PHYSICAL ACTIVITY: A HOPEFUL PATHWAY TO PRODUCTIVITY

by

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Date
ABSTRACT

Presenteeism is defined as a decrease in on-the-job performance and productivity due to the presence of physical and/or psychosocial symptoms or conditions. There is a powerful intersection between employee health and productivity; therefore, the phenomenon of presenteeism has grown in awareness in both areas of business and health promotion. **The purpose of this mixed methods study was to explore the relationship between physical activity and presenteeism.** A purposeful sample of University of Colorado Colorado Springs executives, faculty and staff (n=31) participated in a 1 hour focus group followed by the completion of validated questionnaires addressing: general health, physical activity, perceived stress, and presenteeism. Findings suggest that physical activity increases problem solving, provides motivation and encouragement to accomplish tasks, and presents an opportunity to achieve and sustain both short and long term goals of health and wellness. **Conclusion:** Physical activity can impact employee’s goals, pathways, and agency toward wellness in the workplace. To increase productivity and reduce presenteeism, future workplace wellness programs should consider utilizing this synergistic framework.

*Keywords:* physical activity, presenteeism, stress, worksite wellness, productivity
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CHAPTER 1
INTRODUCTION

Job stress is ubiquitous, yet ambiguous. Stress, a multifaceted phenomenon, can be positive or negative; acute or chronic; and it can be influenced by a variety of factors which impacts everyone differently (Nguyen-Michel, Unger, Hamilton, & Spruijt-Metz, 2006; Sohail, 2015). The Center for Disease Control and Prevention (CDC) defines job stress as the harmful physical and emotional responses that occur when the requirements of the job do not match the capabilities, resources, or needs of the worker. These factors, especially when unremitting, can result in negative physical and psychological health conditions (Callen, Lindley, & Niederhauser, 2013; Cohen, Kamarck, & Mermelstein, 1983; Sohail, 2015).

Unremitting or chronic stress responses are prevalent in today’s business environment and lead to a down regulation of the immune system. If chronic distress is not mitigated, the responses can cause the breakdown and fatigue of bodily systems leading to chronic condition such as: migraine headaches, chronic illness, autoimmune conditions, cardiovascular disease, musculoskeletal disorders and psychological conditions (Mandiracioglu, Bolukbas, Demirel, & Gumeli, 2015; Sachs & Rules, 2011; Harvard Health, 2011). In addition to physical ailments, stress and elevated cortisol levels have been associated with hippocampus atrophy resulting in decreased cognitive function, lack of focus, forgetfulness, negative thoughts, ineffective thinking, lack of
problem solving skills, and reduced productivity (Coutu et al., 2015; McEwen, Leon, Lupien, & Meaney, 1999).

According to the American Psychological Association approximately 70% of Americans report that they experience physical (69%) or non-physical (67%) symptoms of stress. The high prevalence of both physical and mental conditions of stress give insight into the impact chronic stress can have on employee health and the business financial losses which may occur due to the reduction in employee productivity as a result of work stress (Chen et al., 2015; Dursi, 2008; Gosselin, Lemyre, & Corneil, 2013; Guertler et al., 2015; Mazzola, Schonfeld, & Spector, 2011; Sohail, 2015)

Current research uses both absenteeism and presenteeism as measurements for workplace productivity (Chen et al., 2015; Schultz & Edington, 2007). Absenteeism is defined as an employee’s time away from work as a result of illness, absences, disability, or workers’ compensation (Schultz & Edington, 2007). The use of self report surveys and administrative records to quantify absenteeism and worker productivity are most prevalently used in research (Chen et al., 2015; Schultz & Edington, 2007). Within recent years, a more subtle and yet more powerful concept of presenteeism has emerged as a measure of productivity in the workplace (Callen et al., 2013; Lack, 2011). As an emerging term, presenteeism does not have a uniform definition and is more complex when compared to absenteeism (Brown, Gilson, Burton, & Brown, 2011; Chapman, 2005; Lack, 2011; Schultz & Edington, 2007). Presenteeism is operationally defined in this study as decreased on-the-job performance due to the presence of health conditions. Thus, presenteeism refers to employees who are physically present at work, but not fully engaged due to their mental or physical health.
Presenteeism, although difficult to quantify, has shown to have a larger financial impact on business due to productivity loss when compared to absenteeism. The Society for Human Resources projected the estimated cost of presenteeism in 2009 to be over $180 billion dollars per year, while the cost of absenteeism was projected to be near $118 billion dollars in the same year (Callen et al., 2013; Chenoweth, 2011). These estimated dollar figures illustrate the impactful effect of presenteeism on a business’s bottom line.

The current literature identifies a strong relationship between work stress, chronic disease and presenteeism (Callen et al., 2013; Chenoweth, 2011; Coutu et al., 2015; Kilpatrick et al., 2014; Schultz & Edington, 2007). Physical and mental ailments, many which are similar to those caused by chronic stress, have been associated with high levels of presenteeism. These conditions include: common cold, allergies, migraine headaches, musculoskeletal pain, cardiovascular disease, depression, anxiety, and fatigue (Mandiracioglu et al., 2015; Sachs & Rules, 2011; Harvard Health, 2011). The impact of work stress on the health and well-being of employees in addition to the financial burden of presenteeism on organizations demonstrates a need for additional research to identify preventive measure to reduce stress and increase productivity in the workplace.

In addition to the many health benefits of physical activity, regular physical activity reduces the presence and symptoms associated with chronic disease and stress by activating opposing quadrants of the brain negatively impacted by stress (Sarbadhikari & Saha, 2006). The strength of evidence showcasing the preventative benefits of physical activity on health and stress reduction merits future research to explore the relationship between physical activity and presenteeism in the workplace. However, limited research has explored or revealed a link between physical activity and presenteeism (Brown et al.,
2011; Callen et al., 2013; Schultz & Edington, 2007). Therefore, the purpose of this current study was to examine the relationship between physical activity and presenteeism in the workplace using both qualitative and quantitative methods to gain a deeper understanding of the complex phenomenon of presenteeism. It is speculated that individuals who engage in the recommended 30 minutes of moderate physical activity per day, or 20 minutes of vigorous physical activity three times per week will demonstrate lower stress levels and reduced presenteeism. Outcomes of this multifaceted research can be used to inform the development, implementation and evaluation of future worksite wellness programs.
CHAPTER 2
REVIEW OF THE LITERATURE

According to the Bureau of Labor, the average employee in the United States spends an estimated 54% of their waking hours at work. These statistics and the rise of preventable disease in the United States showcase the powerful potential to promote healthy behavior change through worksite wellness programs (WWP) (Caloyeras, Liu, Exum, Broderick, & Mattke, 2014). WWPs are defined as an employment-based activity or employer-sponsored benefit aimed at promoting health-related behaviors and disease management (Goetzel et al., 2014). When properly implemented, these programs are associated with positive health behavior change, reducing health risk factors, boosting morale, increasing worker productivity and reducing health care costs (Caloyeras et al., 2014; Kilpatrick et al., 2014; Mattke et al., 2013; Michaels & Greene, 2013).

Although many positive benefits have been identified through the implementation of WWPs, the effectiveness of WWPs is contested within the literature (Horwitz, Kelly, & DiNardo, 2013). The ineffectiveness of WWPs seen in the literature includes reduced return on investment of programs, lack of employee confidentiality, and incentive discrimination towards unhealthy employees. Despite the contention of the topic, it is agreed by most researchers that creative solutions need to be generated to increase the health of employees and to blunt the rising cost of health care (Goetzel et al., 2014; Horwitz et al., 2013; Mattke et al., 2013). These efforts have sparked recent research focusing on stress in the workplace and how it impacts the health and productivity of
employees (Chen et al., 2015; Dursi, 2008; Gosselin et al., 2013; Guertler et al., 2015; Mazzola et al., 2011; Sohail, 2015). Stress is ubiquitous yet ambiguous; therefore, the purpose of this literature review is to examine the impact of occupational stress on the health and productivity of employees as a unique population.

**Work Stress and Health**

The Center for Disease Control and Prevention (CDC) defines job stress as the harmful physical and emotional responses that occur when the requirements of the job do not match the capabilities, resources, or needs of the worker. Stress is multifaceted, can be positive or negative, and can be influenced by a large number of factors (Nguyen-Michel et al., 2006; Sohail, 2015). Physiologically, stress is the body’s innate response to a perceived threat. This fight or flight response is automatic and prepares the body to escape and instinctively generate solutions to apparent danger (Harvard Health, 2011).

Stressors in the workplace have been identified as a main contributor in the stimulation of the fight or flight response and an individual’s overall stress level (Callen et al., 2013; Cohen et al., 1983; Sohail, 2015). Stress in the work place can be exacerbated by imbalances between work requirements, capabilities, resources, and the ability to make decisions. These factors, especially when unremitting, can result in negative physical and psychological health conditions (Callen et al., 2013; Cohen et al., 1983; Sohail, 2015).

Chronic or continuous stress is common in fast paced, high pressure work environments (Callen et al., 2013). The stress response is intended to be protective; automatically stimulating the sympathetic nervous system to increase heart rate, tense
muscles, and release the stress hormones epinephrine, nor epinephrine and cortisol (Sachs & Rules, 2011). Cohen (1983), states that high levels of stress are associated with poor self-reported health, heightened blood pressure, depression, and reduced immunity.

Additional physiological responses to various stressors include: increase in metabolism, slow formation of proteins, low rate of digestion, and an increase of nutrients such as cholesterol, fat, and sugar in the blood stream to provide energy to the body (Harvard Health, 2011).

