journaling aimed at determining if the wearable device added flexibility to the participants' schedules, which is a question also focused on time. Four of the six participants (Tracking #s 15, 18, 27, and 28) stated that the device had added flexibility to their schedules. One of the two who did not (Tracking #23) perceive flexibility stated that they were "*more intentional with my time and am rigid in my scheduling in order to achieve the walking challenges and get my preferred number of steps in daily."* Initially, four themes emerged through coding: (a) convenience; (b) location; (c) prioritizing; and (d) time. However, through further analysis, the study identified five final themes: (a) ease of use, with 6 entries; (b) mitigates location as a barrier to exercise, with 3 entries; (c) increased time awareness, with 2 entries; (d) prioritization, with 2 entries; and (e) feeling connected, with 1 entry. Four participants (Tracking #s 15, 18, 23, and 28) identified one subtheme that emerged several times under ease of use: low maintenance. Table 17 demonstrates how many participants referenced ways that the wearable device added flexibility to their schedules.

Table 17

Ways that the Device Added Flexibility to the Participants' Schedules

Themes	Number of participants who referenced this theme
Ease of Use	6
Subtheme: Low Maintenance	4
Mitigated Location as A Barrier	4
Increased Time Awareness	2
Improved Prioritization Skills	2

Features with an Impact on Motivation

Questions six through eight gauged responses in relation to the three psychological needs of the participants as outlined in Self-Determination Theory: (a) *competence* in completing tasks and activities in Question 6; (b) *autonomy* or self-control in Question 7; (c) *relatedness* or inclusion with others in Question 8 (Deci & Ryan, 1985, 2000). The study first conducted the analysis for Question 6: *Has the wearable device motivated you to complete your exercise tasks? If so, how? Which feature(s) of the wearable device motivated you the most?* Five out of the six qualitative participants (Tracking #s 15, 18, 23, 27, and 28) reported that the wearable device motivated them to complete their exercise tasks. However, the only theme that emerged was in reference to the instant results participants received, with the step tracker and periodic alerts as the most informative. The step tracker was the most helpful in meeting exercise goals, with all 6 in agreement. Three participants (Tracking #s 18, 27, and 28) chose the weekly summaries of their overall results as the most helpful, and two participants (Tracking #s

23 and 27) referenced the calorie tracker as helpful. Table 18 demonstrates the number of participants who referenced the theme and subthemes.

Table 18

Features that Motivated Participants the Most in Completing Exercise Goals

Themes	Number of participants who referenced this theme
Instant Results	5
Subtheme: Step Tracker	3
Subtheme: Periodic Alerts	2

Next, the study conducted the analysis for Question 7: *Has the wearable device helped you with self-control in relation to your health? If so, how? Which feature(s) of the wearable device motivated you the most?* Four out of the six participants (Tracking #s 15, 23, 27, and 28) reported that the wearable device helped them with self-control, while one participant (Tracking # 18) acknowledged believing that the wearable device promoted self-control indirectly due to the activities and challenges. Two primary themes emerged from the journal entries and focus group notes: (a) determination in meeting physical activity goals; and (b) improved diet. There were two wearable features referenced in relation to self-control and participant health: (b) step tracker; and (b) calorie counter. While only three participants (Tracking #s 23, 27, and 28) reported using the calorie tracker, one participant (#23) reported that *"the best motivating feature for me is the calorie burn tracker."* There were three affirming participant statements regarding determination: (a) "*wearing the device has influenced my determination to get up and move regularly,"* (b) *"I'm also pleased that cooler outdoor temps and wet weather have*

not discouraged me from walking," and (c) *"It has also shown me how easy it is to squeeze a quick 15 minute walk throughout the day."* Table 19 demonstrates how many participants cited the notable wearable features.

Table 19

Features Most Helpful for Self-Control in Relation to Health

Themes	Number of participants who referenced this theme
Step Tracker	5
Calorie Tracker	2

Finally, the study completed the analysis for Question 8: *Has the wearable device helped you feel closer with others in the study? If so, how? Which feature(s) of the wearable device motivated you the most?* Four of the participants (Tracking #s 15, 18, 27, and 28) confirmed that they felt closer to other study participants, and one participant (Tracking #23) found that *"it did create a fun and friendly competitive atmosphere around the office by engaging coworkers that may not typically see or speak with each other often."* However, the same participant reported having a different perspective during the focus group in that the wearable device did help with relatedness as the participants had a shared experience. Additionally, four participants noted the social aspect of the study. Participants noted that it improved their feelings of closeness with others and prompted meaningful interactions in the workplace. Table 20 provides four participant statements that affirmed their perceptions of feeling closer to others during the study.

Table 20

Participant Statements Affirming Relatedness

Participant	Statements
Tracking #15	*Along the way, I've had meaningful chats with fellow participants about exercise in general, daily diets, and overall health matters.*
Tracking #18	*It has given me a small window into life outside of work with a number of my co-workers.*
Tracking #27	*I see myself as an introvert whom only holds a conversation when the other person starts it. I have initiated conversations around the different challenges we have had using the device.*
Tracking #28	*I have also shared laughter and personal experiences with others in the study and discussed reasons why others joined.*

Participants cited two wearable features that had the most impact on relatedness: (a) step tracker; (b) weekly summaries; and (c) Fitbit challenges/community tracker. The step tracker had the most impact on participants feeling connected to others. While only two participants cited the Fitbit challenges or Community Tracker as having an impact on relatedness, participants cited this feature as the second most helpful feature throughout journal entries and focus group findings. Even though not many linked other features to their connections with others in the study, two participants cited the weekly summaries as having an impact. Table 21 demonstrates the number of participants who cited the most helpful features of the wearable device that helped them make connections with others in the study.

Table 21

Features with the Most Impact on Connecting with Others

Feature	Number of Participants Who Cited
Step Tracker	5
Fitbit Challenges/Community Tracker	3
Weekly Summaries	2

Overarching Themes

Through the analysis process, three overarching themes emerged from the narratives in relation to the wearable device and its impact on participant physical activity and well-being. Subthemes accompanied each of the themes. Written and verbal statements affirmed the overarching themes. All six of the participants cited competition with others. While only four reported feeling closer to others in the study, five participants indicated that they engaged more with others and created bonds that they would not normally have had the opportunity to create. While no participants reported that the wearable device saved time, five reported better time awareness in relation to time spent sedentary versus active. However, through prioritizing exercise, the same five participants reported improved time management skills along with increased focus and concentration. All participants indicated that the wearable device was easy to use, but only five participants indicated that the instant results improved their efforts. Half of the participants identified that the device prevented them from making excuses for themselves in relation to location. Table 22 describes the three over-arching themes and six subthemes found through the qualitative analysis process.

Table 22

Overarching Themes and Subthemes from Thematic Analysis

Theme	Subtheme	Number of Participants Who Cited
Shared Experience	Competition with Others	6
	Interactions with Others	5
Increased Time Awareness	Improved Time Management Skills	5
	Focus and Concentration Improved	5
Ease of Use	Instant Results	5
	Mitigated Location as a Barrier	3

Demotivators

While the study did not specially ask for participant perceptions on demotivating factors in relation to the wearable device used, some participants noted demotivation in their journal entries. Participants later discussed demotivators during the focus group. Four participants (Tracking #s 18, 23, 28, and 38) commented on demotivating factors. However, the study only identified two themes in relation to factors that resulted in demotivation: (a) Progress and Goals; and (b) Competition with Others. When problems with the device occurred, participants felt less motivation due to an inability to log their steps. Additionally, the device reportedly did not log steps for specific activities (i.e. kayaking, exercise on an elliptical machine). Participants felt less motivated when the device did not provide feedback and results in relation to activities. Participants felt less motivation when they did not feel competitive or meet their personal goals.

Summary

Chapter IV began with the results from RO1 by describing participant demographics. While the study began with 41 participants, only 38 completed the intervention. While participants primarily consisted of females, participant demographic varied in relation to age, role in the organization, education levels, marital status, number of children, and annual household income. All six of the qualitative participants completed study requirements. The researcher initially informed participants that the qualitative portion would require participation in journaling exercises and a follow-up focus group. The study then reported on changes in rates of absolute absenteeism and the relationship between participant physical activity levels and their rates of absenteeism in response to RO2. The study next responded to RO3 by demonstrating changes in both the absolute and relative presenteeism rates of participants, as well as the findings in relation to the relationship between participant physical activity levels and their rates of presenteeism. The chapter concluded by reporting on findings from RO4, which included the qualitative portion of the study. RO4 results provided 6 categories of information: (a) features with the most impact on participant physical activity and well-being; (b) features with impact on other areas of life; (c) features with impact on time, convenience, and location; (d) features with impact on motivation; (e) overarching themes found in the qualitative narratives; and (f) demotivators.

CHAPTER V – DISCUSSION

The number of corporate WWPs in the United States since the 1970s demonstrates that employers understand that employee health is a problem. Many American workers do not prioritize for their health (Gerteis et al., 2014), which is unfortunate because experts consider the health of an individual to be the most important asset of an organization (Bleakely, 2013; Hokayem and Ziliak, 2014). Employee health problems decrease productivity rates (Parkinson, 2013; Troy & Jones, 2016) and increase costs to employers (CDC, 2015; Prater & Smith, 2011). The costs associated with employee health are avoidable as employers can use WWPs to improve employee health (Boshtam et al., 2010; Jung et al., 2012), productivity levels (Burton et al., 2004; Gates et al., 2008), and employee retention rates (Fitzgerald and Danner, 2012). However, employers must invest in employee health for improvements to occur. Traditional WWPs introduced organizations to the beginning stages of health promotion, but recent research indicates that technology can enhance the results and activities in WWPs (Asimakopoulos et al., 2017; DeVries, 2010). Strategically investing in wearable technology can not only provide benefits to an organization, but also its employees.

Because the human capital risks associated with employee health continue to pose a problem for employers, the current study aimed to analyze two facets of a WWP using wearable technology: (a) the relationship between physical activity and productivity levels; and (b) the impact that the features of wearable technology have on the physical activity levels and well-being of employees. This chapter presents the study's results and includes the following seven components: (a) Summary of the Study; (b) Summary of

Results; (c) Findings, Conclusions, and Recommendations; (d) Implications of the study; (f) Study Limitations; (g) Recommendations for Future Research; and (h) Summary.

Summary of the Study

The purpose of this embedded mixed methods study was to accomplish two tasks: (a) explain the relationship between physical activity and rates of absenteeism and presenteeism; and (b) explore which features of the wearable device used have the most impact on user physical activity and well-being. The study used three types of data collection instruments, a questionnaire, weekly tracking forms, and weekly journal entries. The questionnaire used, the HPQ (WHO, 2002), measured rates of absenteeism as well as presenteeism. Participants recorded daily physical activity on tracking forms, while also allowing the researcher to monitor steps using the wearable device mobile app.

For qualitative participants, journal entries consisted of narrative responses to weekly questions specifically designed to understand which features of the wearable device used, the Fitbit, had the most impact on physical activity and well-being. The study used two sampling approaches, a convenient sampling technique for the quantitative portion, and a purposeful sampling technique for the qualitative portion. The target population for the study consisted of employees of a non-profit social service organization located in Alabama. During the study period, the organization employed 105 employees, with 95 located at the organization's main headquarters and 10 located at a separate location (D. O. Bark, personal communication, June 18, 2018). While 41 participants started the study, only 38 completed the 8-week intervention designed for the quantitative portion. The 6 qualitative participants started and completed the entire study.

Quantitative participants provided responses to questions asked in the questionnaire in relation to absences and health-related performance, which the study compared to physical activity levels, measured in steps taken, using two separate simple linear regression analyses. Qualitative participants provided feedback to journal questions in narrative form over the study period that covered three topics: (a) the most helpful features of the device; (b) the benefits of the device; and (c) the motivation of participants due to using the device.

Summary of Results

The study did not find a significant relationship between physical activity and health-related absenteeism. The predictor variable, physical activity, accounted for 9.5% of the variance in health-related absenteeism, with insignificant results. In comparing the pretest and posttest mean scores, the results demonstrated an increase in overall scores over the 8-week period, but a paired-sample *t*-test revealed that this was not a significant improvement. The study did find a significant relationship between physical activity and presenteeism. The predictor variable, physical activity, accounted for 12.3% of the variance in presenteeism. There was also a decrease in presenteeism as indicated by overall mean scores.

Qualitative results determined that three top features had the most impact on the physical activity and well-being of participants: (a) the step tracker, as a motivator and primarily as a method for measuring progress and goals; (b) Fitbit challenges/community step tracker, mainly to monitor competition with others; and (c) the sleep tracker, primarily to understand sleep habits. In relation to self-determination, the analysis found themes associated with *competence* in completing tasks and activities, *autonomy* or self-

control, and *relatedness* or inclusion with others. Figure four illustrates the overarching themes and subthemes from the thematic analysis.

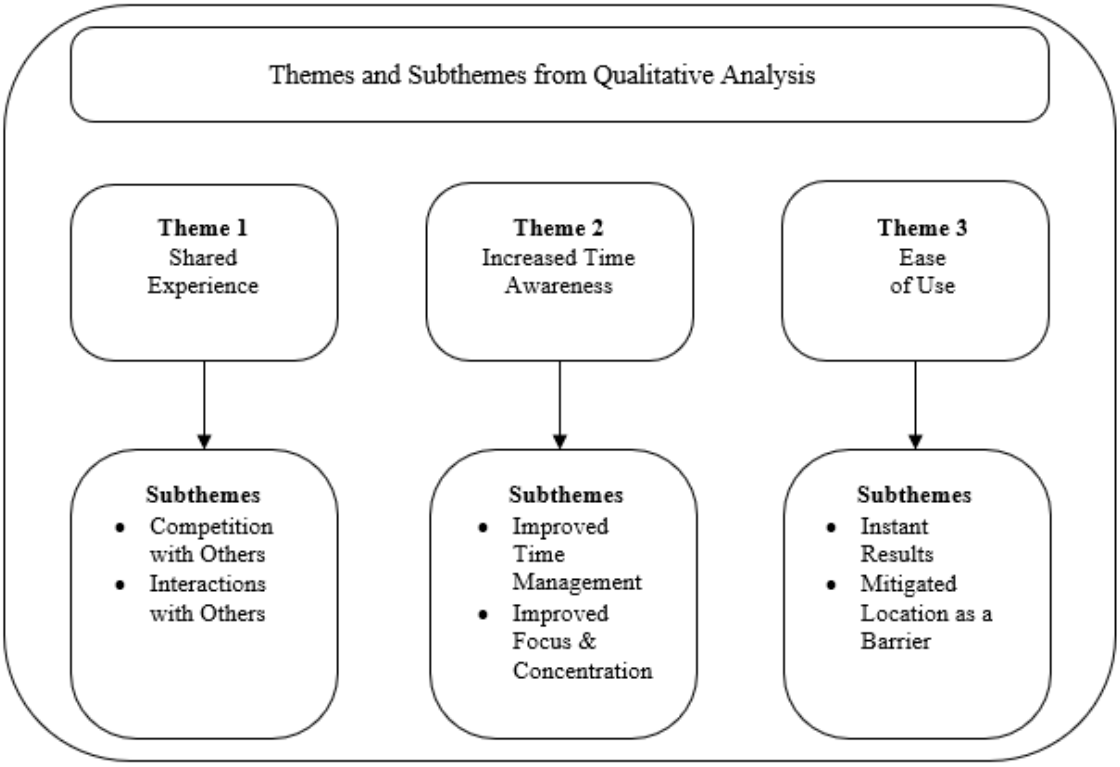


Figure 4. Themes Focused on the Use of Wearable Technology

Findings, Conclusions and Recommendations

The following section includes findings, conclusions, and recommendations based on the results provided in Chapter IV. The findings are based on the researcher's interpretation of participant responses from the quantitative and qualitative portions of the study. The conclusions provide a summation of the information presented. This section also connects the findings to the literature and in relation to solutions for American employee health problems, traditional WWPs, and the impact of using

wearable technology in WWPs. This section also includes recommendations for organizational leaders.