The hypothalamus is responsible for the body’s stress response. Based on the brain’s appraisal of the stressor, the hypothalamus sends a signal to the pituitary gland, stimulating the hypothalamus-pituitary-adrenal (HPA) axis (Figure 1). Once stimulated, the pituitary gland secretes adrenocorticotropic hormone (ACTH). ACTH then stimulates the adrenal cortex to produce the steroid hormone cortisol. In addition to psychosocial stressors which may be present in the workplace, cortisol is also released as a result of fasting, food intake, exercising, and waking up (Almadi, Cathers, & Chow, 2013; Maglione-Garves, Kravitz, & Schneider, 2005). Research indicates that cortisol possesses both anti-inflammatory and inflammatory properties based on circulating plasma levels (Davis et al., 2008). At balanced levels cortisol is anti-inflammatory and becomes inflammatory when levels surpass an individual threshold, increasing and exacerbating risk factors associated with poor health (Maglione-Garves et al., 2005; McEwen et al., 1999). Another key function of cortisol is energy regulation and mobilization. Cortisol is able to regulate energy by mobilizing the appropriate type and amount of carbohydrate, fat or protein that is needed by the body during times of
perceived stress (Maglione-Garves et al., 2005). Figure 1 illustrates the HPA-Axis pathway as well as the physiological effects of stress on the body.

**HPA-Axis**

**Effects of Stress on the Body**

![Figure 1](image.png)

*Figure 1.* Demonstrates the HPA-Axis pathway (right) and physiological effects stress can have on the body (left). Note. From integrativepro.com (left) and mentalhealthamerica.net (right).

During these stress responses, the immune system is down-regulated. Thus, if a continuous stress is present and the HPA response is not mitigated, the symptoms will continue and cause the breakdown and fatigue of bodily systems. Breakdown and fatigue of the body can impact the body systems highlighted in Figure 1 and result in symptoms such as: migraine headaches, chronic illness, autoimmune conditions, cardiovascular disease, musculoskeletal disorders and psychological conditions (Mandiracioglu et al., 2015; Sachs & Rules, 2011; Harvard Health, 2011). Empirical research demonstrates the deteriorating health effects of chronic stress and recommends future examination of the
relationship between work stress and employee health (Mazzola et al., 2011; Sachs & Rules, 2011; Sohail, 2015).

In addition to physical health, stress has shown to disrupt emotional, cognitive, and behavioral aspects of employee well-being (Cohen et al., 1983; Mazzola et al., 2011; Sachs & Rules, 2011; Sohail, 2015). Additionally, emotional or psychosocial stress responses have been identified in both quantitative and qualitative studies. Examples include: irritability, anger, mood irregularities, vulnerability, and/or depression (Ellis, Griffith, Allen, Thorpe, & Bruce, 2015; Mazzola et al., 2011). Additionally, stress and elevated cortisol levels have been associated with hippocampus atrophy which impacts cognitive function through lack of focus, forgetfulness, negative thoughts, ineffective thinking, and lack of problem solving skills (Coutu et al., 2015; Mcewen et al., 1999). Furthermore, research has suggested that behavioral aspects related to stress are changes in eating habits and/or physical activity, sleep, increased drug or alcohol use, and poor job performance (Ellis et al., 2015; Kilpatrick et al., 2014; Sachs & Rules, 2011). These detrimental conditions provide insight into the impact chronic work stress can have on employee productivity, health and underline a rational to prevent it.

Presenteeism

As stated by Chen et al (2015) and Shultz & Edington (2007), health-related work productivity can be evaluated through both absenteeism and presenteeism. Absenteeism is defined as an employee’s time away from work as a result of illness, absences, disability, or workers’ compensation (Schultz & Edington, 2007). Self report surveys and administrative records have been the primary source to quantify absenteeism and worker productivity in relation to health (Chen et al., 2015; Schultz & Edington, 2007).
However, within recent years, presenteeism has gained attention and has become a growing concern in the workplace (Callen et al., 2013; Lack, 2011). Although an emerging topic of interest, presenteeism does not have a uniform definition (Brown et al., 2011; Chapman, 2005; Lack, 2011; Schultz & Edington, 2007). Presenteeism is not simply being present at work, the opposite of absenteeism; it is conceptualized as being physically present at work, but working with reduced productivity as a result of physical and/or psychosocial symptoms or conditions (Brown et al., 2011; Chapman, 2005). Through the evaluation of the literature, the operational definition stated by Shultz & Edington is straightforward, established and applicable to the current study. Presenteeism is operationally defined as decreased on-the-job performance due to the presence of health problems.

Presenteeism at work can negatively impact a company’s output, including profit margins and service quality (Chapman, 2005; Dursi, 2008; Lack, 2011). The Society for Human Resources projected the cost of presenteeism to be over $180 billion dollars in 2009, surpassing absenteeism, estimated to cost nearly $118 billion dollars per year (Callen et al., 2013; Chenoweth, 2011). Given the rising cost of healthcare, it can be assumed that these figures are currently even higher. The monetary loss associated with reduced productivity necessitates a collaborative effort between employers and health promotion practitioners to develop strategies to reduce the prevalence of presenteeism while concurrently increasing health and productivity in the workplace. These efforts should be focused on both environmental and personal factors which are believed to foster presenteeism (Chen et al., 2015; Coutu et al., 2015).
Presenteeism and work environment. Both physical and psychosocial stressors of the work environment can stimulate the stress response (Almadi et al., 2013; Maglione-Garves et al., 2005). According to the American Psychological Association approximately 70% of Americans report that they experience physical (69%) or non-physical (67%) symptoms of stress. The understanding of environmental factors which increase both physical and psychosocial stress and fosters presenteeism is captured through both quantitative and qualitative studies. Through a mixed methods study, Liu et al (2008) found that employees were most commonly affected by the following environmental factors: organizational constraints such as “technology” and “lack of training”; work load pertaining to “deadlines” and “covering for other employees”; interpersonal conflict between “co-workers” or “management”; and lack of autonomy resulting in “frustration” or “anger”. These items are mirrored in a mixed methods review by Mazzola et al (2011). Mazzola et al (2011) also found that organizational constraints, work overload and interpersonal conflict are environmental factors which result in the highest stress levels among employees. Given the congruencies of these studies, organizational constraints, work overload and interpersonal conflict are environmental factors which increase stress and the potential for presenteeism in the workplace.

Within the developing research focusing on presenteeism, a handful of studies have investigated the environmental factors which contribute to the complex phenomenon (Coutu et al., 2015; Dew, Keefe, & Small, 2005; Krohne & Magnussen, 2011). Specific examples of environmental factors which may apply include: high turnover, low resources, economic loss as a result of sickness, and lack of control over
tasks and decisions. While the quantitative methods provide specific examples, qualitative studies extract patterns and themes to describe the essence of why employees come to work even when productivity is impacted (Creswell, 2013; Dew et al., 2005; Krohne & Magnussen, 2011). For example, Dew et al (2005), found that the work environment provides a safe place for some; while on the other hand, some extreme environments introduce an “intolerable burden”. The authors argue that in many cases presenteeism is shaped by social, political, and economic pressures and not an employee “choice”.

Three diverse settings illustrate reasons for showing up to work when ill: perceived responsibility to “family” or team; professional/organizational expectations; and financial need (Dew et al., 2005). Krohne (2011) builds on the theme of “family” through focus groups with offshore workers. Similar to those in Dew et al (2005), Krohne (2011) concludes that a main cause of presenteeism is team loyalty. Additionally, Krohne (2011) found that social norms of the team, attitudes of supervisors, and the level to which the policy is implemented are the most influential environmental contributors to presenteeism.

With proper awareness and intervention, workers and organizations have the ability to mitigate preventable environmental stressors and conditions to reduce stress and presenteeism in the workplace (Mazzola et al., 2011). Although the findings of Coutu, Dew, and Krohne lack external validity and cannot be generalized to the population as a whole, these studies illustrate the diversity and complexity of presenteeism. The use of mixed methodology provides an insight into the environmental aspects which foster
presenteeism (Coutu et al., 2015; Dew et al., 2005; Krohne & Magnussen, 2011; Lu, Chang, & Lai, 2011).

**Presenteeism and health.** In addition to environmental factors, research has shown that several health conditions and risk factors increase presenteeism at work. Through a systematic review, Schultz & Edington (2007) identified many conditions associated with increased presenteeism. Shultz found that the bulk of presenteeism studies focus on health conditions such as diabetes, depression, and arthritis and their association with productivity loss at work. Other conditions that affect presenteeism include: allergies, chronic pain, gastrointestinal conditions, and musculoskeletal problems (Callen et al., 2013; Coutu et al., 2015).

Table 1 is from Society for Human Resources (SHRM) and illustrates the percent of work lost due to the top health conditions of organizations.

Table 1

<table>
<thead>
<tr>
<th>Risk Condition</th>
<th>Absenteeism</th>
<th>Presenteeism*</th>
<th>Total %</th>
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<tr>
<td>Diabetes mellitus</td>
<td>4.94%</td>
<td>18.28%</td>
<td>23.20%</td>
</tr>
<tr>
<td>Depression</td>
<td>2.61%</td>
<td>14.51%</td>
<td>17.12%</td>
</tr>
<tr>
<td>Alcohol abuse</td>
<td>5.00%</td>
<td>4.78%</td>
<td>9.78%</td>
</tr>
<tr>
<td>Overweight/obesity</td>
<td>1.40%</td>
<td>8.30%</td>
<td>9.70%</td>
</tr>
<tr>
<td>High cholesterol</td>
<td>3.14%</td>
<td>4.91%</td>
<td>8.05%</td>
</tr>
<tr>
<td>Cigarette smoking</td>
<td>2.84%</td>
<td>4.78%</td>
<td>7.62%</td>
</tr>
<tr>
<td>High stress</td>
<td>3.08%</td>
<td>4.45%</td>
<td>7.53%</td>
</tr>
<tr>
<td>Arthritis</td>
<td>2.36%</td>
<td>4.30%</td>
<td>6.75%</td>
</tr>
<tr>
<td>High blood pressure</td>
<td>0.37%</td>
<td>5.70%</td>
<td>6.07%</td>
</tr>
<tr>
<td>Asthma</td>
<td>4.80%</td>
<td>1.20%</td>
<td>6.00%</td>
</tr>
<tr>
<td>Migraine</td>
<td>3.96%</td>
<td>1.99%</td>
<td>5.95%</td>
</tr>
<tr>
<td>Physical inactivity</td>
<td>0.28%</td>
<td>4.59%</td>
<td>4.87%</td>
</tr>
</tbody>
</table>

Note. From Promoting Health and Wellbeing by D. Chenoweth, 2011, SHRM, p.4.

Emerging evidence that stress, chronic disease and presenteeism are highly correlated (Callen et al., 2013; Chenoweth, 2011; Coutu et al., 2015; Kilpatrick et al., 2014; Schultz & Edington, 2007) suggests the implementation of low cost Workplace
Wellness Programs (WWP) to reduce stress, increase health, and grow employee and company productivity (Brown et al., 2011; Brown, Ryde, Gilson, Burton, & Brown, 2013; Callen et al., 2013; Chapman, 2005; Chen et al., 2015; Dursi, 2008; Kilpatrick et al., 2014; Mandiracioglu et al., 2015; Mazzola et al., 2011; Schultz & Edington, 2007; Sohail, 2015).

Chenoweth’s findings illustrate the minor impact physical inactivity plays on workload lost due to absenteeism (.28%). However, the annual percent of workload lost due to presenteeism as a result of physical inactivity significantly increases (4.58%). Sedentary worksites and lack of employee physical activity are known to promulgate risk and exacerbate the high ranking and expensive health condition such as: diabetes, depression, obesity, high blood pressure, and stress (Chenoweth, 2011; Schultz & Edington, 2007). The link between sedentary work environments, chronic disease and presenteeism merits further research on the possible preventative relationship between physical activity and presenteeism in the workplace. (Brown et al., 2011; Brown et al., 2013; Guertler et al., 2015; Kilpatrick et al., 2014; Schultz & Edington, 2007).

**Proposed Research**

Research has shown that physical activity can improve many facets of physical and mental health, increase individual well-being, and reduce stress (WHO, 2015). In a systematic review conducted by Brown et al (2011), encouraging yet limited findings link physical activity and presenteeism. Shultz and Edington (2007) reveal a dearth of research relating physical activity and presenteeism, especially with the ample research linking health care costs and the need for physical activity interventions. Furthermore,
Callen et al (2013), found inconsistent findings when examining physical activity and presenteeism.

Given these discrepancies, the purpose of this study is to examine the relationship between physical activity and presenteeism. Empirical evidence supports the many mental and physical health benefits of regular physical activity and identifies physical activity as a key component to overall health and well-being (WHO, 2015). Physical activity has been linked to lower stress levels, increased cardiovascular health, a stronger musculoskeletal system, and a reduced prevalence of disease (WHO, 2015). The American College of Sports Medicine (ACSM) recommends that adults engage in at least 30 minutes of moderate physical activity 5 days per week, or 20 minutes of vigorous physical activity 3 days per week (Haskell et al., 2007). It is hypothesized that individuals who meet the ACSM recommendations will have lower stress and reduced presenteeism resulting in an increase in productivity while at work.

In efforts to understand the complex and dynamic relationship between physical activity and presenteeism, both qualitative and quantitative methods were used in the current study. The concurrent mixed methods approach allows the weaknesses of one methodology to be balanced by the strengths of the other (Morse, 2015). The lived experiences of participants combine with objective statistical findings from this study could have powerful implications for both the health and well-being of employees and organizations alike.
Participants

Participants of the current study included University employees: executives (n=9), faculty (n=7), and staff (n=15). The sample consisted of 10 males with a mean age of 46.4±11.9 and 21 females with a mean age of 50.7±10.3. The participants participated in a variety of physical activities with 179.77 ± 151.87 of vigorous physical activity minutes recorded per week, 164.64 ± 87.0 minutes of walking per week, and 7.1 ± 2.64 hours of sitting per day. This employee sample that elected to participate in the student-led program and the current study can be described as a middle-aged “worried well” population (Cooper & Cartwright, 1997). The “worried well” are individuals who are looking to improve their health and more likely to participate in an implemented worksite wellness program. This sample attempted to capture the voices of middle-aged adults who make up a large percentage of the current work force, but are often overlooked and understudied (Martin, Grünendahl, & Martin, 2001).

The inclusion criteria included UCCS employees who participated in student-led personal training sessions organized through the HSCI 4950 Exercise Testing and Prescription course. A total of 31 (21.5%) employees agreed to participate in the current study from a possible 144 employees who met inclusion criteria. A total of 179 employees participated in the student led personal training program over the last 4 years;
however, thirty-five have since left the University and no longer met the inclusion criteria.

It was speculated that the recruitment timeframe of the current study contributed to the low participation. Initial recruitment emails were sent one week prior the end of the fall semester. Likely, many of the University employees were not checking email over the school break. In addition, the first round of focus groups were conducted in the first two weeks of January when executive and staff employees, but few faculty employees are on campus. The second round of focus groups were held the second week of the spring semester which may also have made it difficult for employees, especially faculty, to make time for a 1 hour session. All communication was done via email. Phone calls and office visits may have resulted in a higher participation rate and should be taken into consideration for future studies.

Approval from UCCS Institutional Review Board (IRB) has been obtained for consent procedures and research under the Feasibility and Benefits of and Intake and Assessment-driven Programming Model for Center for Active Living (CAL) end users (#14-055).

Design

The relationship between physical activity and presenteeism was sought through a convenient and concurrent mixed methods methodological approach (Figure 2). Mazzola et al (2011) states it is prudent for future researchers to use mixed methodology. The use of both qualitative and quantitative methods creates dynamic data so that weaknesses of one approach are balanced by the strengths of the other. Furthermore, a mixed method approach has been cited to provide multiple ways to look at a complex topic and should
be used in future health research (Mendlinger & Cwikel, 2008; Morse, 2015). Given the complexity and multifaceted nature of presenteeism and physical activity, both qualitative and quantitative methods were used. The independent and combine analysis of the qualitative and quantitative findings (Figure 2) was used to examine the relationship between physical activity and presenteeism with a holistic and integrative approach (Brown et al., 2011; Callen et al., 2013; Lack, 2011; Mendlinger & Cwikel, 2008; Schultz & Edington, 2007).

![Figure 2. Concurrent Mixed Methods Flow Chart demonstrating the design of the current study.](image)

**Qualitative methods.** Focus groups evoke an evolution of perception in a social context (Patten, 2009). Furthermore, Cyr (2015) conveys that focus groups are underutilized and useful to explore and understand complex concepts. Therefore, focus groups were utilized in this study to gain group consensus on the complex concept of
presenteeism in a social context. The social context enabled a diverse range of lived experiences to be heard, and concurrently served as a health promotion opportunity to increase the awareness of presenteeism on the UCCS campus (Way, Kanak Zwier, & Tracy, 2015).

A total of nine semi-structured focus groups were held to explore the relationship between physical activity and presenteeism in the workplace. The sessions lasted between 36-52 minutes each and ranged from two to five participants per session. The lead researcher facilitated the focus groups and was cognizant of ethical issues such as avoiding power imbalances between facilitator and participants and moderating the sessions to avoid “group think” (Creswell, 2013). To increase inner-rater reliability and trustworthiness of the data the lead researcher was accompanied by a trained graduate student who took notes and observed interaction of participants. Morse (2015) identifies inter-rater reliability as a major strategy to ensure reliability of the data and is achieved through congruent findings between researchers.

Qualitative research is an iterative process (Creswell, 2013); therefore, pilot testing of focus group questions was performed prior to the formal study to generate data, potential codes, and emerging themes to prepare researchers for the final analysis process (Creswell, 2013). These sessions resulted in the refinement of question context, organization, and number while also providing insight into biases and assumptions of the lead researcher.

**Quantitative methods.** Research calls for studies which use validated measures to better define presenteeism in the literature (Brown et al., 2011; Chapman, 2005; Schultz & Edington, 2007). Thus, the current study employed three validated measures to
examine the relationship and quantify physical activity, stress and presenteeism of the current population: IPAQ short-form (Haskell et al., 2007), Perceived Stress Survey (Cohen et al., 1983), and the Stanford Presenteeism Scale (Koopman et al., 2002).

The one hour session began with the completion of the detailed consent form by participants, followed by participation in focus group discussion, and ended with the administration of the three questionnaires. Literature supporting quantitative measures immediately following focus group sessions was not identified. However, through conversation with qualitative experts, it was advised to give questionnaires following the discussion to yield informed and thoughtful data, since the phenomenon of presenteeism is not well understood.

**Physical activity and general health questionnaire** (Appendix A). The general health questionnaire assessed demographics of the population, self-reported health and chronic conditions of participants, as well as current physical activity using the IPAQ short-form and other validated health behavior questions. This questionnaire is used as the initial intake form for the Center for Active Living (CAL). CAL is an entity focused on physical activity as a part of a larger integrative health center on the UCCS campus and this research will add value and dimension to the integrated health model used by CAL to promote healthy living.

**Perceived Stress Scale** (Appendix B). The Perceived Stress Scale (PSS) is a validated and reliable measure used with a variety of populations to assess the degree to which individuals perceive their lives as stressful (Cohen et al., 1983). The 14 question questionnaire captures how often participants have believed their lives to be unpredictable, uncontrollable, and overloaded in the past month (Cohen et al., 1983).
Scoring for the PSS is obtained by summing of all 14 items. Scores must be reversed on items: 4,5,6,7,9,10 and 13 since these seven items are framed in positive terms. Answers range from “never” to “very often” with three additional answer choices “almost never”, “sometimes”, and “almost always”. Total PSS scores range from 0 (low stress) to 56 (extreme stress). High stress values have been associated with reduced health and a decreased ability to change behavior. For example, lower scores have been associated with an increased risk for the common cold and failure to quit smoking (Cohen et al., 1983). Normative values for PSS-14 are not well published; therefore, the current study followed recommendations of Andreou et al., 2011 as seen in Table 2.