Finding 1. Understanding all variables related to the health of an individual can improve an employer's ability to invest in employee health.

Research has found that wearable technology improves the well-being and physical activity of users (Giddens et al., 2017). Additionally, physical activity is a primary preventer of chronic health conditions (Booth et al., 2012), which increases one's health status and decreases the potential for workplace absences (Gaoshan, 2014). While the participants of the study reported with increased physical activity levels, the results did not find a statistically significant relationship between physical activity and health-related absenteeism. In other words, participants with high levels of physical activity did not necessarily have lower rates of absenteeism than that of participants with low levels of physical activity. Therefore, it appears that there were other variables related to health behavior unaccounted for during the study.

Conclusion. The results of this finding demonstrate that using WWPs to improve employee rates of health-related absenteeism requires accounting for other variables related to health behavior. While the study did allow employees of the target organization to increase engage in regular physical activity over the intervention period, which previous research indicates improves health (ODPHP, 2008; Orhnberger et al., 2017), there was not a significant relationship between physical activity and health-related absenteeism.

Recommendation. Employers should consider investment in WWPs that include wearable technology, which allows employees to easily monitor health information and

account for multiple variables related to employee health. Employers can conduct ongoing comprehensive health risk assessments in addition to encouraging and promoting physical activity and health education to boost the efforts of WWPs. Accounting for all variables in relation to the health of participants may also help when analyzing WWP results and in understanding the needs of the workers in an organization.

Finding 2. Increased physical activity positively impacts employee perceptions of their overall performance.

The study's second finding indicates that participants perceived themselves as more productive in the workplace as a result of increasing physical activity. The study found a significant relationship between physical activity and presenteeism. This finding aligns with past research as individuals who participate in effective WWPs have lower rates of presenteeism (Cancelliere et al., 2011). Additionally, this finding aligns with research by Graff-Zivian and Neidell, (2012) who found that improvements in health also improve productivity levels, labor supply, and the cognitive abilities of employees.

Conclusion. This finding indicates that employees are more likely to continue physical activity as they monitor their progress, which has the potential to impact work performance. Research indicates that there are strong connections between the physical and mental health of individuals (Orhnberger et al., 2017). While past levels of physical health effect present mental health status, there are also known correlations between past mental health and present physical health (Orhnberger et al., 2017). This indicates that increasing employee physical activity can positively impact performance and productivity levels.

Recommendations. Employers should consider investing in wearable technology and opportunities for employees to improve their physical activity levels, which has the potential to improve employee work performance. While it may be difficult to determine the physical and mental health status of employees, wearable technology enables employees to track their own physical activity levels. Past research indicates that it is more beneficial for users of wearable technology to monitor their own fitness (Nikayin et al., 2014). Additionally, other research has asserted that organizational leaders would benefit from implementing WWPs that include wearable technology (DeVries, 2010).

Finding 3. Employee physical activity levels increase due to perceived competition with others.

The study's third finding supports the need for competition in WWPs using wearable technology. All qualitative participants cited the step tracker and the Fitbit challenges/community step tracker as the most helpful features of the wearable device, while also citing competition with others as a motivating factor for achieving their goals. Three themes and six subthemes described the overarching experience of the qualitative participants. Having a shared experience with others was important, but the aspect of competition enhanced the user experience and was a common motivator for increasing step counts.

Conclusion. This finding indicates that employees who participate in WWPs are more engaged in physical activity when there is competition with others. When implementing a WWP, using wearable technology can create an enhanced shared experience and promote healthy competition among participants. The motivation of qualitative participants to improve their step count increased due to perceived

competition with others. This finding aligns with similar findings by Giddens et al. (2017) who suggested that organizations benefit from WWP designs that encourage participants to use the social and tracking features of wearables to connect with others and engage in competition. This finding also aligns with research that found competition with co-workers to be associated with high participation rates (Interdisciplinary Center for Healthy Workplaces, 2018). In terms of self-determination to achieve goals, and therefore improve health, competition provides a strategy that can enhance the motivation and physical activity levels of users.

Recommendation. To ensure participant success in WWPs, employers should consider designing programs that use wearable technology to promote competition. Wearables encourage participants to monitor progress, set goals, and connect with others. Deci and Ryan (1985, 2000) define relatedness as making meaningful connections with others. It is important that leaders support investments that connect employees as a crucial part of self-determination. Designing WWPs using wearables can enhance participant experiences and improve levels of physical activity. Karapanos et al. (2016) found that wearables enhance feelings of autonomy and relatedness and are capable of boosting self-esteem.

Finding 4. Using wearable technology increases time awareness, which can enhance performance in the workplace and improve employee abilities to prioritize and complete exercise tasks.

All participants found that the ease of use of the wearable device made it easier to prioritize and monitor exercise tasks. One specific theme that emerged, *Increased Time Awareness,* described the experiences of participants as it related to other areas of their

lives. Through prioritizing for exercise tasks, all but one participant experienced a positive impact in two areas of their lives outside of exercise: (a) time management; and (b) focus and concentration.

Conclusion. The finding indicated that the perceived performance ability of employees improves as a result of using wearable technology to prioritize time for exercise. This finding aligns with other research focused on the use of wearable technology and physical activity. Giddens et al. (2017) found that the extended use of wearables can improve employee well-being and physical activity levels. Additionally, higher levels of physical activity produce greater health outcomes (ODPHP, 2008). Graff-Zivian and Neidell (2012) also found that health status can directly impact the cognitive abilities of employees. Therefore, wearable technology can motivate employees to increase their physical activity and health, which indicates that it has the potential to improve their performance ability.

Recommendation. Employers should consider investing in wearable technology to help employees prioritize time for exercise, which can promote employee health and performance. Wearable devices help users prioritize and complete exercise tasks, which can impact other areas of the users' lives. Additionally, wearable devices can positively impact not only the physical health of employees, but also their mental health and well-being.

Finding 5. Wearable technology improves employee perceptions of self-determination in achieving exercise goals.

Research has found that users prefer features that improve how they see their motivation and activities relate (Asimakopoulos et al., 2017). In relation to SDT, all

participants, except one, reported that the wearable device motivated them to complete their exercise goals. According to qualitative participant responses, the wearable device met each of the three universal psychological needs outlined in SDT: (a) *competence*; (b) *autonomy*; (c) *relatedness* (Deci & Ryan, 1985, 2000). One overarching theme, *Ease of Use*, gave the participants a feeling of *competence*. Most participants cited that the device provide *autonomy*. This aligns with research by Nikayin et al. (2014) who found that it may be more motivational for participants to monitor their own exercise. Finally, all participants, except one, reported with feeling closer to others during the study, indicating *relatedness*.

Conclusion. This finding indicated that wearable technology meets the psychological needs of users and provides the needed features to improve user motivation to achieve exercise goals. A lack of innovative tools like wearable technology in traditional WWPs may decrease motivation for employees to participate. Additionally, without tools such as wearable technology, employees may lack the encouragement to achieve exercise tasks. This study aligns with research by Karapanos et al. (2016) who found that wearable devices enhance feelings of autonomy and relatedness and are capable of boosting user self-esteem.

Recommendation. Employers implementing WWPs should consider investing in wearable technology as it meets the psychological needs of users and provides features that can enhance user motivation levels. The current study implemented a WWP using four key components: (a) walking challenges, which included competing with others using wearable technology; (b) health education, through brief educational videos; (c) health promotion, through hanging posters and fliers in the office; and (d) incentives.

Although it is dependent on organizational resources, better incentives help with recruiting for WWPs.

Implications of the Study

Although WWPs have become a popular choice for investing in employee health, most limited WWPs still do not incorporate a physical activity component (Mattke et al., 2014), which decreases the potential impact that a program can have on employee health outcomes. Research since the 1960s has considered the health of individuals to be an extremely important component of human capital (Shultz, 1961; Becker, 1962), and professional organizations still advocate for more investment in employee health (SHRM, 2017). This study has the potential to improve employer investments in WWPs and to encourage the implementation of a physical activity component in all WWPs to promote the improvement of employee health.

This study has the potential to add to the body of knowledge focused on the benefits of wearable technology in the workplace. Findings indicated beneficial results for both employees and organizations in relation to investments in wearable technology. Additionally, this study includes recommendations for organizational leaders interested in improving the health of employees.

Finally, the literature revealed no research that tied HCT to a WWP using wearable technology. Research has indicated that the health status of an individual can affect the acquisition of human capital (Currie & Stabile, 2006). Therefore, this study may have implications for human capital practitioners interested in implementing programs using wearable technology. Finally, this study could potentially offer insights

into wellness interventions in organizations where employees have a higher risk for experiencing health problems.

Limitations of the Study

The study measured changes in employee productivity levels by measuring rates of health-related absenteeism and presenteeism in relation to physical activity levels. However, survey data measuring absenteeism and presenteeism were based on employee perceptions only, which posed a threat to internal validity (Phillips et al., 2013). A second limitation is that the researcher worked in the same organization where the research occurred, which increased the potential for factors outside of the proposed study to impact the results. This limitation posed another potential threat to internal validity (Phillips et al., 2013; Swanson & Holton, 2009). Another limitation is that the study used a convenient sampling technique, asking for volunteers only, which could have potentially increased bias, so the findings may only apply to other individuals of similar demographics (Fink, 2003b). Finally, participants of the study consisted only of individuals working in a nonprofit social service organization in Alabama. Therefore, findings may be limited to the target population or similar organizations.

Recommendations for Future Research

While research has recognized that wearable technology can have a positive influence on physical activity, the qualitative portion of the current study established that prioritizing and completing exercise tasks helped the participants with time management as well as focus and concentration. To have a greater understanding of the impact that wearable technology, such as the Fitbit, can have on other areas of users' lives, outside of exercise, future research should explore how these devices can improve human capital

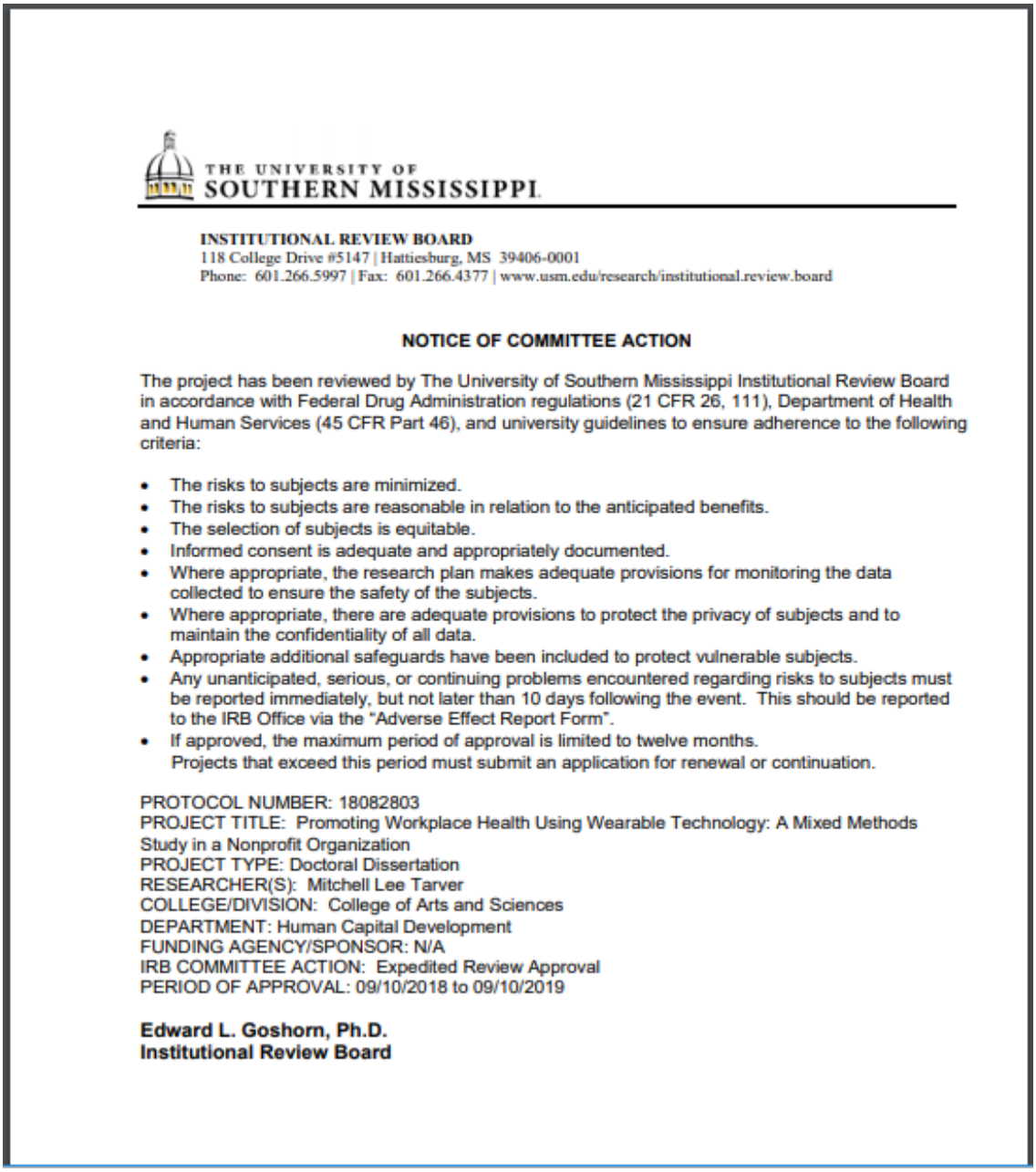
skills that enhance workplace performance. Organizational leaders and human capital practitioners can benefit from better understanding the implications of investing in wearable technology.

Summary

This chapter provided a summary of the study as well as the interpretation of results. The chapter then provided findings related to the literature, which included conclusions and recommendations. Implications of the study, limitations of the study, and recommendations for future research then followed.

The purpose of the current study was to accomplish two tasks: (a) explain the relationship between physical activity and rates of health-related absenteeism and presenteeism; and (b) explore which features of the wearable device used have the most impact on user physical activity and well-being. The quantitative analyses consisted of simple linear regressions, and the qualitative portion included a thematic analysis of information provided in narrative form. The study presented results using narratives, tables, and figures. While the linear regression did not find a significant relationship between physical activity and absenteeism, there was a significant relationship between physical activity and presenteeism. The results of the qualitative portion demonstrated that wearables have the potential to improve motivation levels, increase physical activity levels, and enhance the participant experience in WWPs. The results also indicate that wearable devices have the potential to enhance the human capital potential of employees. Overall, the study demonstrated that wearable technology is a smart investment for employers looking to improve the health of employees.

APPENDIX A – IRB APPROVAL LETTER



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INSTITUTIONAL REVIEW BOARD
118 College Drive #5147 | Hattiesburg, MS 39406-0001
Phone: 601.266.5997 | Fax: 601.266.4377 | www.usm.edu/research/institutional.review.board

NOTICE OF COMMITTEE ACTION

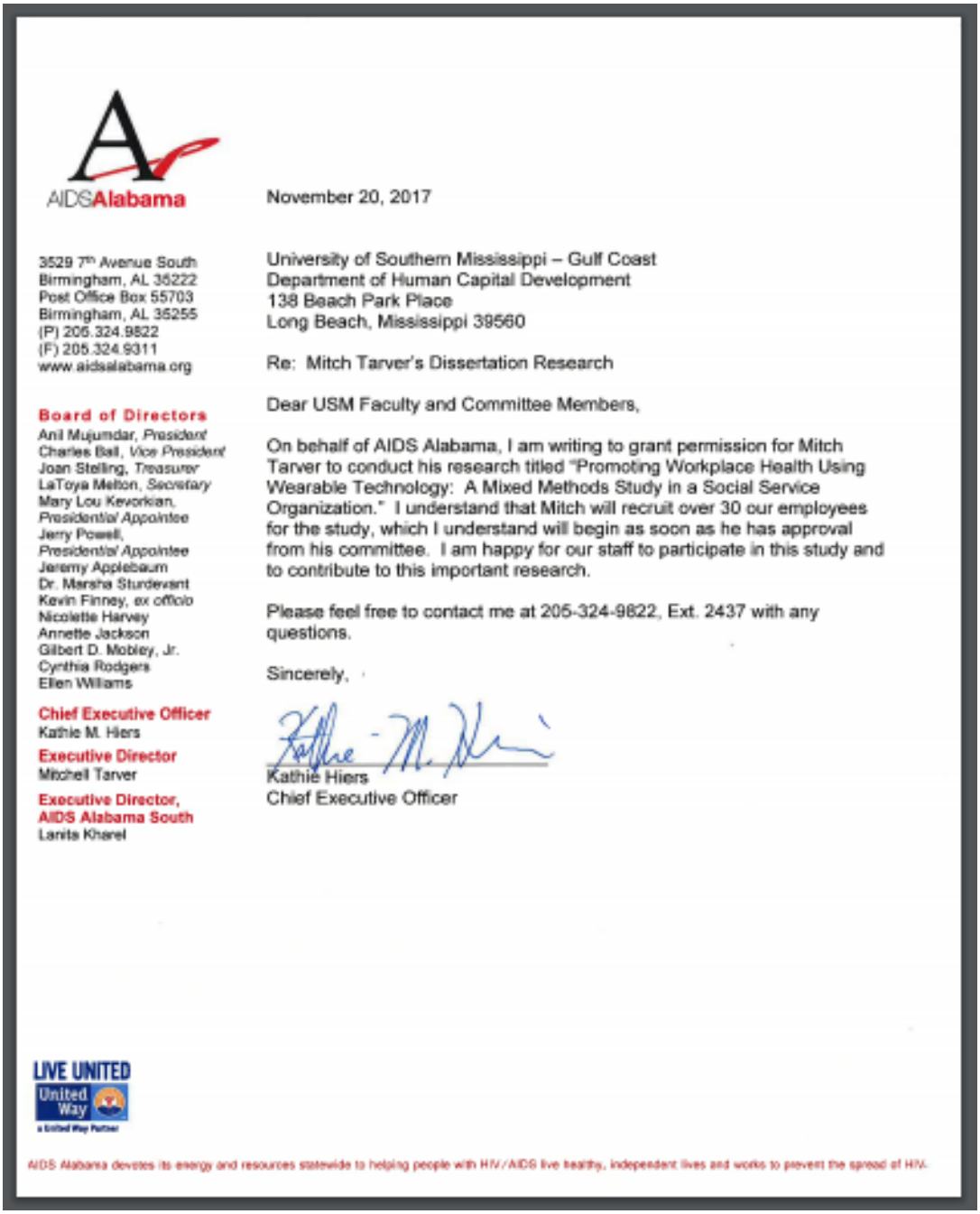
The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months.
  Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 18082803
PROJECT TITLE: Promoting Workplace Health Using Wearable Technology: A Mixed Methods Study in a Nonprofit Organization
PROJECT TYPE: Doctoral Dissertation
RESEARCHER(S): Mitchell Lee Tarver
COLLEGE/DIVISION: College of Arts and Sciences
DEPARTMENT: Human Capital Development
FUNDING AGENCY/SPONSOR: N/A
IRB COMMITTEE ACTION: Expedited Review Approval
PERIOD OF APPROVAL: 09/10/2018 to 09/10/2019

Edward L. Goshorn, Ph.D.
Institutional Review Board

APPENDIX B – PERMISSION LETTER FROM STUDY ORGANIZATION



AIDSAlabama

November 20, 2017

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(F) 205.324.9311
www.aidsalabama.org

University of Southern Mississippi – Gulf Coast
Department of Human Capital Development
138 Beach Park Place
Long Beach, Mississippi 39560

Re: Mitch Tarver's Dissertation Research

Dear USM Faculty and Committee Members,

On behalf of AIDS Alabama, I am writing to grant permission for Mitch Tarver to conduct his research titled "Promoting Workplace Health Using Wearable Technology: A Mixed Methods Study in a Social Service Organization." I understand that Mitch will recruit over 30 our employees for the study, which I understand will begin as soon as he has approval from his committee. I am happy for our staff to participate in this study and to contribute to this important research.

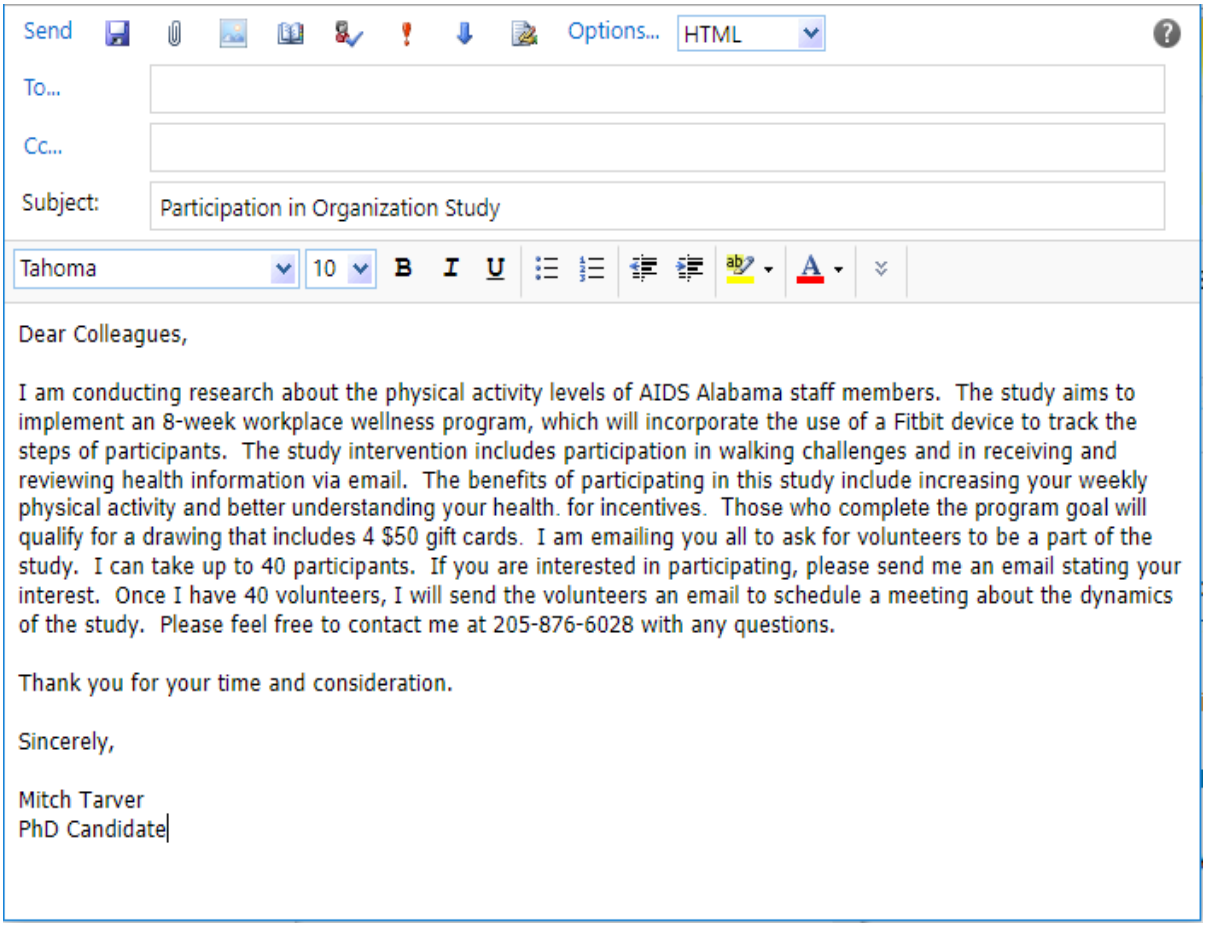
Please feel free to contact me at 205-324-9822, Ext. 2437 with any questions.

Sincerely,

Kathie Hiers
Chief Executive Officer

AIDS Alabama devotes its energy and resources statewide to helping people with HIV/AIDS live healthy, independent lives and works to prevent the spread of HIV.

APPENDIX C – EMAIL SOLICITING PARTICIPATION



Send Options... HTML

To...

Cc...

Subject: Participation in Organization Study

Tahoma 10 B I U

Dear Colleagues,

I am conducting research about the physical activity levels of AIDS Alabama staff members. The study aims to implement an 8-week workplace wellness program, which will incorporate the use of a Fitbit device to track the steps of participants. The study intervention includes participation in walking challenges and in receiving and reviewing health information via email. The benefits of participating in this study include increasing your weekly physical activity and better understanding your health. for incentives. Those who complete the program goal will qualify for a drawing that includes 4 $50 gift cards. I am emailing you all to ask for volunteers to be a part of the study. I can take up to 40 participants. If you are interested in participating, please send me an email stating your interest. Once I have 40 volunteers, I will send the volunteers an email to schedule a meeting about the dynamics of the study. Please feel free to contact me at 205-876-6028 with any questions.

Thank you for your time and consideration.

Sincerely,

Mitch Tarver
PhD Candidate

APPENDIX D – WALKING CHALLENGE SCHEDULE

Walking Challenges						**Optional**	
Walking Challenge Weeks	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Week 1	10 Minutes	15 Minutes	20 Minutes	20 Minutes	20 Minutes	25 Minutes	25 Minutes
Week 2	15 Minutes	20 Minutes	20 Minutes	25 Minutes	25 Minutes	25 Minutes	25 Minutes
Week 3	20 Minutes	25 Minutes	25 Minutes	30 Minutes	30 Minutes	25 Minutes	25 Minutes
Week 4	25 Minutes	30 Minutes	30 Minutes	30 Minutes	30 Minutes	30 Minutes	30 Minutes
Week 5	30 Minutes	35 Minutes	35 Minutes	35 Minutes	35 Minutes	30 Minutes	30 Minutes
Week 6	35 Minutes	30 Minutes	35 Minutes	30 Minutes	35 Minutes	35 Minutes	35 Minutes
Week 7	35 Minutes	40 Minutes	40 Minutes	40 Minutes	40 Minutes	40 Minutes	40 Minutes
Week 8	40 Minutes	45 Minutes	45 Minutes	45 Minutes	45 Minutes	45 Minutes	45 Minutes

APPENDIX E – WEEKLY TRACKING FORM

Weekly Tracking Form

Tracking Number: _____

Week Number: _____

Did you watch the health video(s) emailed to you this week? Yes ___ No ___

Day of the Week	Number of Steps
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	
Saturday	
Sunday	

APPENDIX F – BRIEF HEALTH EDUCATION VIDEOS

Week 1 (2 videos)

Video 1: The Benefits of Exercise - https://www.youtube.com/watch?v=-mW55jAeBOE
Video 2: Nutrition for a Healthy Life - https://www.youtube.com/watch?v=c06dTj0v0sM

Week 2 (2 videos)

Video 1: Healthy Eating and Exercise - https://www.youtube.com/watch?v=W2S4pwY6vmU
Video 2: The Benefits of Walking - https://www.youtube.com/watch?v=lqnZBbbFsII

Week 3 (1 video)

Video 1: Health Benefits of Walking Everyday - https://www.youtube.com/watch?v=1yuW7S0EbF4
Video 2: Depression and Exercise - https://www.youtube.com/watch?v=pS2G8C-EpRU

Week 4 (1 video)

Healthy Aging with Nutrition - https://www.youtube.com/watch?v=KD-FmeueFUo&index=2&list=PL8DF36dW4q3g5LeSpFqPDGH7PPSwMlkcW

Week 5 (2 videos)

Video 1: Smoking & Its Effects on Health -https://www.youtube.com/watch?v=lW6hwmdZbmE
Video 2: The Benefits of Drinking Water – https://www.youtube.com/watch?v=e5sLTcJK7cM

Week 6 (2 Videos)

Video 1: Your Brain on Alcohol – https://www.youtube.com/watch?v=vkpz7xFTWJo
Video 2: Stress Management Strategies - https://www.youtube.com/watch?v=0fL-pn80s-c

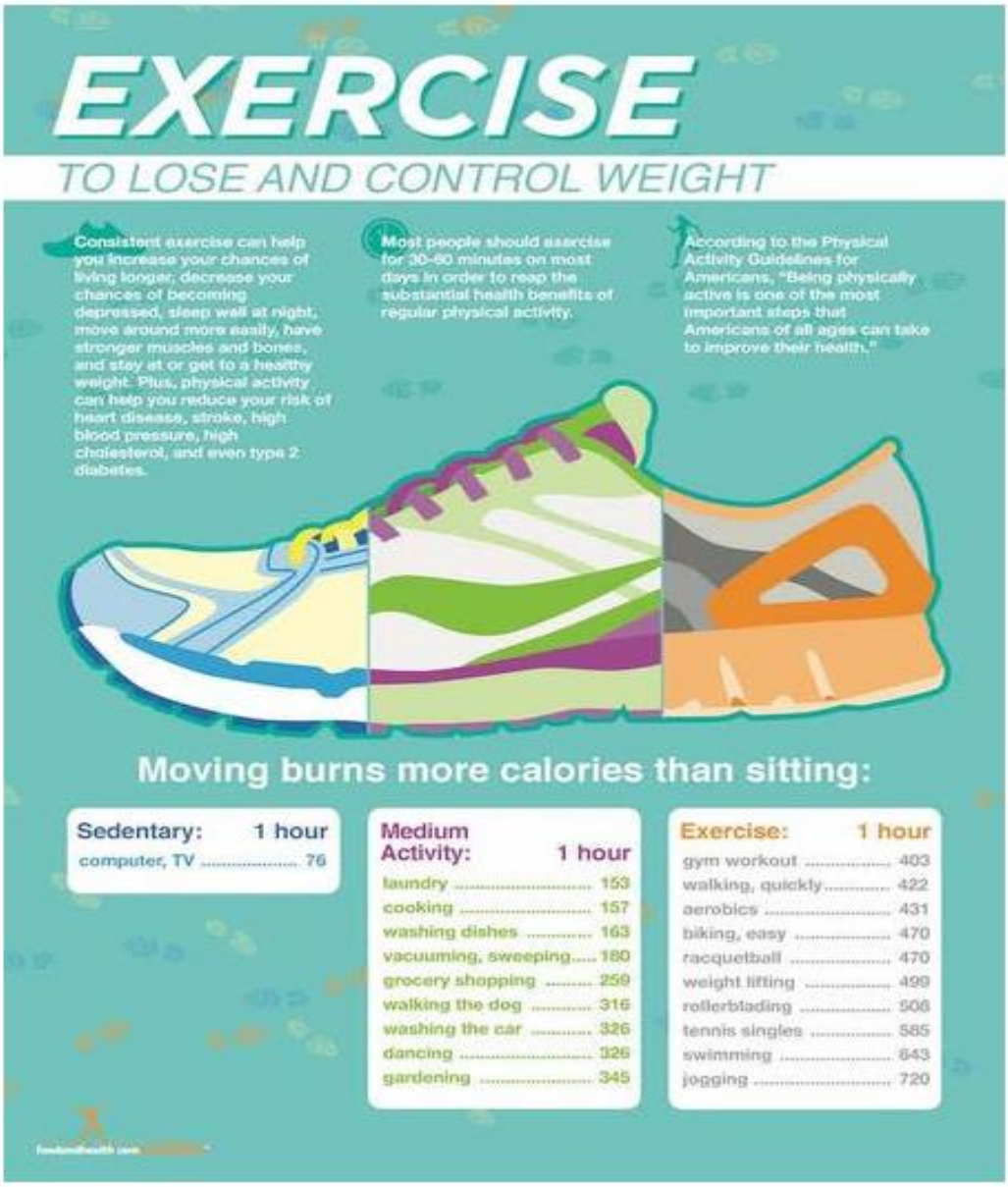
Week 7 (2 VideoS)