Table 2

<table>
<thead>
<tr>
<th>Perceived Stress Scale -14 Normality Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
</tr>
<tr>
<td>&lt;21.44</td>
</tr>
</tbody>
</table>

*Stanford Presenteeism Scale* (Appendix C). The Stanford Presenteeism Scale (SPS) is a 6 question likert scale questionnaire measuring the workers ability to concentrate and accomplish tasks despite their health condition (Koopman et al., 2002). This scale was selected given the brevity and recognized validity identified by Koopman (2002), Mandiracioglu et al (2015); Isetti & Meyer (2014). Responses to the questions range from “strongly disagree” to “strongly agree” with “strongly disagree”, “uncertain”, and “strongly agree” in between. Koopman et al (2002), also establishes that the SPS-6 has a high psychometric rating indicating that it holds validity as a tool to assess worker health and productivity.
Presenteeism on the SPS is scored based on sums of positive questions 2, 5, 6 and reverse responses from questions 1, 3, and 4. The scores range from 6-30 total points. A higher score on the SPS-6 translates to a higher ability to concentrate and accomplish work despite a health condition. Similarly, a lower presenteeism score indicates a reduced ability to concentrate and accomplish tasks. Normative baseline values in Appendix D have been adapted from a more descriptive chart from Koopman (2002). The following values will help to define normative data and set a foundation for analysis understanding.
CHAPTER 4

RESULTS

Qualitative Analysis

Moustakas (1994) “phenomenological reduction” was used to understand the common meaning of the participants reporting of physical activity and its relationship to productivity. Verbatim transcripts of focus groups were transcribed, read and re-read several times to gain familiarity with the participants’ lived experience. Recurring trends and patterns of the phenomenon were identified and descriptive significant statements were extracted from the transcripts.

Moustakas (1994) concept of “horizontalization” was used to formulate meaning from the significant statements and code words. From here, the coded patterns and meanings were clustered into themes to reveal the relationship between physical activity and presenteeism. As codes, themes, and significant statements were identified, ideas were discussed among researchers to ensure trustworthiness of the data and check that researcher biases on the topic were suspended. Inter-rater reliably and suspension of researcher bias are key elements to the analysis of qualitative data (Creswell, 2013; Morse, 2015; Way et al., 2015). The visual data display (Figure 3) provides significant statements of the participants and the three themes which emerged through Moustaka’s (1994) “phenomenological reduction”.

<table>
<thead>
<tr>
<th>Themes</th>
<th>Significant Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pathways to Problem Solving</td>
<td>• “I am more creative when I work out regularly.”</td>
</tr>
<tr>
<td></td>
<td>• “I would say that I do notice on the days that I workout, there’s that efficiency that just drives me.”</td>
</tr>
<tr>
<td></td>
<td>• “There is a lot of thinking time. I find that I solve a lot of problems during the workouts.”</td>
</tr>
<tr>
<td>Agency to Buffer Stress</td>
<td>• “I can tell when there’s a week maybe that I haven’t exercised as much, my stress levels are definitely higher.”</td>
</tr>
<tr>
<td></td>
<td>• “For me, physical activity is a buffer. I have got to keep doing that so I can stay up.”</td>
</tr>
<tr>
<td></td>
<td>• “Stepping away sometimes gives you a fresh start and you say, “I will try this since I’m invigorated.”</td>
</tr>
<tr>
<td>Goals to Health &amp; Wellbeing</td>
<td>• “You just feel better, stronger. You have a more positive attitude.”</td>
</tr>
<tr>
<td></td>
<td>• “The activity piece just really helped. It was almost like taking an antidepressant.”</td>
</tr>
<tr>
<td></td>
<td>• I’ve spent so many years not being able to be physically active, it’s a gift!”</td>
</tr>
</tbody>
</table>

*Figure 3.* Visual data display of qualitative themes

The next step in this phenomenological data analysis is to describe the essence or meaning of physical activity and productivity to the sample population (Creswell, 2013). The essence of the participants’ experience is achieved through understanding “what” these employees experienced and “how” they experienced it (Moustakas, 1994). Recurring patterns and concepts of the current population are summarized in the
following structural and textural composites. The structural composite description provides insight into what constitutes physical activity for the cohort. The textural composite illustrates similarities in the participants experience when describing the role physical activity plays in their levels of productivity at work and the greater meaning which is associated with their movement. Finally, the structural and textural elements have been integrated and distilled to reveal the essence of physical activity and productivity among this sample of University employees.

**Structural description.** For many in this cohort, physical activity “could be anything -- walking, riding, working out.” Any kind of movement increased their productivity in the workplace. Others had never thought about the relationship between physical activity and productivity before. They did say, however, that they “always feel better” when they “get a structured workout in.” Structured workouts consisted primarily of walking, hiking, strength training, biking, and yoga; performed prior to or after their work day. The accountability associated with the student-led training sessions was a strong motivator to engage in structured exercise.

In addition to structured exercise, a majority of the participants indicated that spontaneous movement throughout the day was important as well to increase their focus and concentration. “Just getting up and moving around” helped a lot. “Going, going, going” “getting stuck in the spreadsheets” all day long was dulling until finally, “a step away” was made “and it (was) like - oh, okay.”

Recurring workplace stressors were viewed as barriers to wellness. Lack of time to accomplish tasks, scheduled meetings, distractions by phone and email, as well as
showering after exercise were identified as the most significant barriers to performing structured physical activity during the work day. At the same time, these same stressors and distractions were identified as catalysts for conscious, sporadic movement.

**Textural description.** References to physical activity as being “invigorating” or “energizing” were common as were descriptions of physical activity being “calming” or “refreshing”. Although different viewpoints were expressed, the majority of participants had the common experience and therefore expected outcome of “feeling good” after moving. These valued experiences and outcomes of physical activity provided motivation for participants to self-manage and adapt to the work environment by “putting movement into” their day.

In addition to short term rewards of “feeling good” and/or “better”, many participants discussed a shift in perception about engaging in regular physical activity. For example, one participant started out the program saying, “I hate to run. It’s punishment...” and now she has “started jogging.” These shifts indicate an increase in awareness which helps to facilitate and develop a deeper purpose and meaning to physical activity engagement. Furthermore, the participants expressed how movement helped them “adapt to potentially stressful situations” and increase productivity during the workday.

**Essence of physical activity.** Through the support and framework offered by the student-led program, most participants identified both structured and spontaneous movement as strategies to obtain perceived outcome expectancies of physical activity. The perceived physical and mental benefits resulting from physical activity were linked
to increased productivity while at work. According to Kretchmar (2000), meaning can be viewed as the offspring of participants’ commitment which helps to grow intrinsic motivation. The shift in perception and creation of intrinsic motivation gained through their supported experience has allowed these individuals to increase their pathways and motivational energy to perform physical activity.

The majority of these individuals are currently physically active in some capacity; however, they acknowledge that their “sessions” and “intensities” ebb and flow with the seasons or “semesters cycles”. Greater body awareness in the participants has transcended through their supported physical activity intervention. These employees have generated a deeper meaning and awareness to the physiological “release (of) tension”, “better sleep”, and “increased stamina”. Moreover, these participants have identified pathways to use movement to balance the effects of their environment or mental tension to increase productivity while at work.

The mindfulness to use physical stress to counterbalance the effects of mental or emotional stress has resonated and created a salient meaning for performing physical activity to increase productivity for many of the participants. “My best productive day starts with some physical activity.” Through the lived experiences of these participants the essence of physical activity is to balance the physical, mental, and emotional aspect of well-being, resulting in an increase in productivity while at work. Furthermore, physical activity is used as a balancing agent for these employees to consciously help control the ebbs and flows of their day which enable them to be more present while at work. The lived experiences of these employees showcase the power of intrinsic motivation, gratitude and meaning with regards to physical activity and productivity. In essence,
these employees consciously and effectively use physical activity as a balancing agent and pathway to increase their productivity and reduce presenteeism in the workplace.

Figure 4. A “phenomenological reduction” of the qualitative data.

Quantitative Data

Data cleaning. All statistical analyses were performed using SPSS v. 23 (Aromonk, NY:IBM Corp) following an initial analysis of qualitative data. Frequency and descriptive statistics were run to screen the data for inconsistencies and outliers. The skewness, kurtosis, and internal consistencies were also calculated. Normality was assessed for all continuous variables using the Shapiro Wilks test, visual inspection of histograms and Q-Q plots, comparison of mean and median values, and box plots. The Perceived Stress Scale and Stanford presenteeism Scale were both identified to be normally distributed. Average minutes of vigorous physical activity and walking were not
normally distributed. These variables were transformed into categorical variables using the IPAQ-short form guidelines (Appendix E).

**Statistical analysis.** Descriptive statistics were performed to gather demographic and lifestyle responses and ensure validity of the data. Combinations of parametric and non-parametric statistics were run to describe the relationship between physical activity and presenteeism. Parametric statistics included correlation to identify the relationship between the Perceived Stress Scale (PSS) and Stanford Presenteeism Scale (SPS). Given the skew and kurtosis of the data, non-parametric tests including Mann-Whitney U and Kruskall-Wallis tests were used to identify differences among various independent variables. Furthermore, median comparisons were run on the data to provide more accurate scores for perceived stress and presenteeism.