Video 1: Heart Healthy Aging with Nutrition - https://www.youtube.com/watch?v=OsJEZeztUPY&list=PL8DF36dW4q3g5LeSpFqPDGH7PPSwMlkcW&index=3
Video 2: How Exercise Effects Your Brain - https://www.youtube.com/watch?v=GssC6Dbr9fw

Week 8 (1 Video)

How the Foods You Eat Affect the Brain - https://www.youtube.com/watch?v=xyQY8a-ng6g

APPENDIX G – SAMPLE HEALTH PROMOTION POSTER



APPENDIX H – INFORMED CONSENT FOR QUANTITATIVE PARTICIPANTS

ORI | Office of Research Integrity

INSTITUTIONAL REVIEW BOARD

STANDARD (SIGNED) INFORMED CONSENT

STANDARD (SIGNED) INFORMED CONSENT PROCEDURES
This completed document must be signed by each consenting research participant. • The Project Information and Research Description sections of this form should be completed by the Principal Investigator before submitting this form for IRB approval. • Signed copies of the consent form should be provided to all participants. Last Edited February 9th, 2018

Today's date:		
PROJECT INFORMATION		
Project Title: Promoting Workplace Health Using Wearable Technology: A Mixed Methods Study in a Nonprofit Organization		
Principal Investigator: Mitchell Tarver	Phone: 205-876-6028	Email: mitchell.tarver@usm.edu
College: College of Arts and Sciences	Department: Department of Human Capital Development	

RESEARCH DESCRIPTION

1. **Purpose:**

This study will add to the body of knowledge focused on the benefits of wearable technology in the workplace and will potentially offer insights into the use of wearable technology in Workplace Wellness Programs.

2. **Description of Study:**

This mixed methods study includes an 8-week workplace wellness program intervention period where 40 participants will engage in walking challenges, review health education material, and use a wearable technology device (the Fitbit) to report their number of weekly steps. The researcher will monitor activities using the Fitbit App. Additionally, the researcher will select a second, smaller group of 6 participants who will participate in weekly journaling activities to provide feedback on their experience using the Fitbit.

3. **Benefits:**

The participants of the study will benefit from health education, increases in weekly physical activity during the intervention period, and will, potentially, qualify for incentives. Those who complete the program goal will qualify for a drawing that includes 4 $50 gift cards. Participants are strongly encouraged to participate in the walking challenges. However, there is no penalty for not completing a walking challenge once it is started.

4. **Risks:**

The risks are minimal as walking challenges are designed to increase physical activity outside of normal day-to-day activities, starting with 10 minutes on day one to 45 minutes by the end of the 8-week intervention. Participants are voluntary and will sign a liability waiver form provided by the target organization.

5. **Confidentiality:**

Each participant will volunteer for participation in the study. Therefore, the researcher will know the identities

of participants. However, participants will use their tracking numbers to fill out the survey instrument distributed. The researcher will keep the identifies of participants in a central database but will not release the identities of the participants to any outside organization or through reporting the results of the study.

6. **Alternative Procedures:**

There are no alternative procedures for this study.

7. **Participant's Assurance:**

This project has been reviewed by the Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations.

Any questions or concerns about rights as a research participant should be directed to the Chair of the IRB at 601-266-5997. Participation in this project is completely voluntary, and participants may withdraw from this study at any time without penalty, prejudice, or loss of benefits.

Any questions about the research should be directed to the Principal Investigator using the contact information provided in Project Information Section above.

CONSENT TO PARTICIPATE IN RESEARCH

Participant's Name: _____

I hereby consent to participate in this research project. All research procedures and their purpose were explained to me, and I had the opportunity to ask questions about both the procedures and their purpose. I received information about all expected benefits, risks, inconveniences, or discomforts, and I had the opportunity to ask questions about them. I understand my participation in the project is completely voluntary and that I may withdraw from the project at any time without penalty, prejudice, or loss of benefits. I understand the extent to which my personal information will be kept confidential. As the research proceeds, I understand that any new information that emerges and that might be relevant to my willingness to continue my participation will be provided to me.

Questions concerning the research, at any time during or after the project, should be directed to the Principal Investigator with the contact information provided above. This project and this consent form have been reviewed by USM's Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research participant should be directed to the Chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5116, Hattiesburg, MS 39406-0001, 601-266-5997.

Include the following information only if applicable. Otherwise delete this entire paragraph before submitting for IRB approval: The University of Southern Mississippi has no mechanism to provide compensation for participants who may incur injuries as a result of participation in research projects. However, efforts will be made to make available the facilities and professional skills at the University. Participants may incur charges as a result of treatment related to research injuries. Information regarding treatment or the absence of treatment has been given above.

_____	_____
Research Participant	**Person Explaining the Study**
_____	_____
Date	**Date**

APPENDIX I – INFORMED CONSENT FOR QUALITATIVE PARTICIPANTS

ORI | Office of Research Integrity

INSTITUTIONAL REVIEW BOARD

STANDARD (SIGNED) INFORMED CONSENT

STANDARD (SIGNED) INFORMED CONSENT PROCEDURES

This completed document must be signed by each consenting research participant.

- The Project Information and Research Description sections of this form should be completed by the Principal Investigator before submitting this form for IRB approval.
- Signed copies of the consent form should be provided to all participants.

Last Edited February 9th, 2018

Today's date:		
PROJECT INFORMATION		
Project Title: Promoting Workplace Health Using Wearable Technology: A Mixed Methods Study in a Nonprofit Organization		
Principal Investigator: Mitchell Tarver	Phone: 205-876-6028	Email: mitchell.tarver@usm.edu
College: College of Arts and Letters	Department: Department of Human Capital Development	

RESEARCH DESCRIPTION

1. **Purpose:**

This study will add to the body of knowledge focused on the benefits of wearable technology in the workplace and will potentially offer insights into the use of wearable technology in Workplace Wellness Programs.

2. **Description of Study:**

This mixed methods study includes an 8-week workplace wellness program intervention period where 40 participants will engage in walking challenges, review health education material, and use a wearable technology device (the Fitbit) to report their number of weekly steps. The researcher will monitor activities using the Fitbit App. Additionally, the researcher will select a second, smaller group of 6 qualitative participants who will participate in completing weekly journaling activities to provide feedback on their experience using the Fitbit. Each qualitative participant will also participate in a focus group following the study intervention to discuss journal entry information and to clarify any unclear information found by the researcher. The focus group will be video recorded to ensure that relevant information clearly documented.

3. **Benefits:**

The participants of the study will benefit from health education, increases in weekly physical activity during the intervention period, and will, potentially, qualify for incentives. Those who participate in the qualitative portion of the study, which include completing and emailing weekly journal entries and participation in a focus group following the 8-week intervention, will be given a $25 gift card, or cash, for their participation.

4. **Risks:**

The risks are minimal as walking challenges are designed to increase physical activity outside of normal day-to-day activities, starting with 10 minutes on day one to 45 minutes by the end of the 8-week intervention. There are no potential risks for participating in the qualitative portion of the study.

5. **Confidentiality:**

Each participant must volunteer and be willing to participate in the qualitative portion of the study. Therefore, the researcher will know the identities of participants. The researcher will keep the identifies of participants in a central database but will not release the identities of the participants to any outside organization or through reporting the results of the study. Once journal entries are emailed to the researcher, the researcher will add each entry to a central document where the entries are only identified by the tracking number of the participant.

6. **Alternative Procedures:**

If a participant is unable to email their weekly journal entry, they are asked to contact the researcher directly to determine how to deliver their form to the researcher.

7. **Participant's Assurance:**

This project has been reviewed by the Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations.

Any questions or concerns about rights as a research participant should be directed to the Chair of the IRB at 601-266-5997. Participation in this project is completely voluntary, and participants may withdraw from this study at any time without penalty, prejudice, or loss of benefits.

Any questions about the research should be directed to the Principal Investigator using the contact information provided in Project Information Section above.

CONSENT TO PARTICIPATE IN RESEARCH

Participant's Name: _____

I hereby consent to participate in this research project. All research procedures and their purpose were explained to me, and I had the opportunity to ask questions about both the procedures and their purpose. I received information about all expected benefits, risks, inconveniences, or discomforts, and I had the opportunity to ask questions about them. I understand my participation in the project is completely voluntary and that I may withdraw from the project at any time without penalty, prejudice, or loss of benefits. I understand the extent to which my personal information will be kept confidential. As the research proceeds, I understand that any new information that emerges and that might be relevant to my willingness to continue my participation will be provided to me.

Questions concerning the research, at any time during or after the project, should be directed to the Principal Investigator with the contact information provided above. This project and this consent form have been reviewed by USM's Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research participant should be directed to the Chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5116, Hattiesburg, MS 39406-0001, 601-266-5997.

Include the following information only if applicable. Otherwise delete this entire paragraph before submitting for IRB approval: The University of Southern Mississippi has no mechanism to provide compensation for participants who may incur injuries as a result of participation in research projects. However, efforts will be made to make available the facilities and professional skills at the University. Participants may incur charges as a result of treatment related to research injuries. Information regarding treatment or the absence of treatment has been given above.

Research Participant	Person Explaining the Study
Date	Date

APPENDIX J – PARTICIPANT CONTRACT

Participant Contract

I, _____, understand that by volunteering for this study that I agree to the following terms in relation to Mitch Tarver's research study.

- I will participate in walking challenges during the 8-week intervention period.
- I will watch and listen to health information sent to me via email weekly.
- I will use the Fitbit device provided to me for the study as intended.
- I will monitor my participation using a smart phone or other mobile technology device.
- I will report any problems that occur in relation to the wearable device.
- I will report my daily number of steps on a tracking form weekly.
- I will complete surveys administered to me prior to the study and after it ends.

By signing below, I also understand that I may withdraw from the study at any time, which means that I will have to return the wearable device given to me for the study.

_____ _____

Participant Name Date

_____ _____

Researcher Name Date

APPENDIX K – PERMISSION TO USE SURVEY INSTRUMENT

FW: Permission to Use the HPQ

Kang, Amie <Kang@hcp.med.harvard.edu>

Mon 2/5/2018 10:59 AM

To: Mitchell Tarver <Mitchell.Tarver@usm.edu>;

Cc: Garcia, Jerry <garcia@hcp.med.harvard.edu>;

Dear Mitchell,

Thank you for your interest in the HPQ. The versions of the HPQ posted on our website are free to use. We simply ask that you include the WHO copyright when you use the survey. Also, please note that we (Harvard) no longer provide web-based administration support.

However, it seems like the version that you're interested in is the HPQ Select, the next generation HPQ developed by the Integrated Benefits Institute (IBI). This new tool enables employers to obtain a good estimate of the cost associated with lost productivity due to health-related reasons. More importantly, the estimated productivity cost can be obtained quickly without having to conduct a lengthy survey of your employee population. IBI is directing this new initiative and will be able to assist you if are interested. For more information on the HPQ Select, go to http://www.ibiweb.org/tools/hpq-select. Any questions regarding permission and cost to use the HPQ Select should also be directed to the IBI.

If you have any questions regarding the HPQ, feel free to contact me.

Warm regards,
Amie

From: Mitchell Tarver [mailto:Mitchell.Tarver@usm.edu]
Sent: Sunday, February 04, 2018 6:53 PM
To: HMS-RonkAdm
Subject: Permission to Use the HPQ

Dr. Kessler,

My name is Mitch Tarver. I am currently a PhD student at the U. of Southern Mississippi and am interested in using the HPQ in my dissertation research. My research interests are focused on workplace wellness and the relationships between levels of physical activity, productivity, and job satisfaction. I am interested in using the short version of the HPQ. Is there a process for obtaining permission to use the HPQ? Are there any fees attached? I greatly appreciate your time and answers.

Sincerely,

Mitch Tarver

APPENDIX L – HEALTH AND WORK PERFORMANCE QUESTIONNAIRE

World Health Organization Health and Performance Questionnaire (HPQ): Clinical Trials Baseline Version

_____

TRACKING NUMBER

BLANK INNER PAGE OF FRONT COVER SHEET

INSTRUCTIONS

Most of the following questions have numbered response options. Respond by CIRCLING THE NUMBER for your preferred answer. For example, if you consider your health "Fair," respond as follows:

A1. In general, how would you rate <u>your overall health</u> now?

1. Excellent
2. Very Good
3. Good
4. Fair
5. Poor

If none of the categories fits you exactly, please respond with the closest category to your experience.

If you want to change your response, put an "X" through the incorrect response and circle the correct response. For example, if you want to change your response from "Fair" to "Good," make the correction as follows:

A1. In general, how would you rate <u>your overall health</u> now?

1. Excellent
2. Very Good
3. Good
4. Fair
5. Poor

A few questions in the booklet require you to fill in numbers or to provide brief written descriptions. Please fill these out legibly.

C1. How old are you?

46 YEARS OLD

There are no right or wrong answers. Your responses are completely confidential. Please answer as honestly and accurately as you can.

A. YOUR WORK

A1. Are you currently in any of the following work situations? For each "Yes" response, record how long you have been in this situation (for example, 3 weeks or 5 months or 7 years).

	Yes	No	How long have you been in this situation? *Enter Number*	*(Circle only one)* Weeks	Months	Years
a. Unemployed and looking for work?..	1	2	_____	1	2	3
b. Temporarily laid off?.....	1	2	_____	1	2	3
c. Maternity leave?.....	1	2	_____	1	2	3
d. Short-term sick leave?.....	1	2	_____	1	2	3
e. Extended sick leave or disability?.....	1	2	_____	1	2	3
f. Retired?.....	1	2	_____	1	2	3

A2. Do you do any of the following kinds of work? For each "Yes" response, estimate the number of hours you typically spend doing this kind of work each week. If it varies, estimate the average.