**Results**

A total of 144 individuals were invited to participate in the current study. Thirty-one employees of the 144 participated in both the qualitative and quantitative aspects, yielding a participation rate of 21.5%. Table 3 presents the frequencies n (%) of employee demographics as well as the mean ± standard deviation of PSS and SPS scores. The population was predominately Caucasian and female. The age of participants ranged from 29-66 years of age and these individuals have worked at the University between 6 months to 31.5 years. To better assess relationships between variables, employee type and years in position were transformed into categorical variables using equal percentile cut points. In addition to demographic information, Table 4 displays the cohort’s physical activity behavior and general health characteristic.
Table 3

Demographic Descriptive Characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>( n ) (%)</th>
<th>PSS (mean±SD)</th>
<th>SPS (mean±SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender(^1)</td>
<td>Male</td>
<td>10(32.3)</td>
<td>16.9±6.8</td>
<td>24.0±3.9</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>21(67.7)</td>
<td>18.2±7.3</td>
<td>23.5±5.3</td>
</tr>
<tr>
<td>Age(^2)</td>
<td>29-45 years</td>
<td>12(38.7)</td>
<td>20.3±6.7</td>
<td>22.3±4.9</td>
</tr>
<tr>
<td></td>
<td>46-55 years</td>
<td>9(29.0)</td>
<td>16.7±7.7</td>
<td>23.6±4.9</td>
</tr>
<tr>
<td></td>
<td>56+ years</td>
<td>10(32.3)</td>
<td>17.1±6.7</td>
<td>25.8±4.2</td>
</tr>
<tr>
<td>Ethnicity(^2)</td>
<td>White</td>
<td>27(87.1)</td>
<td>18.6±7.2</td>
<td>23.2±4.8</td>
</tr>
<tr>
<td></td>
<td>Hispanic</td>
<td>2(6.5)</td>
<td>19.0±7.1</td>
<td>26.0±5.6</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>2(6.5)</td>
<td>12.5±4.9</td>
<td>28.0±2.8</td>
</tr>
<tr>
<td>Employee Type(^2)</td>
<td>Executive</td>
<td>9(29.0)</td>
<td>18.3±6.2</td>
<td>22.4±4.5</td>
</tr>
<tr>
<td></td>
<td>Faculty/Instructor</td>
<td>7(22.6)</td>
<td>16.9±7.9</td>
<td>26.3±4.3</td>
</tr>
<tr>
<td></td>
<td>Staff</td>
<td>15(48.4)</td>
<td>18.7±7.5</td>
<td>23.4±5.0</td>
</tr>
<tr>
<td>Years in Position(^2)</td>
<td>&lt;=3.5 years</td>
<td>11(35.5)</td>
<td>18.5±6.8</td>
<td>23.1±4.1</td>
</tr>
<tr>
<td></td>
<td>3.6-6.0 years</td>
<td>10(32.3)</td>
<td>18.0±8.4</td>
<td>25.7±4.5</td>
</tr>
<tr>
<td></td>
<td>6.1+ years</td>
<td>10(32.3)</td>
<td>18.0±8.4</td>
<td>22.2±4.8</td>
</tr>
</tbody>
</table>

\(^1\)Mann-Whitney U Test  
\(^2\)Kruskal-Wallis Test  
*Significance <0.05  
**Significance ≤0.001
<table>
<thead>
<tr>
<th>Lifestyle Category</th>
<th>Description</th>
<th>n (%)</th>
<th>PSS (mean+SD)</th>
<th>SPS (mean+SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Physical Activity</td>
<td>Engaging</td>
<td>19(61.3)</td>
<td>16.1+8.1</td>
<td>23.6+5.5</td>
</tr>
<tr>
<td></td>
<td>Thinking about it</td>
<td>12(38.7)</td>
<td>21.5+3.1</td>
<td>23.8+3.8</td>
</tr>
<tr>
<td>ACSM Vigorous Physical Activity</td>
<td>&lt;149 min per wk</td>
<td>16(51.6)</td>
<td>20.5+5.4</td>
<td>24.1+3.5</td>
</tr>
<tr>
<td></td>
<td>&gt; 150 min per week</td>
<td>15(48.4)</td>
<td>15.7+7.9</td>
<td>23.3+5.9</td>
</tr>
<tr>
<td>IPAQ</td>
<td>Insufficiently Active</td>
<td>6(19.4)</td>
<td>21.6+4.8</td>
<td>22.6+5.1</td>
</tr>
<tr>
<td>Classification</td>
<td>Minimally Active</td>
<td>13(41.9)</td>
<td>20.1+6.1</td>
<td>24.2+3.6</td>
</tr>
<tr>
<td></td>
<td>Health Enhancing PA</td>
<td>13(41.9)</td>
<td>15.0+7.7</td>
<td>23.7+4.8</td>
</tr>
<tr>
<td>Perceived Health</td>
<td>High Perceived Health</td>
<td>18(58.1)</td>
<td>15.1+6.7</td>
<td>25.6+4.3</td>
</tr>
<tr>
<td>Health</td>
<td>Low Perceived Health</td>
<td>13(41.9)</td>
<td>22.5+5.1</td>
<td>21.2+4.5</td>
</tr>
<tr>
<td>Health Conditions</td>
<td>0-1 Condition</td>
<td>20(64.5)</td>
<td>16.9+7.3</td>
<td>24.2+4.8</td>
</tr>
<tr>
<td></td>
<td>(Self-Reported)</td>
<td>11(35.5)</td>
<td>20.6+6.1</td>
<td>22.9+4.5</td>
</tr>
</tbody>
</table>

1 Mann-Whitney U Test
2 Kruskal-Wallis Test
*Significance \( \leq 0.05 \)
**Significance \( \leq .001 \)
General trends and patterns within the lifestyle characteristics can be seen in Table 4. The relationship between perceived stress and presenteeism was investigated using the Pearson product-moment correlation coefficient since data were normally distributed. There was a strong negative correlation between the two variables ($r= -0.607$, $p=0.001$), with high levels of stress associated with lower ability levels to concentrate and accomplish tasks due to a health condition.

Two statistically significant differences between groups were identified (Table 4). The first significant difference seen was between the PSS scores of current physical activity level groups, and the second statistical significance was found in the PSS and SPS scores of participants’ perceived health. There was a statistically significant difference in perceived stress levels of those employees who identified as being regularly physically active when compared to those employees who are thinking about becoming regularly physically (16.1±8.1 vs. 21.5±3.1, $p= .018$). No significance was found between groups when comparing presenteeism. In addition, statistical significance was found in both perceived stress and presenteeism scores when comparing participants with high perceived health and those with low perceived health. Those individuals who self-reported their health as “very good” or “excellent” had significantly lower perceived stress than the participants who perceived their health as “good” or “fair” (15.1±6.7 vs. 22.5±5.1, $p=.003$). Additionally, high perceived health employees displayed a significantly greater capacity to focus and perform tasks despite a mental or physical health condition when compared to those who self reported as less healthy according the SPS (25.6±4.3 vs.21.2±4.5, $p=.016$).
Although a significant difference was not found between the three classified IPAQ categories or the ACSM standards for vigorous physical activity, a trend emerged which demonstrated that as physical activity (level or minutes) increased an individual’s perceived stress decreased. These results are consistent with the qualitative findings of this study and other quantitative research demonstrating the buffering effect of physical activity on stress (Brown et al., 2011; Callen et al., 2013; Sarbadhikari & Saha, 2006; Sliter, Sinclair, Cheung, & McFadden, 2014).

Table 4 also illustrates no significant difference between PSS or SPS scores in those employees who reported 0-1 health conditions when compared to those who had 2+ health conditions. However, those who reported 0-1 health conditions appear to be less stressed and have a greater capacity to accomplish tasks and remain focused despite their health condition. Stress/anxiety was reported as the top health concern by the participants of the current study. The prevalence of health conditions and respective PSS and SPS scores of the current population are seen in Figure 5 and Table 5.

Figure 5. Prevalence of employee health conditions in the current study.
Table 5

*Self-Reported Health, Perceived Stress and Presenteeism*

<table>
<thead>
<tr>
<th>Self-Reported Health Condition</th>
<th>n (%)</th>
<th>PSS (mean±SD)</th>
<th>SPS (mean±SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arthritis</td>
<td>5(16)</td>
<td>15.0±6.0</td>
<td>24.8±4.5</td>
</tr>
<tr>
<td>Anxiety/Stress</td>
<td>11(35.4)</td>
<td>20.1±9.4</td>
<td>23.4±4.3</td>
</tr>
<tr>
<td>Depression</td>
<td>5(16.1)</td>
<td>24.4±6.8</td>
<td>19.4±5.1</td>
</tr>
<tr>
<td>Pain</td>
<td>3(9.7)</td>
<td>21.0±2.6</td>
<td>19.0±6.1</td>
</tr>
<tr>
<td>Poor Sleep</td>
<td>7(22.6)</td>
<td>18.4±4.4</td>
<td>21.4±5.3</td>
</tr>
<tr>
<td>Weight Gain</td>
<td>8(25.8)</td>
<td>20.4±8.3</td>
<td>24.0±4.4</td>
</tr>
</tbody>
</table>

Using normality values of Andreou et al (2001), depression was the only health condition which has a PSS score above normal (24.4±6.8). The remaining health conditions, including stress/anxiety, reported by the employees were below the normal PSS scores. These below normal perceived stress scores reinforce the identification of this population as the “worried well”.

*Figure 6. Types of physical activities utilized by participants.*
Figure 7. The participant’s perceptions of physical activity.

Figure 6 visual displays the most popular activities among employees in the current study. All of the employees use walking as type of physical activity (100%). Additionally, 87% of employees reported participating in two or more types of physical activity. These values demonstrate that this population is physically active in at least one type of physical activity. Furthermore, Figure 7 illustrates the population’s perceptions of physical activity. All participants (100%) believe physical activity makes them feel physically better. “Feeling better” was also continuously alluded to by participants in the qualitative portion of the current study. Although the majority of the sample is physically active, only 73% enjoy the act of physical activity.

The results provide insight into the relationship between physical activity, stress and presenteeism. Self-reported perceptions of physical activity engagement and perceived health produced significant differences when comparing the groups perceived stress. Presenteeism had the most significant difference when examining those employees with high perceived health and those with low perceived health. Although significant findings were not found when comparing vigorous physical activity minutes or IPAQ
physical activity level, an obvious pattern revealed that those employees with higher amounts of physical activity had lower stress levels than those employee who reported lower physical activity engagement. These findings illustrate both the mental and physical components at play when examining the relationship between physical activity, stress and presenteeism.
CHAPTER 5
DISCUSSION

The purpose of the current study was to explore the relationship between physical activity and presenteeism in the workplace. Both the qualitative and quantitative results revealed physical and mental components informing the relationship between physical activity productivity. However, the true essence and understanding of the complex relationship was identified through the application of Hope Theory (Snyder, Feldman, Taylor, Schroeder, & Adams, 2000) as a theoretical lens to interpret the quantitative and qualitative components. Through detailed analysis of qualitative and quantitative data and the application of Hope Theory, the current study found that physical activity acts as a balancing agent to increase pathways to problem solving, develops agency to buffer stress, and enhances the ability to achieve and sustain iterative goals of health and wellbeing.

Hope Theory and Physical Activity

Hope is defined as “a positive motivational state that is based on an interactively derived sense of successful (1) agency (goal-directed energy), and (2) pathways (planning to meet goals)” (Snyder, Irving, & Anderson 1919, p287). Initially, the qualitative data was collected a priori in order to rely as much as possible on the participants’ views (Creswell, 2013). However, after in-depth analysis, parallels were evident between physical activity, productivity and three main constructs of Hope Theory: pathways, agency and goal setting. Attainable, yet challenging goals either help
to develop or are generated from an individual’s identified pathways and perceived sense of agency. These elements of Hope Theory are dynamic and iterative in nature which is congruent with the reported ebbs and flow of physical activity among the participants of this study. Moreover, the use of the cognitively based Hope Theory highlights the necessary balance of mental and physical components of physical activity which lead to increase in productivity at work.

Given the dynamic balance between physical and mental aspects of physical activity and productivity, Hope Theory provides an appropriate theoretical lens to describe the relationship between physical activity and presenteeism. The current study shows that physical activity increases productivity in the workplace through the development of (1.) increased pathways to problem solving, (2.) enhanced agency to cope with stress, and (3.) the achievement of sustainable goals in health and wellbeing.

**Pathways to Problem Solving**

In the current study, physical activity appears to act as a pathway to increase problem solving through the achievement of mental clarity while also providing an opportunity for employees to actively problem solve without distractions in the workplace. Pathway thinking is defined as an individual’s ability to develop viable routes to achieve a desired goal(s) (Snyder & Lopez, 2005). High hope individuals have been recognized as especially effective in reaching desired goals through an increase in realistic pathways.

The quantitative results show that 93% of the employees agree that physical activity increases their mental clarity. Moreover, employees alluded to feelings of “mental freshness” and their ability to “re-focus” when regularly performing physical
activity. Coupled together, the quantitative and qualitative findings of the current study reveal physical activity as varied and viable pathways to problem solving through mental clarity. Physical activity as a pathway to problem solving is supported through physiological research (Sarbadhikari & Saha, 2006). The empirical research demonstrates that physical activity can enhance time management skills and the ability to concentrate (Colcombe et al., 2004) as a result of additional blood flow to the prefrontal cortex and parietal cortices. Furthermore, regular physical activity increases the size of the hippocampus which improves memory, mood, and autonomic function. These physiological shifts support the employees reported outcomes in describing their ability to be more present and productive in the workplace when regularly performing physical activity.

Agency to Buffer Stress

Through the development of pathways, individuals create agency. Agency is defined as motivational energy resulting from the perceived capacity to use pathways to obtain goals (Snyder et al., 2000). Through the structure and support of the student-led exercise program, employees acknowledged a shift in awareness and confidence throughout the process, especially when circumventing and buffering work stress. The participants’ frequently described the impact both regular physical activity and spontaneous movement, such as quick walks around the building, had on their ability to mitigate stress and increase their productivity while at work. The perceived outcomes of both structured and spontaneous physical activity increase the agency and likelihood of the employees to participate in movement based activities to reduce stress and increase productivity in the workplace.
The current population averaged $18.9 \pm 7.0$ on the PSS which is considered to be a low stress population when compared to Andreou et al., 2011 ratings. However, a significant difference and inverse relationship was found in PSS scores when comparing individuals who have been engaged in regular physical activity (defined as performing 150 minutes of physical activity per week for the last 6 months) and those who are thinking about or prepared to become regularly physical activity. The significant difference between these two groups of physically active individuals demonstrates how regular physical activity, no matter what type as heard in the qualitative results, can act as a buffer to work stress.

These results are supported by additional research. Individuals who are regularly physically active, such as the current sample, have a higher level of intrinsic motivation to perform an activity. Moreover, intrinsically motivated individuals obtain an increased sense of agency and are more likely to identify and utilize physical activity as an avenue to cope with a stressful situation (Kilpatrick, Hebert, & Jacobsen, 2002; Kretchmar, 2000). Furthermore, physiological research shows that exercise stimulates opposing quadrants of the brain which are negatively impacted by stress. Therefore, an individual’s perceived ability to overcome a stressful event and the physiological process reinforce the mental and physical components of how physical activity can buffer stress. Therefore, the support of previous research and the congruencies of both the quantitative and qualitative results of the current study, demonstrate how regular physical activity increases an employees’ agency to buffer stress to increase productivity in the workplace.
Goals of Health and Wellbeing

Goals are the foundation for Hope Theory guided by the assumption that human actions are goal directed (Snyder & Lopez, 2005). Participants of the current study presented both short term and long-term goals when asked what made them decide to participate in the student-led physical activity program. The majority initially signed up for accountability to help develop their “habit” or intrinsic motivation to be regularly physical active. Participants also described long term goals which consisted of both positive approach goals and “forestalling” of negative outcomes (Snyder, 2002). With proper support, employees can use pathways, agency, and desired goals as powerful motivation increase well-being and productivity in the workplace (Chen et al., 2015; Murru & Martin Ginis, 2010).

Both short and long term goals, coupled with proper support, have the ability to generate pathways and agency which are critical in motivating and sustaining any behavior change (Snyder, 2002). The current research provides an initial snapshot into the creation of a synergistic workplace wellness framework. This framework would aim to marry the physiological elements of physical activity and the cognitive components of Hope Theory to provide a stable, sustainable, and meaningful structure to increase productivity and reduce presenteeism in the workplace. The combination of physical activity and Hope can help to generate pathways to create a stronger sense of agency and meaning around a desired behavior. Once an individual has reflected and connected with a greater meaning of a behavior, it is more likely to be sustained (Kretchmar, 2000). Moreover, sustainability indicates self-regulation and intrinsic motivation which are crucial for individuals to perform at optimal levels and maintain a necessary work-life
balance to avoid burnout. Findings in this study indicate that using and promoting physical activity as a balancing agent in the workplace may increase an individual’s ability to develop pathways, create agency and intrinsic motivation to buffer the effect of stress, and provide sustainability to increase productivity and reduce presenteeism (Figure 8).

Figure 8. A visual representation of the relationship between Hope, physical activity and productivity in the workplace.

**Future Research**

The examination of physical activity, stress and presenteeism in the current study provides a foundation for additional research. One recommendation for future research is to use the current methodology with the inclusion of Hope Theory scales to gain additional insight into the relationship between Hope, physical activity, and productivity in the workplace.
Another prominent and potential impactful area for future research is to better understand the middle-aged population and physical activity. A strong foundation of research exists when looking at physical activity, children (<18) and older adults (>60); however, less information is present when examining the perceptions of middle-aged adults and physical activity (Tucker, Welk, & Beyler, 2011). This population makes up a large percentage of the current workforce and appears to be a viable target audience given the amount of life transition which occurs during these years. Thus, future research identifying the impact of life transitions (job change, family and provide support could translate into increased productivity is executed correctly.

In addition environmental conditions, biological rhythms know as chronobiology, in addition to physiological biomarkers, such as cytokines and cortisol, merit future research to explore the relationship between physical activity, stress and productivity in the workplace. According to Postolache and Raheja (2016), a strong association between biological rhythms, performance, mood and well-being exist. Understanding the biological cycles and levels of physiological biomarkers, could provide valuable insight into the adaptation of individuals to the work environment. This future research could be used to inform and enhance WWP to increase productivity, health and well-being of employees.

Finally, future development and validation of tools to assess presenteeism and productivity in a healthier population are needed. The current study illustrates the limitations with the Stanford Presenteeism Scale when used with individuals who do not have a “health condition”. A proposed tool may include other potential distractions in the workplace and at home which increase presenteeism for those who do not have a chronic
A tool of this nature would help to better define and identify various aspects of presenteeism and continue to inform health promotion specialists in the development, implementation and evaluation of worksite wellness programs.

Assumptions

There are two main assumptions present in the current study. The first is that all the participants answer both quantitative and qualitative methods truthfully. The next assumption is that the researchers’ values and biases were suspended during the rigorous qualitative analysis process. Inter-rater reliability was essential to ensure bias and values were not skewing the results.

Limitations

The current study is not without limitations. The use of self-reported questionnaires is a key limitation of the study. In addition, the SPS was a difficult tool for the employees to fill out since many could not identify a chronic health condition to use when filling out this questionnaire. Another limitation of the study was the lead researcher as the tool to collect information during the qualitative portion of the study. The clarity of discussion questions as well as probing questions informs the accuracy of the information gathered. In addition to the questions asked, retrospective recall for both qualitative and quantitative methods introduces another limitation to the study. However, the use of both qualitative and quantitative research allowed the researchers to understand the participant’s current physical activity engagement.

Additionally, the convenient and cross sectional sample from a University provides another limitation to the external validity of the study. The lived experiences of University employees will be different from employees in other sectors of the workforce.
Finally, Colorado provides yet another limitation with the easily accessible outdoor recreation (especially on campus) and the weather. Several participants alluded to the importance of the sun and space when getting away from their desk. Also, during the second round of focus groups a large snow storm hit the area. The storm closed the University which could have reduced stress levels of these participants while also contributing to additional physical activity through shoveling and additional time.