	Yes	No	Average Number of Hours each Week
a. Caregiver for your child(ren)?.....	1	2	_____
b. Working a full-time paying job?.....	1	2	_____
c. Working a part-time paying job?.....	1	2	_____
d. Self-employed?.....	1	2	_____
e. Volunteer work?.....	1	2	_____
f. Full-time student?.....	1	2	_____
g. Part-time student?.....	1	2	_____
h. Housework/home maintenance?.....	1	2	_____

A3. If you currently work for pay or profit or are on sick leave, please choose the category that best describes your <u>main</u> job. If none of the categories fits you exactly, please respond with the closest category. If you are currently not working and not on sick leave, skip to question B1. ***(Circle only <u>one</u> number.)***

1. Executive, administrator, or senior manager
   (e.g., CEO, sales VP, plant manager)

2. Professional
   (e.g., engineer, accountant, systems analyst)

3. Technical support
   (e.g., lab technician, legal assistant, computer programmer)

4. Sales
   (e.g., sales representative, stockbroker, retail sales)

5. Clerical and administrative support
   (e.g., secretary, billing clerk, office supervisor)

6. Service occupation
   (e.g., security officer, food service worker, janitor)

7. Precision production and crafts worker
   (e.g., mechanic, carpenter, machinist)

8. Operator or laborer
   (e.g., assembly line worker, truck driver, construction worker)

A4. How many people do you <u>personally</u> supervise on your main job?

_____ NUMBER OF PEOPLE

A5. How many hours does your employer <u>expect</u> you to work in a typical 7-day week? If it varies, estimate the average. If you are self-employed, estimate the number of hours you would consider a full work week. If you have more than one job, combine total number of hours for all jobs.

_____ NUMBER OF HOURS

A6. Now please think of your work experiences over the <u>past 4 weeks</u> (28 days). In the spaces provided below, write the number of days you spent in each of the following work situations.

In the past <u>28 days</u>, how many days did you…	NUMBER OF DAYS
a. ...miss an **<u>entire</u>** work day because of problems with your physical or mental health?	_____
b. ...miss an **<u>entire</u>** work day for any other reason (including vacation)?	_____
c. ...miss **<u>part</u>** of a work day because of problems with your physical or mental health?	_____
d. ...miss **<u>part</u>** of a work day for any other reason (including vacation)?	_____
e. ...come in early, go home late, or work on your day off?	_____

A7. About how many hours altogether did you work in the <u>past 4 weeks</u> (28 days)? (See examples below.) If you have more than one job, report the combined total number of hours for all jobs. If you did not work at all in the <u>past 28 days</u>, enter "0" and skip to question B1.

_____ NUMBER OF HOURS

<u>Examples for Calculating Hours Worked in the Past 4 Weeks</u>
40 hours per week for 4 weeks = 160 hours
35 hours per week for 4 weeks = 140 hours
40 hours per week for 4 weeks with 2 8-hour days missed = 144 hours
40 hours per week for 4 weeks with 3 4-hour partial days missed = 148 hours
35 hours per week for 4 weeks with 2 8-hour days missed and 3 4-hour partial days missed = 112 hours

A8. Did you have any of the following experiences at work in the past 4 weeks?

	Yes	No
a. Any special work success or achievement?.....	1	2
b. Any special work failure?.....	1	2
c. An accident that caused either damage, work delay, a near miss, or a safety risk?....	1	2

d. If you answered "Yes" to any of the questions A8a, A8b, or A8c, please describe what happened.

_____

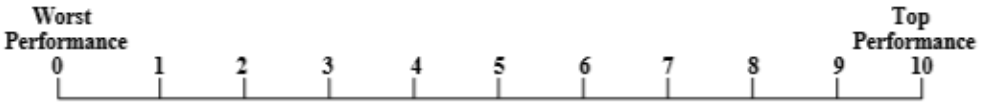
_____

_____

A9. The next questions are about the time you spent during your hours at work in the past 4 weeks. Circle the one number from each question that comes closest to your experience.

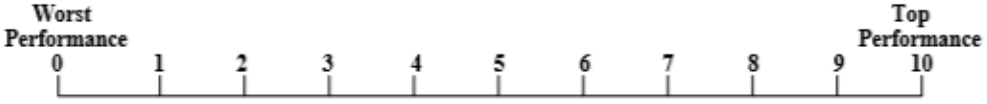
	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a. How often was your performance **higher** than most workers on your job?.....	1	2	3	4	5
b. How often was your performance **lower** than most workers on your job?.....	1	2	3	4	5
c. How often did you do no work at times when you were supposed to be working?..	1	2	3	4	5
d. How often did you find yourself not working as **carefully** as you should?.....	1	2	3	4	5
e. How often was the **quality** of your work lower than it should have been?.....	1	2	3	4	5
f. How often did you not concentrate enough on your work?.....	1	2	3	4	5
g. How often did health problems limit the kind or amount of work you could do?.....	1	2	3	4	5

A10. **On a scale from 0 to 10 where 0 is the worst job performance anyone could have at your job and 10 is the performance of a top worker, how would you rate the usual performance of most workers in a job similar to yours?** ***(Circle the number)***



A11. **Using the same 0-to-10 scale, how would you rate your usual job performance over the past year or two?** ***(Circle the number)***

A12. **Using the same 0-to-10 scale, how would you rate your overall performance on the days you worked during the past 4 weeks?** ***(Circle the number)***



A13. How would you compare your overall job performance on the days you worked during the <u>past 4 weeks</u> with the performance of most other workers who have a similar type of job? ***(Circle the number)***

1. You were **<u>a lot better</u>** than other workers
2. You were **<u>somewhat better</u>** than other workers
3. You were **<u>a little better</u>** than other workers
4. You were about **<u>average</u>**
5. You were **<u>a little worse</u>** than other workers
6. You were **<u>somewhat worse</u>** than other workers
7. You were **<u>a lot worse</u>** than other workers

B. DEMOGRAPHICS

B1. How old are you?

_____ **Years Old**

B2. Are you male or female? ***(Circle the letter)***

a. Male
b. Female

B3. What is your current marital status?

a. Married or cohabiting
b. Separated
c. Divorced
d. Widowed
e. Never married

B4. How many children do you have?

a. None
b. One
c. Two
d. Three
e. Four or more

B5. What is the highest grade or level of school that you have <u>completed</u>? ***(Circle the letter)***

a. 8th grade or less
b. Some high school, but did not graduate
c. High school graduate or GED
d. Some college or 2-year degree
e. 4-year college graduate
f. More than 4-year college degree

B6. What is your height? (Please record both feet and inches.)

_____ Feet _____ Inches

B7. How much do you weigh?

_____ Pounds

B8. What is your <u>annual</u> income from your job, <u>before</u> taxes? *(Circle the letter)*

a.	$1 - $999	l.	$11,000 - $11,999	w.	$30,000 - $34,999
b.	$1,000 - $1,999	m.	$12,000 - $12,999	x.	$35,000 - $39,999
c.	$2,000 - $2,999	n.	$13,000 - $13,999	y.	$40,000 - $44,999
d.	$3,000 - $3,999	o.	$14,000 - $14,999	z.	$45,000 - $49,999
e.	$4,000 - $4,999	p.	$15,000 - $15,999	aa.	$50,000 - $74,999
f.	$5,000 - $5,999	q.	$16,000 - $16,999	bb.	$75,000 - $99,999
g.	$6,000 - $6,999	r.	$17,000 - $17,999	cc.	$100,000 - $149,999
h.	$7,000 - $7,999	s.	$18,000 - $18,999	dd.	$150,000 - $199,999
i.	$8,000 - $8,999	t.	$19,000 - $19,999	ee.	$200,000 - $299,999
j.	$9,000 - $9,999	u.	$20,000 - $24,999	ff.	$300,000 - $499,999
k.	$10,000 - $10,999	v.	$25,000 - $29,999	gg.	$500,000 - $999,999
				hh.	$1,000,000 or more

THANK YOU

Please return the

completed survey in the

postage-paid envelope.

BACK COVER PAGE

World Health Organization Health and Performance Questionnaire (HPQ): Clinical Trials Follow-up Version

_____

TRACKING NUMBER

BLANK INNER PAGE OF FRONT COVER SHEET

INSTRUCTIONS

Most of the following questions have numbered response options. Respond by CIRCLING THE NUMBER for your preferred answer. For example, if you consider your health "Fair," respond as follows:

A1. In general, how would you rate <u>your overall health</u> now?

1. Excellent
2. Very Good
3. Good
(4) Fair
5. Poor

If none of the categories fits you exactly, please respond with the closest category to your experience.

If you want to change your response, put an "X" through the incorrect response and circle the correct response. For example, if you want to change your response from "Fair" to "Good," make the correction as follows:

A1. In general, how would you rate <u>your overall health</u> now?

1. Excellent
2. Very Good
(3) Good
(X) Fair
5. Poor

A few questions in the booklet require you to fill in numbers or to provide brief written descriptions. Please fill these out legibly.

C1. How old are you?

46 YEARS OLD

There are no right or wrong answers. Your responses are completely confidential. Please answer as honestly and accurately as you can.

C1. Has there been any change in your employment status since your last interview? ***(Circle all that apply)***

1. No change
2. Started a new job
3. Quit a job
4. Fired
5. Laid off
6. Went out on illness/sick leave
7. Any other change in employment status (Please describe below)

_____

_____

DIRECTIONS: If you currently work for pay or profit or are on sick leave, continue with Question 2. If you are currently not working and not on sick leave, this is the end of the questionnaire.

C2. How many hours does your employer <u>expect</u> you to work in a typical 7-day week?
If it varies, estimate the average. If you are self-employed, estimate the number of hours you would consider a full work week. If you have more than one job, combine total number of hours for all jobs.

_____ **NUMBER OF HOURS**

C3. Now please think of your work experiences in the <u>past 4 weeks</u> (28 days). In the spaces provided below, write the number of days you spent in each of the following work situations.

In the past 28 days, how many days did you…	NUMBER OF DAYS
a. ...miss an **<u>entire</u>** work day because of problems with your physical or mental health?	_____
b. ...miss an **<u>entire</u>** work day for any other reason (including vacation)?	_____
c. ...miss **<u>part</u>** of a work day because of problems with your physical or mental health?	_____
d. ...miss **<u>part</u>** of a work day for any other reason (including vacation)?	_____
e. ...come in early, go home late, or work on your day off?	_____

C4. About how many hours altogether did you work in the past 4 weeks (28 days)? (See examples below.) If you have more than one job, report the combined total number of hours for all jobs. If you did not work at all in the past 28 days, enter "0" and skip to the end of the questionnaire.

_____ NUMBER OF HOURS

Examples for Calculating Hours Worked in the Past 4 Weeks
40 hours per week for 4 weeks = 160 hours
35 hours per week for 4 weeks = 140 hours
40 hours per week for 4 weeks with 2 8-hour days missed = 144 hours
40 hours per week for 4 weeks with 3 4-hour partial days missed = 148 hours
35 hours per week for 4 weeks with 2 8-hour days missed and 3 4-hour partial days missed = 112 hours

C5. Did you have any of the following experiences at work in the past 4 weeks?

	Yes	No
a. Any special work success or achievement?.....	1	2
b. Any special work failure?.....	1	2
c. An accident that caused either damage, work delay, a near miss, or a safety risk?....	1	2

d. If you answered "Yes" to any of the questions C5a, C5b, or C5c, please describe what happened.

_____

_____

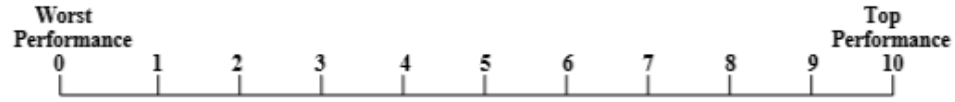
_____

C6. The next questions are about the time you spent during your hours at work in the past 4 weeks. Circle the one number from each question that comes closest to your experience.

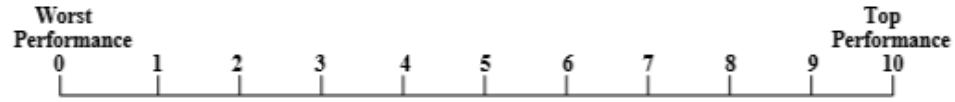
	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a. How often was your performance **higher** than most workers on your job?.....	1	2	3	4	5
b. How often was your performance **lower** than most workers on your job?.....	1	2	3	4	5
c. How often did you do no work at times when you were supposed to be working?..	1	2	3	4	5
d. How often did you find yourself not working as **carefully** as you should?.....	1	2	3	4	5
e. How often was the **quality** of your work lower than it should have been?.....	1	2	3	4	5
f. How often did you not concentrate enough on your work?.....	1	2	3	4	5
g. How often did health problems limit the kind or amount of work you could do?.....	1	2	3	4	5

C7. On a scale from 0 to 10 where 0 is the worst job performance anyone could have at your job and 10 is the performance of a top worker, how would you rate the usual performance of <u>most</u> workers in a job similar to yours? ***(Circle the number)***

C8. Using the same 0-to-10 scale, how would you rate your <u>usual</u> job performance over the <u>past year or two</u>? ***(Circle the number)***



C9. Using the same 0-to-10 scale, how would you rate your <u>overall</u> performance on the days you worked in the <u>past 4 weeks</u>? ***(Circle the number)***



C10. How would you compare your overall job performance on the days you worked in the <u>past 4 weeks</u> with the performance of most other workers who have a similar type of job? ***(Circle the number)***

1. You were **<u>a lot better</u>** than other workers
2. You were **<u>somewhat better</u>** than other workers
3. You were **<u>a little better</u>** than other workers
4. You were about **<u>average</u>**
5. You were **<u>a little worse</u>** than other workers
6. You were **<u>somewhat worse</u>** than other workers
7. You were **<u>a lot worse</u>** than other workers

THANK YOU

Please return the

completed survey in the

postage-paid envelope.

BACK COVER PAGE

SCORING RULES
HPQ 28-DAY CLINICAL VERSION

BASELINE VERSION

Scoring Absenteeism

Absolute absenteeism: 4*A5 – A7

Relative absenteeism: (4*A5 – A7)/(4*A5)

Relative hours of work: A7/(4*A5)

Scoring Presenteeism

Absolute presenteeism: 10*A12

Relative presenteeism: A12/A10

FOLLOW-UP VERSION

Scoring Absenteeism

Absolute absenteeism: 4*C2 – C4

Relative absenteeism: (4*C2 – C4)/(4*C2)

Relative hours of work: C4/(4*C2)

Scoring Presenteeism

Absolute presenteeism: 10*C9

Relative presenteeism: C9/C7

For additional information on the HPQ go to: http://www.hcp.med.harvard.edu/hpq/info.php.

APPENDIX M – JOURNAL GUIDELINES FOR QUALITATIVE PORTION

Journal Guidelines

The purpose of this journal is to give the researcher an understanding of your perceptions of using a wearable technology device during this 8-week intervention. Please spend 20 to 30 minutes each week documenting your experience in using the wearable device in relation to the following questions. Please answer the assigned question for the current week in the intervention. In narrative form, please comment on anything that you think will help the researcher understand what it is like to use the wearable device. You can include narratives of actual events between yourself and other people if you like. The researcher will ask you to comment on anything you like on week 8 of the intervention period. Additionally, the researcher will ask that if any of your opinions relating to specific questions change over time that you provide your changed opinion on week 8.