**Delimitations**

Delimitations of the current study include the investigation of presenteeism and the tools used to measure it. Absenteeism research is well established in the productivity research, where presenteeism is still an emerging term and necessitates more research (Brown et al., 2011; Callen et al., 2013; Chapman, 2005; Lack, 2011; Schultz & Edington, 2007). The evaluation of physical activity and presenteeism is another delimitation of the current study. Other health behaviors such as nutrition and sleep were omitted to ensure a comprehensive view of the relationship between presenteeism and physical activity (Schultz & Edington, 2007).

In addition to the study of presenteeism, the use of the Stanford Presenteeism Scale (SPS) as a quantitative measurement tool of presenteeism is another delimitation of the study. The SPS was chosen given the brevity and recognized validity (Isetti & Meyer, 2014; Koopman et al., 2002; Mandiracioglu et al., 2015). Other validated tools have been identified for exploring the relationship between physical activity and presenteeism, but are longer and ask several financial questions to measure monetary impact of presenteeism (Brown et al., 2014; Chapman, 2005). The financial impact of presenteeism is an important aspect; however, is not a priority in the current study.
Conclusions

Through rigorous mixed methods analysis, the hypothesis was proven to be true. Those employees who perform more than the required 150 minutes of moderate to vigorous physical activity per week have lower stress levels which correlates with an increase in productivity and reduced presenteeism. Through the lived experiences of the participants, it was found that both planned and spontaneous movement can enhance concentration and focus to increase productivity in the work place.

Another notable finding from this study is the importance of an individual’s health perception. Employees’ who had a higher perception of their health were found to have significantly lower stress and presenteeism scores. The concept of health perceptions is important for both the employee and health specialist to recognize and use to build pathways and agency to obtain goals. Through focus group discussions, it was found that participants had varied expectations and outcomes on how physical activity increased their productivity. Although different, all employees acknowledged that being physically active made them feel better whether the behavior gave them energy, calmed them down, or helped them sleep better. The fact that participants indicated several different outcome expectancies demonstrate the potential pathways in which health promotion specialists can use to help foster sustainable behavior change and increase productivity.

For the majority of this sample, physical activity was a key element to overall wellbeing, enabling employees to increase productivity at work. If cultivated and supported correctly, a workplace wellness framework combining physical activity and
cognitive elements of Hope Theory can be used to effectively increase productivity and reduce presenteeism in the workplace. This balanced synergistic combination merits future investigation for the planning, implementation, and evaluation of workplace wellness programs.

**Practical Application for Organizations**

The current study provides empirical rational for the development and implementation of supported WWP to increase worker productivity and reduce the significant financial burden of presenteeism. The following are practical applications ascertained from this study:

1. Understand and identify the impact of presenteeism within the company or organization.

2. Develop, implement and support a tailored WWP using the synergistic framework of physical activity and Hope presented in the current study. The balanced framework can be used to generate energy and positivity to shift perception and culture surrounding physical activity, stress, and productivity in the workplace.

3. Quantitatively and qualitatively measure year over year impact of the program on the health, well-being and productivity of employees within the organization.
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APPENDIX A

GENERAL HEALTH AND PHYSICAL ACTIVITY

Thank you for taking the time to complete this questionnaire. All of your responses will remain confidential and will only be seen by the current research team members.

1. What is your current job at UCCS?

____________________________________________________

2. How long have you been working in this position?

____________________ years or months or weeks (please circle one)

3. Are you involved in physical activity in any of the following domains? (Check all that apply)

_____ (1) On the job? (Occupational) Manual labor, walking, carrying or lifting objects

_____ (2) At home? (Domestic) Housework, yard work, child care, self-care, shopping

_____ (3) For the purpose of going somewhere? (Transportation/utilitarian) Walking, biking, climbing/descending stairs to public transportation

_____ (4) For leisure? (Leisure time) Discretionary or recreational activities, exercise, sports, hobbies, volunteer work

_____ (5) Other (please specify) ______________________________________________________

4. If you are not currently physically active, when were you last physically active at least 30 minutes on most days?

_____ (1) Within the last 6 weeks

_____ (2) More than 6 weeks ago but less than 3 months ago
_____ (3) Between 3 and 6 months ago
_____ (4) Between 6 months and a year ago
_____ (5) More than a year ago

5. Are you **regularly physically active** for approximately **150 minutes** per week or **30 minutes/day** on most days? (Check one)

   ___(1) Yes, I **have been** physically active for **more than 6 months**
   ___(2) Yes, I **have become** physically active **within the past 6 months**
   ___(3) Yes, I **am** physically active **once in a while, but not consistently**
   ___(4) No, I **have been thinking about** becoming physically active but have not yet
   ___(5) No, I **am not physically active** and do **not plan on** becoming physically active

6. If you **are physically active**, what **type** of activities are you currently doing? (Check all that apply)

   _____ (1) **Not physically active**        _____ (2) Walking        _____ (3) Hiking
   _____ (4) Jogging/running               _____ (5) Biking          _____ (6) Pilates
   _____ (7) Group fitness class           _____ (8) Yoga            _____ (9) Golf
   _____ (10) Strength Training            _____ (11) Tennis         _____ (12) Pickleball
   _____ (13) Tai Chi                      _____ (14) Meditation     _____ (15) Swimming
   _____ (16) Other________________________

7. If you **are physically active**, choose the **time of day** you like to perform activities. (Check all that apply)

   _____ (0) I **am not physically active**
   _____ (1) during the midnight hours (between 12:00p and 4:00am)
   _____ (2) early morning hours (between 4:00am and 8:00am)
   _____ (3) morning hours (between 8:00am and 12:00pm)
   _____ (4) early afternoon hours (between 12:00pm and 4:00pm)
_____ (5) early evening hours (between 4:00pm and 8:00pm)
_____ (6) evening hours (between 8:00p and 12:00am)

8. Describe with whom you prefer to be physically active. (Check all that apply)
   _____ (1) I am not currently physically active  
   _____ (2) By myself/Alone  
   _____ (3) Trainer/coach  
   _____ (4) Friend  
   _____ (5) Family member  
   _____ (6) With a large group/team  
   _____ (7) With a small group/team  

9. Think about all the vigorous activities that you did in the last 7 days. Vigorous physical activities refer to activities that take hard physical effort and make you breathe much harder than normal, like heavy lifting, aerobics, or fast bicycling.

   How many days did you do vigorous physical activities? Approximately how many minutes did you do this activity continuously? If you did not do any vigorous physical activities in the last 7 days, please enter 0.
   _____ Days per week  
   _____ Average minutes of continuous activity  

10. Think about the time you spent walking in the last 7 days. This includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure.

   During the last 7 days, on how many days did you walk?
   _____ Days per week  
   _____ Average minutes of continuous walking  

11. This next question is about the time you spent sitting on weekdays during the last 7 days. Include time spent at work, at home, and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

During the last 7 days, how much time did you spend sitting on a week day?

_____ Hours per day

12. Has a healthcare professional ever suggested that you initiate physical activity to help with the symptoms of any of the following? What did you do as a result?

_____ (1) Arthritis       Result___________________________________________

_____ (2) Anxiety         Result___________________________________________

_____ (3) Depression       Result___________________________________________

_____ (4) Diabetes         Result___________________________________________

_____ (5) Fatigue          Result___________________________________________

_____ (6) Pain             Result___________________________________________

_____ (7) Poor Sleep       Result___________________________________________

_____ (8) Stress           Result___________________________________________

_____ (9) Weight gain      Result___________________________________________

_____ (10) Other Condition Result__________________________________________

13. If you are presently exercising, Please answer the following questions using the scale below:

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree</td>
<td>Agree</td>
<td>Neutral</td>
<td>Disagree</td>
<td>Strongly disagree</td>
</tr>
</tbody>
</table>

1. Exercise makes me feel better physically:  

2. Exercise makes my mood better in general:  

3. Exercise helps me feel less tired:
4. Exercise makes my muscles stronger:  

5. Exercise is an activity that I enjoy doing:  

6. Exercise gives me a sense of accomplishment:  

7. Exercise makes me more alert mentally:  

14. How confident do you feel about making lifestyle changes? (Circle one)  
1 2 3 4  
Very Somewhat A Little Not much  

15. Age  

16. Gender  

Male Female  

17. What is the race or ethnicity that best describes you? (Check all that apply)  

American Indian or Alaska Native White  
Native Hawaiian or Other Pacific Islander Asian  
African American Hispanic/Latino  
Other European  

19. How do you rate your current health? (Check one)  

Poor  
Fair  
Good  
Very Good  
Excellent  

Thank you for your time and participation!
APPENDIX B

PERCEIVED STRESS SCALE

INSTRUCTIONS:

The questions in this scale ask you about your feelings and thoughts during THE LAST MONTH. In each case, you will be asked to indicate your response by placing an “X” over the circle representing HOW OFTEN you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer fairly quickly. That is, don’t try to count up the number of times you felt a particular way, but rather indicate the alternative that seems like a reasonable estimate.