Week 1: Which features of the wearable device are most helpful?

Week 2: How have those features helped you in meeting your exercise goals for the week?

Week 3: Has the wearable device helped you in other areas of your life? If so, how?

Week 4: Has the wearable device provided during the study saved you time? If so, how?

Week 5: Has the wearable device added flexibility to your schedule needs? If so, how?

Week 6: Has the wearable device motivated you to complete your exercise tasks?

a. If so, how?
b. Which feature(s) of the wearable device motivated you the most?

Week 7: Has the wearable device helped you with self-control in relation to your health?

c. If so, how?
d. Which feature(s) of the wearable device helped you the most with self-control in relation to your health?

Week 8: Has the wearable device helped you feel closer with others in the study?

e. If so, how?
f. Which feature(s) of the wearable device helped you the most?

REFERENCES

Abdullah, D. N., & Lee, O. Y. (2012). Effects of wellness programs on job satisfaction, stress, and absenteeism between two groups of employees (attended and not attended). *Social and Behavioral Sciences, 65*(2012), 479-484. doi:10.1016/j.sbspro.2012.11.152

Affordable Care Act, 42 U.S.C. 18001 (2010).

Ahola, K. (2007). Occupational burnout and health. *Finnish Institute of Occupational Health.* Report 81.

Aldana, S. (2016, June). Wearables and wellness programs: The complete guide. Retrieved from https://www.wellsteps.com/blog/2016/06/13/wearables-and-wellness-programs/

Alexander, K., & Lambert, E. V. (2013). Noncommunicable disease prevention and worksite health promotion programs: A brief review. *Occupational Medicine and Health Affairs, 1*(7), 1-8. doi:10.4172/2329-6879.1000141

Althoff, T., Sosic, R., Hicks, J. L., King, A. C., Delp, S. L., & Leskovec, J. (2017, July 20). Large-scale physical activity data reveal worldwide activity inequality. *Nature, 547,* 336-339. doi:10.1038/nature23018

Americans with Disabilities Act, 42 U.S.C.A. § 12101 (1990).

Ammendolia, C., Cote, 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,* 1190. doi:10.1186/s12889-016-3843-x

Applied Business Intelligence. (2013). Corporate wellness is a 13 million unit wearable wireless device opportunity. Retrieved from https://www.abiresearch.com

Aronsson, G., Gustafsson, K., & Dallner, M. (2000). Sick but yet at work: An empirical Study of sickness presenteeism. *Journal of Epidemiology and Community Health, 54*, 502-509. doi:10.1136/jech.54.7.502

Asimakopoulos, S., Asimakopoulos, G., & Spillers, F. (2017). Motivation and user engagement in fitness tracking: Heuristics for mobile healthcare wearables. *Informatics, 4*(5), 1-16. doi:10.3390/informatics4010005

Automatic Data Processing Research Institute. (2012). Why you should care about wellness programs. Retrieved from https://www.adp.com/tools-and-resources/adp-research-institute

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

Bagenstos, S. R. (2017). The EEOC, the ADA, and WWPs. *Health Matrix, 27*, 81-99. Retrieved from https://scholarlycommons.law.case.edu/healthmatrix

Bangum, T. J., Orsak, K. C., & Chng, C. L. (1996). Factors affecting adherence to a Worksite wellness program (wwp). *Medicine and Science in Sports and Exercise, 28*(5), 85. doi:10.1177/1090198110384469

Banos, O., Amin, M. B., Khan, W., Afzal, M., Hussain, M., Kang, B. H., & Lee, S. (2015). The mining minds digital health and wellness framework. *Biomed Eng Online, 15*(1), 166-186. doi:10.1186/s12938-016-0179-9

Baptiste, I. (2001). Educating lone wolves: Pedagogical implications of human capital theory. *Adult Education Quarterly, 51*(3), 184-201. doi:10.1177/074171360105100302

Becker, G. (1962). Investment in human capital. *The Journal of Political Economy, 70*(5), 9-49. Retrieved from https://www-vip.sonoma.edu/users/c/cuellar/econ421/humancapital.pdf

Becker, G. (1976). The economic approach to human behavior. Retrieved from http://www.pauldeng.com/pdf/Becker_the%20economic%20approach%20to%20human%20behavior.pdf

Becker, G. (1993). Human capital: A theoretical and empirical analysis with special reference to education. Chicago, IL: University of Chicago Press.

Becker, G. (2007). Health as human capital: Synthesis and extensions. *Oxford Economic Papers, 59*, 379-410. doi:10.1093/oep/gpm020

Becker, G. (2008). Human capital. Retrieved from http://www.econlib.org/library/Enc/HumanCapital.html

Becker, G. S., & Chiswick, B. R. (1966). Education and the distribution of earnings. *American Economic Review, 56*, 358-369. Retrieved from https://www.aeaweb.org/journals/aer

Belsi, A., Papi, E., & McGregor, A. H. (2016). Impact of wearable technology on psychosocial factors of osteoarthritis management: A quantitative study. *British Medical Journal, 6*(2), 1-7. doi:10.1136/bmjopen-2015-010064

Beresford, S., Thompson, B., Bishop, S., Macintyre, McLerran, D., & Yasui, Y. (2010). Long-term fruit and vegetable change in worksites: Seattle 5 a day follow-up. *American Journal of Health Behavior, 34*(6), 707-720. doi:10.5993/AJHB.34.6.7

Berry, L. L., Mirabito, A. M., & Baun, W. B. (2010, December). What's the hard return on employee wellness programs. *Harvard Business Review*. Retrieved from https://hbr.org

Biron, C., Burke, R. J., & Cooper, C. L. (2014). Creating Healthy Workplaces: Stress Reduction, Improved Well-being, and Organizational Effectiveness [DX Readers version]. Retrieved from http://ebookcentral.proquest.com.lynx.lib.usm.edu/lib/usmiss/detail.action?docID=1589597

Bleakley, H. (2013). Health, human capital, and development. *Annual Review of Economics, 2*, 283-310. doi:10.1146/annurev.economics.102308.124436

Bondi, M. A., Harris, J. R., Atkins, D., French, M. E., & Umland, B. (2006). Employer coverage of clinical preventative services in the United States. *American Journal of Health Promotion, 20*(3), 214-222. doi:10.4278/0890-1171-20.3.214

Booth, F. W., Roberts, C. K., & Laye, M. J. (2012). Lack of exercise is a major cause of chronic diseases. *Comprehensive Physiology, 2*(2), 1143-1211. doi:10.1002/cphy.c110025

Boshtam, M., Sarafzadegen, N., Zare, K., Sadeghi, S., Sajjadi, F., & Rabiei, K. (2010). Effects of 5-year interventions on cardiovascular risk factors of factories and office employees off Isfahan and najafabad: Worksite intervention project-isfahan

healthy heart program. *ARYA Atherosclerosis, 6*(3), 94-101. doi:10.1016/S0167-5273(12)70315-7

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101. doi:10.1191/1478088706qp063oa

BridgeCrest Medical. (2015, May). Wearable technology and real-time analytics to prevent fatigue-related accidents. Retrieved from http://www.mining.com/web/wearable-technology-and-real-time-analytics-to-prevent-fatigue-related-accidents/

Brown, L. G. (1990) Convenience in services marketing. *Journal of Services Marketing, 4*(1), 53-59. doi:10.1108/EUM0000000002505

Brown, P. R., Brown, W. J., & Miller, Y. D. (2001). Perceived constraints and social support for active leisure among mothers with young children. *Leisure Sciences, 23*, 131-144. doi:10.1080/014904001316896837

Bureau of Labor Statistics [BLS]. (2016). Average hours per day spent in selected activities by sex and day. Retrieved from https://www.bls.gov/charts/american-time-use/activity-by-sex.htm

Bureau of Labor Statistics [BLS]. (2016). National business employment dynamics data by firm size class. Retrieved from https://www.bls.gov/

Bureau of Labor Statistics [BLS]. (2017). Labor force statistics from the current labor population survey. Retrieved from https://www.bls.gov/

Burton, W. N., Pransky, G. C., Conti, D. J., Chen, C. Y., & Edington, D. W. (2004). The association of medical conditions and presenteeism. *Journal of Occupational and*

Environmental Medicine, 46(6), 38-45. doi:10.1097/01.jom.0000126687.49652.44

Cancelliere, C., Cassidy, J. D., Ammendolia, C. & Cote, 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*, 395. doi:10.1186/1471-2458-11-395

Carter, E. (2010, September). Social welfare organizations. Retrieved from http://charitylawyerblog.com/2010/09/29/nonprofit-law-jargon-buster-social-welfare-organization/

Centers for Disease Control and Prevention [CDC]. (2012, May 16). Higher education and income levels keys to better health [Press release]. Retrieved from https://www.cdc.gov/media/releases/2012/p0516_higher_education.html

Centers for Disease Control and Prevention [CDC]. (2015). Workplace health promotion: Using the workplace to improve the nation's health. Retrieved from https://www.cdc.gov/chronicdisease/resources/publications/aag/pdf/2015/aag-workplace-health.pdf

Centers for Disease Control and Prevention [CDC]. (2016a). Absenteeism and employer costs associated with chronic diseases and health risk factors in the U.S. workforce. Retrieved from https://www.cdc.gov/pcd/issues/2016/15_0503.htm

Centers for Disease Control and Prevention [CDC]. (2016b). Adult obesity causes and consequences. Retrieved from https://www.cdc.gov/obesity/adult/causes.html

Centers for Disease Control and Prevention [CDC]. (2017a). Chronic disease prevention and health promotion. Retrieved from https://www.cdc.gov/chronicdisease/overview/index.htm

Centers for Disease Control and Prevention [CDC]. (2017b). Using the workplace to improve the nation's health at a glance. Retrieved from https://www.cdc.gov/chronicdisease/resources/publications/aag/workplace-health.htm

Chandrum, S., Bardas, A. G., Case J., Ou, X., Wesch, M., McHugh, J., & Rajagopalan, S. (2015). A human capital model of mitigating security analyst burnout. *Symposium on Usable Privacy and Security (SOUPS), 2015*, 347-359. Retrieved from https://www.usenix.org/conference/soups2015/proceedings/presentation/sundaramurthy

Chen, K. C., & Jang, S. J. (2010). Motivation in Online Learning: Testing A Model of Self-Determination Theory. *Computers in Human Behavior*, *26*, 741-752. doi:10.1016/j.chb.2010.01.011

Chesky, R. (2015, August). What are the actual benefits of wearable technology? Retrieved from https://www.techwalls.com/what-are-the-actual-benefits-of-wearable-technology/

Congressional Budget Office. (2016, March). Federal subsidies for health insurance coverage for people under age 65, 2016-2026. Retrieved from https://ccf.georgetown.edu/wp-content/uploads/pdfs/51385-HealthInsuranceBaseline_OneCol.pdf

CNET. (2017). Best wearable tech for 2018. Retrieved from https://www.cnet.com/reviews/

CNET. (2018). Apple watch series 3 review. Retrieved from https://www.cnet.com/products/apple-watch-series-3/review/

Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches* (2nd ed.). Thousand Oaks, CA: Sage.

Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research* (2nd ed.). Thousand Oaks, CA: Sage.

Crothers, B. (2015, April). So, what about making phone calls on the apple watch? Retrieved from http://www.foxnews.com/tech/2015/04/23/so-what-about-making-phone-calls-on-apple-watch.html

Currie, J., & Stabile, M. (2006). Child mental health and human capital accumulation: The case of ADHD. *Journal of Health Economics, 25*, 1094-1118. doi:10.1016/j.jhealeco.2006.03.001

Dallat, M. A., Hunter, R. F., Tully, M. A., Carins, K. J., & Kee, F. (2013). A lesson in cost-effectiveness analysis of a novel financial incentive intervention for business: Increasing physical activity in the workplace. *BMC Public Health, 13*, 953-975. doi:10.1186/1471-2458-13-953

Danielson, C. (2017, March 31). Top 15 corporate wellness incentives by budget. *Core Health Technologies*. Retrieved from http://blog.corehealth.global/

Deci, E. L., & Ryan, R. M. (1980). The empirical exploration of intrinsic motivational processes. *Advances in Experimental Social Psychology, 13*, 39-80. doi:10.1016/S0065-2601(08)60130-6

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic Motivation and Self-Determination in Human Behavior*. New York, NY: Plennum.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227-268. doi:10.1207/S15327965PLI1104_01

Deci, E. L., & Ryan, R. M. (2002). Overview of self-determination theory: An organismic dialectical perspective. Retrieved from http://www.elaborer.org/cours/A16/lectures/Ryan2004.pdf

Deci, E. L., Olafsen, A. H., & Ryan, R. M. (2017). Self-determination theory in work organizations: The state of a science. *Annual Review of Organizational Psychology and Organizational Behavior, 4,* 19-43. doi:10.1146/annurev-orgpsych-032516-113108

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

DeVries, G. T. (2010). Innovations in workplace wellness: Six new tools to enhance programs and maximize employee health and productivity. *Compensation and Benefits Review, 42*(1), 46-51. doi:10.1177/0886368709346692

Driver, S., Panjwani, A., Spring, B., Lloyd-Jones, D. M., & Allen, N. (2015). Abstract 19252: Ideal cardiovascular health and employee productivity. *Circulation, 132.* Retrieved from http://circ.ahajournals.org/content/132/Suppl_3/A19252

Elliot, H. (1997). The use of diaries in sociological research on health experience. *Sociological Research Online, 2*(2), 1-11. doi:10.5153/sro.38

Elliot & Associates (2005). *Guidelines for conducting a focus group.* Retrieved from https://datainnovationproject.org/wp-content/uploads/2017/04/4_How_to_Conduct_a_Focus_Group-2-1.pdf

Eng, J. Y., Moy, M., & Bulgiba, A. (2016). Impact of workplace health promotion program on employees' blood pressure in a public university. *PLoS One, 11*(2), 1-10. doi:10.1371/journal.pone.0148307

Farrell, M. (2017). Time management. *Journal of Library Administration, 57*(2), 215-222. doi:10.1080/01930826.2017.1281666

Field, A. (2013). *Discovering statistics using ibm SPSS statistics* (4th ed.). Thousand Oaks, CA: Sage.

Fink, A. (2003a). *How to assess and interpret survey psychometrics* (2nd ed.). Thousand Oaks, CA: Sage.

Fink, A. (2003b). *How to sample in surveys* (2nd ed.). Thousand Oaks, CA: Sage.

Finkelstein, E. A., Linnan, L. A., Tate, D. F., & Birken, B. E. (2007). A pilot study testing the effect of different levels of financial incentives on weight loss among overweight employees. *Journal of Occupational and Environmental Medicine, 49*(9), 981-989. doi:10.1097/JOM.0b013e31813c6dcb

Fitbit, Incorporated. (2016, October). *Two fitbit group health customers demonstrate cost Savings from corporate wellness programs* [Press release]. Retrieved from https://investor.fitbit.com/press/press-releases/press-release-details/2016

Fitzgerald, C. J., & Danner, K. M. (2012). Evolution in the office: How evolutionary psychology can increase employee health, happiness, and productivity. *Evolutionary Psychology, 10*(5), 770-781. doi:10.1177/147470491201000502

Fronstin, P., & Roebuck, M. C. (2015). Financial incentives and workplace wellness program participation. Retrieved from https://www.ebri.org/pdf/briefspdf/EBRI_IB_412_Mar15_Wlns-Incnts.pdf

Gallup Organization. (2006). Gallup study: Engaged employees inspire company innovation. Retrieved from http://gmj.gallup.com/content/24880/GallupĞStudyĞEngagedĞEmployeesĞInspireĞCompany.aspx

Gates, D. M., Succop, P., Brehm, B. J., Gillespie, G. L., & Sommers, B. D. (2008). Obesity and presenteeism: The impact of body mass index on workplace productivity. *Journal of Occupational and Environmental Medicine, 50*(1), 39-45. doi:10.1097/JOM.0b013e31815d8db2

Gaoshan, J. (2014). The association between work productivity and physical activity among Singapore full time employees (Master's Thesis). Retrieved from Proquest Dissertations and Theses database. (UMI No. 1555545)

Genetic Information Nondiscrimination Act, 42 U.S.C. Chapter 21F (2008).

Gerteis, J., Izrael, D., Deitz, D., LeRoy, L., Ricciardi, R., Miller, T., & Basu, J. (2014). Multiple chronic conditions chartbook. *Agency for Healthcare Research and Quality Publications* (Q14-0038). Retrieved from https://www.ahrq.gov/sites/default/files/wysiwyg/professionals/prevention-chronic-care/decision/mcc/mccchartbook.pdf

Giddens, L., Leidner, D., & Gonzalez, E. (2017). The role of fitbits in corporate wellness programs: Does step count matter? *Hawaii International Conference on System Sciences, 2017*, 3627-3635. Retrieved from http://hdl.handle.net/10125/41596

Goetzel, R. Z, Carls, G. S., Wang, S., Kelly, E., Mauceri, E., Columbus, D., & Cavouti, A. (2009). The relationship between modifiable health risk factors and medical expenditures, absenteeism, short-term disability, and presenteeism among employees at novartis. *Journal of Occupational and Environmental Medicine, 51*(4), 487-499. doi:10.1097/JOM.0b013e31819eb902

Goetzel, R. Z., Long, S. R., Ozminkowski, R. J., Hawkinds, K., Wang, S., Lynch, W. (2004). Health, absence, disability, and presenteeism cost estimates of certain physical and mental health conditions among U.S. employees. *Journal of Occupational and Environmental Medicine, 46*(4), 398-412. doi:10.1097/01.jom.0000121151.40413.bd

Graff-Zivian, J., & Neidell, M. (2012). The impact of production on worker productivity. *American Economic Review, 102*(7), 3652-3673. doi:10.1257/aer.102.7.3652

Graff-Zivian, J., & Neidell, M. (2013). Environment, health, and human capital. *Journal of Economic Literature, 51*(3), 689-730. doi:10.1257/jel.51.3.689

Grawitch, M. J., Ledford, G. E., Ballard, D. W., & Barber, L. K. (2009). Leading the healthy workforce: The integral role of employee involvement. Consulting *Psychology Journal, 61*(2), 122-135. doi:10.1037/a0015288

Haines, D., Davis, L., Rancour, P., Robinson, M., Neel-Wilson, T., & Wagner, S. (2007). A pilot intervention to promote walking and wellness and to improve the health of

College faculty and staff. *Journal of American College Health, 55*(4), 219-225. doi:10.3200/JACH.55.4.219-225

Hamilton M. T., Hamilton D. G., & Zderic T. W. (2007). Role of low energy expenditure and sitting in obesity metabolic syndrome, type 2 diabetes, and cardiovascular disease. *Diabetes, 56*(11), 2655-2667. doi:10.1155/2012/712435

Hannon, P. A., Hammerback, M. A., Garson, G., Harris, J. R., & Sopher, C. J. (2012). Stakeholder perspectives on workplace health promotion: A qualitative study of midsized employers in low-wage industries. *American Journal of Health Promotion, 27*(2), 103-110. doi:10.4278/ajhp.110204-QUAL-51

Harden, A., Peersman, G. O., Oliver, S., Mauthner, M., & Oakley, A. (1999). A systematic review of the effectiveness of health promotion interventions in the workplace. *Occupational Medicine, 49*(8), 540-548. doi:10.1093/occmed/49.8.540

Harris J. R., Huang Y., Hannon P. A., & Williams B. (2011). Low-SES workers: Health risks and how to reach them. *Journal of Occupational & Environmental Medicine, 53*, 132-138. doi:10.1097/JOM.0b013e3182045f2c

Healy G. N., Dunstan D. W., Salmon J., Cerin E., Shaw J. E., & Zimmet P. Z. (2008). Breaks in sedentary time: Beneficial associations with metabolic risk. *Diabetes Care, 31*(4), 661-666. doi:10.2337/dc07-2046

Hemp, P. (2004). At work – but out of it. *Harvard Business Review*. Retrieved from https://hbr.org/

Hochart, C., & Lang, M. (2011). Impact of a comprehensive worksite wellness program on health risk, utilization, and health care costs. *Population Health Management, 14*(3), 111-116. doi:10.1089.pop2010.0009

Hoeger, W. K., Bond, L., Ransdell, L., Shimon, J. M., & Merugu, S. (n.d.). One-mile step count at walking and running speeds. *Health & Fitness Journal, 12*(1), 14-19. doi:10.1249/01.FIT.0000298459.30006.8d

Hokayem, C., & Ziliak, J. P. (2014). Health, human capital, and life cycle labor supply. *American Economic Review: Papers and Proceedings, 104*(5), 127-131. doi:10.1257/aer.104.5.127

Holden, L., Scuffman, P. A., Hilto, M. F., Ware, R. S., Vecchio, N., & Whiteford, H. A. (2011). Health-related productivity losses increases when the health condition is co-morbid with psychological distress: Findings from a large cross-sectional sample of working Australians. *BMC Public Health, 11,* 417-421. doi:10.1186/1471-2458-11-417

Hon, A. H. (2012). Shaping environments conductive to creativity: The role of instrinsic motivation. *Cornell Hospitality Quarterly*, *53*(1), 53-64. doi:10.1177/1938965511424725

Honoken, T., Ahola, K., Pertovaara, M., Isometa, E., Kalimo, R., Nykyri, E., . . .Lonngvist, J. (2006). The association between burnout and physical illness in the general population. *Journal of Psychosomatic Research, 61*, 59-66. doi:10.1016/j.jpsychores.2005.10.002

Incentive. (n.d.). *In Merriam-Webster dictionary online*. Retrieved from https://www.merriam-webster.com/

Incentives for Nondiscriminatory Wellness Programs Rule. 78 C.F.R. 33158 (2013).

Inoue M., Yamamoto S., Kurahashi N., Iwasaki M., Sasazuki S., & Tsugane S. (2008). Daily total physical activity level and total cancer risk in men and women: Results from a large-scale population-based cohort study in Japan. *Am J Epidemiol, 168*(4), 391-403. doi:10.1093/aje/kwn146

Interdisciplinary Center for Healthy Workplaces. (2018). Finding fit: Implementing wellness programs successfully. Retrieved from https://www.transamericacenterforhealthstudies.org/docs/default-source/wellness-page/2018EmployerGuide.pdf?sfvrsn=10

Internal Revenue Service [IRS]. (2016). Tax treatments of wellness program benefits and employer reimbursement of premiums provided pre-tax under a section 125 cafeteria plan. Retrieved from https://www.irs.gov/

Internal Revenue Service [IRS]. (2017). Questions and answers on employer shared responsibility provisions under the Affordable Care Act. Retrieved from https://www.irs.gov/

Internal Revenue Service [IRS]. (2017). FAQs for government entities regarding cafeteria plans. Retrieved from https://www.irs.gov/

Jacelon, C. S., & Imperio, K. (2005). Participant diaries as a source of data in research with older adults. *Qualitative Health Research, 15*(7), 991-997. doi:10.1177/1049732305278603

Johansson, G., Johnson, J. V., & Hall, E. M. (1991). Smoking and sedentary behaviors as related to work organization. *Social Science & Medicine, 32*, 837-846. doi:10.1016/0277-9536(91)90310-9

Jung, H., Lee, B., Lee, J. E., Kwon, Y. H., & Song, H. (2012). Efficacy of a programme for workers with metabolic syndrome based on an e-health system in the workplace: A pilot study. *Journal of Telemedicine and Telecare, 18*(6), 339-343. doi:10.1258/jtt.2012.120318

Kahill, S. (1988). Symptoms of professional burnout: A review of the empirical evidence. *Canadian Psychology, 29*(3), 284-297. doi:10.1037/h0079772

Karapanos, E., Gouveia, R., Hassenzahl, M., & Forlizzi, J. (2016). Wellbeing in the Making: Peoples' experiences with wearable activity trackers. *Psychology of Well-Being, 6*(1), 1-17. doi:10.1186/s13612-016-0042-6

Kessler, R. C. (March 8, 2003). *Scoring the HPQ*. Retrieved from https://www.hcp.med.harvard.edu/hpq/ftpdir/hpq_scoring_doc.pdf

Kessler, R. C., Barber, C., Beck, A., Berglund, P., Cleary, P. D., McKenas, D., . . .Wang, P. (2003). The world health organization health and work performance questionnaire (HPQ). *Journal of Occupational and Environmental Medicine, 45*(2), 156-174. doi:10.1097/01.jom.0000052967.43131.51

Kessler, R. C., Greenberg, P. E., Mickelson, K. D., Meneades, L. M., & Wang, P. S. (2001). The effects of chronic medical conditions on work loss and work cutbacks. *The Journal of Occupational and Environmental Medicine, 43*(3), 218-225. doi:10.1097/00043764-200103000-00009

Kessler, R. C., Petukhova, M., McInnes, K., & Ustun, T. B. (2007). *Persons interested in the WHO HPQ absenteeism and presenteeism questions*. Retrieved from https://www.hcp.med.harvard.edu/hpq/ftpdir/absenteeism%20presenteeism%20scoring%20050107.pdf

Kiana, T., & Michael, A. (2014). Wearable technology and wearable devices: Everything You need to know. Retrieved from http://www.wearabledevices.com/what-is-a-wearable-device/

Kim, H., Ji, J., & Kao, D. (2011). Burnout and physical health among social workers: A three-year longitudinal study. *National Association of Social Workers, 56*(3), 258-268. doi:10.1093/sw/56.3.258

Klatt, M. D., Sieck, C., Gascon, G., Malarkey, W., & Huerta, T. (2016). A healthcare utilization cost comparison between employees receiving a worksite mindfulness or a diet/exercise lifestyle intervention to matched controls 5 years post intervention. *Complementary therapies in Medicine, 27*(2016), 139-144. doi:10.1016/j.ctim.2016.05.008

Knani, M. (2013). Exploratory study of the impacts of new technology implementation of burnout and presenteeism. *International Journal of Business and Management, 8*(22), 92-97. doi:10.5539/ijbm.v8n22p92

Krueger, B. (2016, August). Top five benefits of wearable technology & solutions. Retrieved from http://www.abr.com/top-5-benefits-wearable-technology-solutions/

Kullgren, J. T., Williams, J. C., Resnicow, K., An, L. C., Rothberg, A., Volpp K. G., & Heisler, M. (2016). The promise of tailoring incentives for health behaviors. *The International Journal for Workplace Health Management, 9*(1) 2-16. doi:10.1108/IJWHM-12-2014-0060

Laerd Statistics. (2013). Linear regression analysis using spss statistics. Retrieved from https://statistics.laerd.com/spss-tutorials/linear-regression-using-spss-statistics.php

Lamkin, P. (2014, September). The history of wearable technology. Retrieved from https://www.raconteur.net/technology/history-of-wearable-technology

Landi, H. (2016, October). Study: Fitbit corporate wellness programs cut employer healthcare costs. Retrieved from https://www.healthcare-informatics.com/news-item/mobile/study-fitbit-corporate-wellness-programs-cut-employer-healthcare-costs

Larose, C., Katz, M., & Zhedi, P. (2017, March). March fadness: Wearable tech in the workplace. Retrieved from https://www.employmentmattersblog.com/2017/03/march-fadness-wearable-tech-in-the-workplace/

Levenson, A. (2015, February). The workplace wellness debate: Should employers adopt these programs? Retrieved from https://mha.gwu.edu/the-workplace-wellness-debate/

Lind, K. D., & Noel-Miller, C. (2011). *Chronic condition prevalence in the 50+ U. S. Population* [Fact Sheet 245]. Retrieved from https://www.aarp.org/

Loeppke, R., Edington, D., Bender, J., & Reynolds, A. (2013). The association of technology in a workplace wellness program with health risk factor reduction. *Journal of Environmental Medicine, 55*(3), 259-264. doi:10.1097/JOM.0b013e3182898639

Loeppke, R., Nicholson, S., Taitel, M., Sweeney, M., Haufle, V., & Kessler, R. C. (2008). The impact of an integrated population health enhancement and disease management program on employee health risk, health conditions, and productivity. *Population Health Management, 11*(6), 287-296. doi:10.1089/pop.2008.0006

Luckhaupt, S. E., Cohen, M. A., Li, J., & Calvert, G. M. (2014). Prevalence of obesity Among U. S. workers and associations with occupational factors. *American Journal of Preventive Medicine, 46*(3), 237-248. doi:10.1016/j-amepre.2013.11.002

Madison, K. M., Volpp, K. G., & Halpern, S. D. (2011). The law, policy, and ethics of employers use of financial incentives to improve health. *Journal of Law, Medicine & Ethics, 39*(3), 450-468. doi:10.1111/j.1748-720X.2011.00614.x

Martin, K. G. (2018). Outliers: To drop or not to drop. Retrieved from https://www.theanalysisfactor.com/outliers-to-drop-or-not-to-drop/

Maslach, C., Jackson, S., & Leiter, M. (1996). *Maslach burnout inventory manual* (3rd ed.). Palto Alto, CA: Consulting Psychologists Press.

Maslach, C., & Leiter, M. (1997). *The truth about burnout.* San Francisco, CA: Jossey-Bass.

Maslach, C., & Leiter, M. (2016). Understanding the burnout experience: Recent research and its implications for psychiatry. *World Psychiatry, 15*(2), 103-111. doi:10.1002/wps.20311

Maslach, C., Schaufeli, W. B., & Leiter, M. (2001). Job burnout. *Annual Review of Psychology, 52*, 397-423. doi:10.1146/annurev.psych.52.1.397

Mastroberte, T. (2015). Working the local angle: Benefits of location-based technology. Retrieved from https://hospitalitytech.com/working-local-angle-benefits-location-based-technology

Mattke, S., Schnyer, C., & Van Busum, K. R. (2012). A review of the U.S. workplace wellness market. Retrieved from https://www.dol.gov/

Mattke, S., Kapinos, K., Caloyeras, J. P., Taylor, E. A., Batorsky, B., Liu, H., Van Busum, K. R., & Newberry, S. (2014). Workplace wellness programs: Services offered, participation, and incentives. Retrieved from https://www.dol.gov/

Mattke, S., Liu, H., Caloyeras, J. P., Huang, C. Y., Van Busum, K. R., Khodyakov, D., & Shier, V. (2013). Workplace wellness programs study. Retrieved from https://www.dol.gov/

Mauch, J. E., & Park, E. (2003). *Guide to the successful thesis and dissertation: A handbook for students and faculty* (5th ed). New York, NY: Marcel Dekker.