<table>
<thead>
<tr>
<th>PSS-14</th>
<th>Never</th>
<th>Almost Never</th>
<th>Sometimes</th>
<th>Fairly Often</th>
<th>Very Often</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In the last month, how often have you been upset because of something that happened unexpectedly?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>2. In the last month, how often have you felt that you were unable to control the important things in your life?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>3. In the last month, how often have you felt nervous and “stressed”?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>4. In the last month, how often have you dealt successfully with day to day problems and annoyances?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>5. In the last month, how often have you felt that you were effectively coping with important changes that were occurring in your life?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>6. In the last month, how often have you felt confident about your ability to handle your personal problems?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>7. In the last month, how often have you felt that things were going your way?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>8. In the last month, how often have you found that you could not cope with all the things that you had to do?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>9. In the last month, how often have you been able to control irritations in your life?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>10. In the last month, how often have you felt that you were on top of things?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>Almost Never</td>
<td>Sometimes</td>
<td>Fairly Often</td>
<td>Very Often</td>
</tr>
<tr>
<td>---</td>
<td>-------</td>
<td>--------------</td>
<td>-----------</td>
<td>--------------</td>
<td>------------</td>
</tr>
<tr>
<td>11. In the last month, how often have you been angered because of things that happened that were outside of your control?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>12. In the last month, how often have you found yourself thinking about things that you have to accomplish?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>13. In the last month, how often have you been able to control the way you spend your time?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>14. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
APPENDIX C

STANFORD PRESENTEEISM SCALE

Stanford Presenteeism Scale*
(SP6-6)

Directions: Please describe your work experiences in the past month. These experiences may be affected by many environmental as well as personal factors, and may change from time to time. For each of the following statements, please check one of the following responses to show your agreement or disagreement with this statement in describing your work experiences in the past month.

Please use the following scale:

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Uncertain</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

1. Because of my (health problem)*, the stresses of my job were much harder to handle.

2. Despite having my (health problem)*, I was able to finish hard tasks in my work.

3. My (health problem)* distracted me from taking pleasure in my work.

4. I felt hopeless about finishing certain work tasks, due to my (health problem)*.

5. At work, I was able to focus on achieving my goals despite my (health problem)*.

6. Despite having my (health problem)*, I felt energetic enough to complete all my work.

* Note that the words ‘back pain,’ ‘cardiovascular problem,’ ‘illness,’ ‘stomach problem,’ or other similar descriptors can be substituted for the words ‘health problem’ in any of these items.

* The Stanford Presenteeism Scale (SPS-6; 2001 version) is jointly owned by Merck & Co, Inc., and Stanford University School of Medicine.
### APPENDIX D

**STANFORD PRESENTEEISM SCALE NORMALITY VALUES**

**Stanford Presenteeism Scale Normative Values**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Mean ± SD</th>
<th>Test Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>23.0 ±3.9</td>
<td>t(161)=0.30</td>
</tr>
<tr>
<td>Female</td>
<td>22.9±4.2</td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;35</td>
<td>21.9±4.0</td>
<td></td>
</tr>
<tr>
<td>35-50</td>
<td>23.5±4.3</td>
<td>F(2,159)=1.60</td>
</tr>
<tr>
<td>&gt;50</td>
<td>22.8±3.7</td>
<td></td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black/AfrAmer</td>
<td>22.4±5.7</td>
<td>F(4,157)=1.15</td>
</tr>
<tr>
<td>Asian American</td>
<td>23.4±4.0</td>
<td></td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>21.3±4.2</td>
<td></td>
</tr>
<tr>
<td>White/EuroAmer</td>
<td>23.3±3.7</td>
<td></td>
</tr>
<tr>
<td>“Other”</td>
<td>22.9±5.0</td>
<td></td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High/Trade School</td>
<td>23.8±4.6</td>
<td>F(2,159)=1.85</td>
</tr>
<tr>
<td>Some College</td>
<td>21.6±4.7</td>
<td></td>
</tr>
<tr>
<td>Bachelor’s Degree</td>
<td>23.7±3.3</td>
<td></td>
</tr>
<tr>
<td>Some Grad School</td>
<td>23.0±3.8</td>
<td></td>
</tr>
<tr>
<td>Advanced Degree</td>
<td>23.3±3.5</td>
<td></td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>22.2±4.5</td>
<td>F(2,153)=0.84</td>
</tr>
<tr>
<td>Married or Similar</td>
<td>23.2±3.8</td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td>22.6±3.9</td>
<td></td>
</tr>
<tr>
<td><strong>Job Type</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service/Maint.</td>
<td>21.0±3.7</td>
<td></td>
</tr>
<tr>
<td>Clerk</td>
<td>21.8±4.5</td>
<td></td>
</tr>
<tr>
<td>Protective Service</td>
<td>20.3±4.6</td>
<td>F(5,159)=2.32* (p&lt;0.05)</td>
</tr>
<tr>
<td>Technician/Para</td>
<td>22.3±3.7</td>
<td></td>
</tr>
<tr>
<td>Office/Admin/Pro</td>
<td>23.6±3.5</td>
<td></td>
</tr>
<tr>
<td>“Other”</td>
<td>24.4±4.3</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX E

IPAQ CATEGORIES CRITERIA

1. Inactive (CATEGORY 1)
This is the lowest level of physical activity. Those individuals who not meet criteria for Categories 2 or 3 are considered insufficiently active’ [CATEGORY 1].

2. Minimally Active (CATEGORY 2)
The minimum pattern of activity to be classified as sufficiently active. is any one of the following 3 criteria:

a) 3 or more days of vigorous activity of at least 20 minutes per day
b) 5 or more days of moderate-intensity activity or walking of at least 30 minutes per day
c) 5 or more days of any combination of walking, moderate-intensity or vigorous intensity activities achieving a minimum of at least 600 MET-min/week.

Individuals meeting at least one of the above criteria would be defined as achieving the minimum recommended to be considered minimally active’ [CATEGORY 2]. This category is more than the minimum level of activity recommended for adults in current public health recommendations, but is not enough for total PA. when all domains are considered. IPAQ measures total physical activity whereas the recommendations are based on activity (usually leisure-time or recreational)over and above usual daily activities.

4. HEPA active (CATEGORY 3)
A separate category labeled HEPA level, which is a more active category (CATEGORY 3) can be computed for people who exceed the minimum public health physical activity recommendations, and are accumulating enough activity for a healthy lifestyle. This is a useful indicator because it is known that higher levels of participation can provide greater health benefits, although there is no consensus on the exact amount of activity for maximal benefit. Also, in considering lifestyle physical activity, this is a total volume of being active which reflects a healthy lifestyle. It is at least 1.5-2 hours of being active throughout the day, which is more than the LTPA-based recommendations of 30 minutes7.

In the absence of any established criteria, the IPAQ scientific group proposes this new cutpoint, which equates to approximately at least 1.5 -2 hours of total activity per day, of at least moderate intensity activity. It is desirable to have a HEPA activity category, because in some populations, a large proportion of the population may be classified as minimally active because the IPAQ instrument assess all domains of activity (Category 3) sets a higher threshold of activity and provides a useful mechanism to distinguish variation in sub-population groups.
APPENDIX F

FOCUS GROUP QUESTIONS

1. Take a couple minutes and give us your name and your role at UCCS and also what prompted you to sign up for the student led training sessions?

2. Tell me about your experience while working with your student trainer.

3. Tell me about your current physical activity?

4. Given your experience, do you think there is a relationship between your physical activity and your engagement and productivity at work?

5. How do you define a productive day?

This passage supplies an example of the presenteeism. Please take 5 minutes to read the passage, identify key words, phrases, and concepts and write a definition for the phenomenon of presenteeism. I encourage you to mark up the paper at hand.

For years, Amy, who designs transmission components for International Truck and Engine, suffered in silence. Once in a while, when an allergy-related sinus headache escalated into a full-blown migraine, she missed a day of work. But most of the time, she went to the office and quietly lived with the congestion and discomfort of her seasonal allergies. “Sometimes, it’s like you wouldn’t mind if your head rolled off your body,” says the 31-year-old engineer, who spends most of her day working with 3-D models on a computer screen. “You feel clogged up and hazy. The pressure makes you want to close your eyes. It’s hard to focus. You end up just muddling through.” (Harvard Business Review, 2004)

6. Please share what you have come up with.

7. Tell me about a time when you may have been physically present at work- but out of it.
APPENDIX G

INSTITUTIONAL REVIEW BOARD APPROVAL

University of Colorado
Colorado Springs
Institutional Review Board (IRB) for the Protection of Human Subjects

Date: 10/1/2015

IRB REVIEW

IRB PROTOCOL NO.: 14-055
Protocol Title: Feasibility and Benefits of an Intake and Assessment-driven Programming Model for Center of Active Living (CAL) end users
Principal Investigator: Mary Ann Kluge
Faculty Advisor if Applicable: N/A
Application: Report of Change (4)
Type of Review: Expedited 7
Risk Level: No more than Minimal Risk
Renewal Review Level (If changed from original approval) if Applicable: N/A No Change
This Protocol involves a Vulnerable Population: N/A (No Vulnerable Population)
Expires: *
*Note, if exempt: If there are no major changes in the research, protocol does not require review on a continuing basis by the IRB. In addition, the protocol may match more than one review category not listed.
Externally funded: ☒ No ☐ Yes
OSP #: Sponsor:

Thank you for submitting your Request for IRB Review of a proposed change to your original IRB protocol. The protocol identified above has been reviewed according to the policies of this institution and the provisions of applicable federal regulations. The review category is noted above, along with the expiration date, if applicable.

Once human participant research has been approved, it is the Principal Investigator’s (PI) responsibility to report any changes in research activity related to the project:

- The PI must provide the IRB with all protocol and consent form amendments and revisions.
- The IRB must approve these changes prior to implementation.
- All advertisements recruiting study subjects must also receive prior approval by the IRB.
- The PI must promptly inform the IRB of all unanticipated serious adverse (within 24 hours). All unanticipated adverse events must be reported to the IRB within 1 week (see 45 CFR 46.103b[5]). Failure to comply with these federally mandated responsibilities may result in suspension or termination of the project.
- Renew study with the IRB prior to expiration.
- Notify the IRB when the study is complete

If you have any questions, please contact Research Compliance Specialist in the Office of Sponsored Programs at 719-255-3903 or irb@uccs.edu

Thank you for your concern about human subject protection issues, and good luck with your research.

Sincerely yours,

Michele L. Okun, PhD
IRB Reviewer

www.uccs.edu/osp/comppliance/
Version 01/03

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