McManamy, S. (2016, October 10). Why people do and don't participate in wellness programs. *Harvard Business Review*. Retrieved from https://hbr.org/

Medium. (2011, April). The disadvantages and limitations of wearable tech. Retrieved from https://medium.com/@mytiyoapp

Melamed, S., Shirom, A., Toker, S., Berliner, S., & Shapira, I. (2006). Burnout and risk of cardiovascular disease: Evidence, possible causal paths, and promising research directions. *Psychological Bulletin, 132,* 327-353. doi:10.1037/0033-2909.132.3.327

Meth, P. (2003). Entries and omissions: Using solicited diaries in geographical research. *Area*, *35*(2), 195-205. doi:10.1111/1475-4762.00263

Miller, S. (2016). IRS reminds employers: Wellness incentives are taxable. *The Society For Human Resource Management*. Retrieved from https://www.shrm.org/

Mohren, D. C., Swaen, G. M., Kant, I., Amelsvoort, L. G., Borm, P. J., & Golama, J. M. (2003). Common infections and the role of burnout in the Dutch working population. *Journal of Psychosomatic Research, 55*(2003), 201-208. doi:10.1016/S0022-3999(02)00517-2

Mushkin, S. (1962). Health as an investment. *Journal of Political Economy, 70*(5), 129-157. doi:10.1086/258730

Newell, J. M., & MacNeil, G. A. (2010). Professional burnout, vicarious trauma, secondary traumatic stress, and compassion fatigue: A review of theoretical terms, risk factors, and preventive methods for clinicians and researchers. *Best Practice in Mental Health, 6*(2), 57-68. doi:10.1177/0886260513507135

Nikayin, F., Heikkila, M., Reuver, M., & Solaimani, S. (2014). Workplace primary prevention programs enabled by information and communication technology. *Technological Forecasting and Social Change, 89*, 326-332. doi:10.1016/j.techfore.2014.08.003

Novelli, W. D., & Ziska, D. (1982). Health promotion in the workplace: An overview. *Health Education Quarterly, 9*, 20-26. doi:10.1177/10901981820090S104

Office of Disease Prevention and Health Promotion. (2008). Introducing the 2008 physical activity guidelines for Americans. Retrieved from https://health.gov/paguidelines/guidelines/

Orhnberger, J., Fichera, E., & Sutton, M. (2017). The dynamics of physical and mental health in the older population. *The Journal of the Economics of Aging, 9*, 52-62. doi:10.1016/j.jeoa.2016.07.002

Ortega, F. B., Brown, W. J., Lee, D., Baruth, M., Sui, X., & Blair, S. N. (2010). In fitness and health? A prospective study of changes in marital status and fitness in men and women. *American Journal of Epidemiology, 173*(3), 337-344. doi:10.1093/aje/kwq362

Oussedik, E., Foy, C. G., Masicampo, E. J., Kammrath, L. K., Anderson, R. E., & Feldman, S. R. (2017). Accountability: A missing construct in models of adherence behavior and in clinical practice. *Patient Preference & Adherence, 11*, 1285-1294. doi:10.2147/PPA.S135895

Owen N., Bauman A., & Brown W. (2009). Too much sitting: a novel and important predictor of chronic disease risk? *British Journal of Sports Medicine, 43*(2), 81-83. doi:10.1136/bjsm.2008.055269

Parkinson, M. D. (2013). Employer health and productivity roadmap strategy. *Journal of Occupational and Environmental Medicine, 55*(12), 46-51. doi:10.1097/JOM 0000000000000049

Pearson, S. D., & Lieber, S. R. (2009). Financial penalties for the unhealthy? Ethical guidelines for holding employees responsible for their health. *Health Affairs, 28*(3), 845-852. doi:10.1377/hlthaff.28.3.845

Pejtersen, J. H., Kristensen, T. S., Borg, V., & Bjorner, J. B. (2010). The second version of the Copenhagen psychosocial questionnaire. *Scandinavian Journal of Public Health*. doi:10.1177/1403494809349858.

Person, A. L., Colby, S. E., Bulova, J. A., & Eubanks, J. W. (2010). Barriers to participation in a worksite wellness program. *Nutrition Research and Practice, 4*(2), 149-154. doi:10.4162/nrp.2010.4.2.149

Peterson, U., Demerouti, E., Bergstrom, G., Samuelsson, M., Asberg, M., & Nygren, A. (2008). Burnout and physical and mental health among Swedish healthcare workers. *Journal of Advanced Nursing, 62,* 84-95. doi:10.1111/j.1365-2648.2007.04580.x

Phillips, P. P., Phillips, J. J., & Aaron, B. (2013). *Survey basics.* Alexandria, VA: American Society for Training and Development Press.

Pitt-Catsouphes, M., James, J. B., & Matz-Costa, C. (2015). Workplace-based health Wellness programs: The intersection of aging, work, and health. *The Gerontologist, 55*(2), 262-270. doi:10.1093/geront/gnu114

Pomeranz, J. L. (2015). Participatory WWPs: Reward, penalty, and regulatory conflict. *The Milbank Quarterly, 93*(2), 301-318. doi:10.1111/1468-0009.12123

Powell A. C., Landman A. B., & Bates D. W. (2014). In search of a few good apps. *Journal of the American Medical Association. 311*(18), 1851-1852. doi:10.1001/jama.2014.2564

Prater, T., & Smith, K. (2011). Underlying factors contributing to presenteeism and absenteeism. *Journal of Business and Economic Research, 9*(6), 1-14. doi:10.19030/jber.v9i6.4374

PricewaterhouseCoopers [PWC]. (2014, October). The wearable future. Retrieved from https://www.pwc.com/mx/es/industrias/archivo/2014-11-pwc-the-wearable-future.pdf

Prochaska, J. O., & DiClemente, C. C. (1983). Stages and processes of self-change of smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology, 51,* 390-395. doi:10.1037//0022-006X.51.3.390

Prochaska, J. O., DiClemente, C. C., & Norcross, J. (1992). In search of how people change: Applications to addictive behavior. *American Psychologist, 47*(9), 1102-1114. doi:10.1037/0003-066X.47.9.1102

Prochaska, J. O., & Velicer, W. F. (1997). The transtheoretical model of health behavior change. *American Journal of Health Promotion, 12*(1), 38-48. doi:10.4278/0890-1171-12.1.38

Pronk, N. P., Martinson, B., Kessler, R. C., Beck, A. L., Simon, G. E., & Wang. P. (2004). The association between work performance and physical activity, cardiorespiratory fitness, and obesity. *Journal of Occupational and Environmental Medicine, 46*(1), 19-25. doi:10.1097/01.jom.0000105910.69449.b7

Pronk, N. P. (2014). Placing workplace wellness in proper context: Value beyond money. *Preventing Chronic Disease, 11*, 1-4. doi:10.5888/pcd11.140128

Protected Health Information, 45 C.F.R. 160.103 (2011).

Putnam, L. (2017, January). Does happy = healthy?: Transitioning from a wellness plan to a well-being program. *Alliance learning circle.* Symposium conducted the meeting of the Alliance Provider Network, Madison, WI.

Racette, S. B., Deusinger S. S., Inman, C. L., Burlis , T. L., Highstein, G. R., Buskirk, T. D., . . . Peterson, L. R. (2009). Worksite opportunities for wellness (WOW):

Effects on cardiovascular disease risk factors after 1 year. *Preventive Medicine, 49*, 108-114. doi:10.1016/j.ypmed.2009.06.022

Ramey, K. (2013). The advantages and disadvantages of technology in the workplace. Retrieved from https://www.useoftechnology.com/technology-workplace-2/

Rasmussen, B., Sweeny, K., & Sheehan P. (2016). *Health and the economy: The impact Of wellness on workforce productivity in global markets.* A Report to the U.S. Chamber of Commerce's Global Initiative on Health and Economy, U.S. Chamber of Commerce. Retrieved from https://www.nursingeconomics.net

Reardon, J. (1998). The history and impact of worksite wellness. *Nursing Economics, 16*(3), 117-121. Retrieved from https://www.nursingeconomics.net

Reissman, C. K. (1993). Narrative Analysis. In A. Huddersfield, England; University of Huddersfield. *Narrative, Memory & Everyday Life* (pp. 1-7).

Remington, P. L., & Brownson, R. C. (2011). Fifty years of progress in chronic disease epidemiology and control. *Morbidity & Mortality Weekly Report, 60*(04), 70-77. Retrieved from https://www.cdc.gov/

Roberts, A. R. (2009). *Social worker's desk reference* (2nd ed.). New York, NY: Oxford University Press.

Roberts, C. M. (2010). *The dissertation journey* (2nd ed). Thousand Oaks, CA: Corwin.

Ryan, R. M. (1982). Control and information in the intrapersonal sphere: An extension of cognitive evaluation theory. *Journal of Personality and Social Psychology, 43*, 450-461. doi:10.1037//0022-3514.43.3.450

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68-78. doi:10.1037/0003-066x.55.1.68

Ryan, R. M., Patrick, H., Deci, E. L., & Williams, G. C. (2008). Facilitating health behavior change and its maintenance: Interventions based on self-determination theory. *The European Health Psychologist, 10*. Retrieved from http://www.ehps.net/

Ryan, R. M., Williams, G. C., Patrick, H., & Deci, E. L. (2009). Self-determination theory and physical activity: The dynamics of motivation in development and wellness. *Hellenic Journal of Psychology, 6*, 107-124. Retrieved from http://psycnet.apa.org/record/2009-12422-002

Schaefer, P. (2018, January). The hidden costs of presenteeism: Causes and solutions. Retrieved from https://www.businessknowhow.com/manage/presenteeism.htm

Schaufeli, W. B., Leiter, M. P., Maslach, C., & Jackson, S. E. (1996). The MBI-general survey. *Maslach burnout inventory manual* (3rd ed.). Retrieved from https://www.researchgate.net/publication/277816643_The_Maslach_Burnout_Inventory_Manual

Scherrer, P., Sheridan, L., Sibson, R., Ryan, M. M., & Henley, N. (2010). Employee engagement with a corporate physical activity program: The global corporate challenge. *International Journal of Business Studies, 18*(1), 125-139. Retrieved from www.ecu.edu.au/

Schultz, T. (1961). Investment in human capital. *The American Economic Review, 51*(1), 1-17. Retrieved from https://www.aeaweb.org/journals/aer

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-Experimental designs for generalized causal inference.* Belmont, CA: Wadsworth Cengage Learning.

Social Work Policy Institute. (2011). Investing in the social work workforce. Retrieved from https://www.socialworkers.org/

Society for Human Resource Management. (2017). 2017 employee benefits: Remaining competitive in a challenging talent marketplace. Retrieved from https://www.shrm.org/hr-today/trends-and-forecasting/research-and-surveys/Documents/2017%20Employee%20Benefits%20Report.pdf

Springbuk. (2015). Wearable technology: Unlocking ROI of workplace wellness. Retrieved from https://www.springbuk.com

Stanley, T. L. (2004, May 1). Burnout: A manager's worst nightmare. *Supervision, 65*(5), 11-13. Retrieved from http://www.supervisionmagazine.com

Statistical Package for the Social Sciences [SPSS]. (Version 24). [Computer software]. Armonk, NY: IBM.

Stoler, F. D., Touger-Decker, R., O'Sullivan-Maillet, J., & Debchoudhary, I. (2006). Wellness in the workplace: A 12-week group and individual program. *Journal of the American Dietetic Association, 106*(8), A9-A9. doi:10.1016/j.jada.2006.05.021

Swanson, R. A., & Holton, E. F. (2005). *Research in organizations: Foundations and methods of inquiry*. San Francisco, CA: Berrett-Koehler.

Swanson, R. A., & Holton, E. F. (2009). *Foundations of human resource development.* San Francisco, CA: Berrett-Koehler.

Teixeira, P. J., Carraca, E. V., Markland, D., Silva, M. N., & Ryan, R. M. (2012). Exercise, physical activity, and self-determination theory: A systematic review. *International Journal of Behavioral Nutrition and Physical Activity, 9*(78), 1-30. doi:10.1186/1479-5868-9-78

The RAND Corportation. (2013). WWPs study: Case studies summary report. Retrieved from https://www.dol.gov/

Thomas, J., & Harden, A. (2007). Methods for the thematic synthesis of qualitative research in systematic reviews. ESCR National Centre for Research Methods. Retrieved from http://eprints.ncrm.ac.uk/

Thompson, S. J., & Rew, L. (2015). The healthy workplace project: Results of a Hygiene-based approach to employee wellness. *American Journal of Health Promotion, 29*(5), 339-341. doi:10.4278/ajhp.130830-ARB-459

Troy, T. D., & Jones, K. L. (2016). State of employers-sponsored health care part 1: Top concerns of CHROs and their teams (pp. 1-11). Retrieved from http://www.americanhealthpolicy.org

U. S. Department of Health and Human Services [HHS]. (2015a). Step it up! The surgeon general's call to action to promote walking and walkable communities. Retrieved from https://www.surgeongeneral.gov/

U. S. Department of Health and Human Services [HHS]. (2015b). HIPAA privacy and security and workplace wellness programs. Retrieved from https://www.hhs.gov/

Vo, A., Brooks, G. B., Farr, R., & Raimer, B. (2016). Benefits of telemedicine in remote communities & use of mobile and wireless platforms in healthcare. Retrieved from https://telehealth.utmb.edu/

Ward, B. W., Schiller, J. S., & Goodman, R. A. (2014). Multiple chronic conditions among U.S. adults: A 2012 update. *Preventing Chronic Disease, 11*, 1-4. doi:10.5888/pcd11.130389

Weafer, B. (2016, December). Views stepping away from traditional workplace wellness programs. Employee benefit advisor. Retrieved from https://www.employeebenefitadviser.com/opinion/stepping-away-from-traditional-workplace-wellness-programs

Williams, G. C., & Deci, E. L. (1996). Internalization of biopsychosocial values by medical students: A test of self-determination theory. *Journal of Personality and Social Psychology, 70*(4), 767-779. doi:10.1037/0022-3514.70.4.767

World Health Organization [WHO]. (2010). *Health and Work Performance Questionnaire Clinical Trials 28-Day Version* [Measurement Instrument]. Retrieved from https://www.hcp.med.harvard.edu/info.php

World Health Organization [WHO]. (2014). Global status report on noncommunicable diseases. Retrieved from http://apps.who.int/iris/bitstream/10665/148114/1/9789241564854_eng.pdf?ua=1

Yoon, C., & Kim, S. (2007). Convenience and TAM in a ubiquitous computing Environment. *Electronic Commerce Research and Applications, 6*, 102-112. doi:10.1016/j.elerap.2006.06.009

Zhang, M., Luo, M., Nie, R., & Zhang, Y. (2017). Technical attributes, health attributes, consumer attributes and their roles in adoption intention of healthcare wearable technology. *International Journal of Medical Informatics, 108*, 97-109. doi:10.1287/isre.9.2.204

Zimering, R., Monroe, J., & Gulliver, S. B. (2003). Secondary traumatization in mental health care providers. *Psychiatric Times, 20*(4), 43-47. Retrieved from http://www.psychiatrictimes.com