Predicting Walking Using the Theory of Planned Behavior in a Worksite Wellness Setting.

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PREDICTING WALKING USING THE THEORY OF PLANNED BEHAVIOR IN A WORKSITE WELLNESS SETTING

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PREDICTING WALKING USING THE THEORY OF PLANNED BEHAVIOR

IN A WORKSITE WELLNESS SETTING

by

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THESIS

Presented to the Faculty of the Graduate School of

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Abstract

The study examined constructs from the Theory of Planned Behavior (TpB) as predictors of walking behavior among adult university employees. Specifically, attitudes, subjective norms, and perceived behavioral control towards walking were used to predict behavioral intentions to walk and concurrent walking behavior in a sample of adult university employees. The study is a secondary analysis of data already collected on a sample of 118 employees enrolled in a Worksite Wellness Program from a large southwestern university who completed a self-administered questionnaire regarding, TpB constructs and actual walking behavior. The questions from the survey were derived from the Theory of Planned Behavior (Ajzen, 1985) and the International Physical Activity Questionnaire (Craig et. al., 2003). Results were analyzed using correlation and multiple regression analysis. The analyses suggest that attitudes and self-efficacy were important predictors of behavioral intention to walk in this sample.
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Chapter 1: Introduction

Health promotion is a growing field that recognizes the importance of individual behavior change in promoting adherence to a wide-range of health issues. Particularly relevant to the present proposal is the promotion of sufficient levels of physical activity (PA). As described below, studies have shown that lifestyle choices, specifically regarding participation in regular physical activity, can improve levels of personal health. This document proposes a secondary analysis study examining how personal factors relate to intentions and performance of one form of physical activity: brisk walking. Personal factors studied included those from the Theory of Planned Behavior and the International Physical Activity Questionnaire. The remainder of the literature review describes effects of lifestyles choices, specifically the engagement of PA and current levels of PA in the general population and locally. The literature review concludes with a description of the constructs of the Theory of Planned Behavior (TpB), empirical research supporting the TpB in relation to weight loss and physical activity, before describing the specific methods and analyses that will be employed.
Chapter 2: Literature Review

2.1 EFFECTS OF LIFESTYLE CHOICES: PHYSICAL ACTIVITY

Lifestyle choices may severely affect health and limit life expectancy and quality of life. For example, physical inactivity and poor diet have contributed to the increased prevalence of obesity observed in the last 20 years and to increased rates of hypertension and cardiovascular disease, which may lead to premature deaths (Mokdad et al., 2000).

A positive association between moderate exercise and health benefits is well-documented in scientific literature. A link exists among moderate physical activity and reduced cardiovascular disease, hypertension, stress, diabetes, cancer, obesity, depression and osteoporosis and (Warburton et al. 2006, Lawler & Hoper 2001).

Obesity, a consequence of poor diet and physical inactivity, is a problem, one that is becoming more and more apparent as the years pass. According to Flegal et al. (2010), 33.8% of all adults aged 20 and over were obese in 2007-2008; 32.2% of men and 35.5% of women. The study also looked at overweight and obesity combined, which was reported to be 68.0% for all the population; 72.3% of men and 64.1% of women. Obesity is associated with major health risks and serious medical diseases such as diabetes mellitus, coronary heart disease, high blood pressure, stroke, osteoarthritis, sleep apnea and premature death (Joy et al., 2005, Warburton et al. 2006).

One national consequence of obesity is diabetes, particularly type 2 diabetes. In 2007, the CDC (2007) estimated a prevalence rate of 5.7% of the US population translating to 17.4 million people. Of these, the CDC estimates that 14.6 million were diagnosed and another 6.2 million were undiagnosed CDC (2005). In Texas alone, diabetes has been on the rise over the past ten years growing from 6.3% to 10.4%, a prevalence rate that is higher than
the national average (CDC, 2009). Aerobic physical activity has been association with a decreased risk of type 2 diabetes (Warburton et al., 2006). One specific study fund an association between an increase of 500 kcal in energy expenditure with a decreased incidence of type 2 diabetes of 6% (Gregg et al., 2003).

Other problems co-exist with obesity and physical inactivity. National rates of up to 22.1% and 6.5% respectively, exist for hypertension and coronary heart disease (CDC, 2005), with hypertension levels for those aged 45-64 being 31.2%. One study found that being active or fit was associated with a 50% reduction in the risk of death from any cause and from cardiovascular disease (Warburton et al., 2006). Further, an increase in energy expenditure from physical activity was associated with a mortality benefit of about 20% (Warburton et al., 2006). In another study by Hu et al. (2004), it was found that physically inactive (1 hour or less of exercise a week) middle-aged women experienced a doubling of cardiovascular related mortality compared to physically active women.

According to the CDC, colorectal cancer is one of the most commonly diagnosed cancers in the U.S. and breast cancer is the most common form of cancer in women, aside from non-melanoma skin cancer (CDC, 2007). Kampert et al., (1996), reported that routine physical activity is associated with reductions of cancers, specifically colon and breast cancer. According to Hu et al., (2004) there is a 29% reported increase in cancer related mortality inactive women when compared to active women.

In summary, lifestyle choices such as living a sedentary lifestyle, may lead to obesity, a major health risk. Engaging in physical activity may help alleviate these risks.
2.1.1 Physical Activity Recommendations

The Center for Disease Control and Prevention (CDC) defines physical activity (PA) as engaging in thirty minutes or more of moderate PA five or more days per week, or vigorous PA for twenty or more minutes three or more days a week or an equal combination of both (CDC, 2009). Moderate physical activity is any form of exercise or movement that increases the heart rate and breathing that involves large muscle movement in rhythmic manner for a sustained period of time; brisk walking, dancing and jumping rope are typical forms of moderate physical activity. Vigorous PA can also be defined as activity that increases an individual’s heart rate to 75-85% of his or her maximum heart rate (based on age), which is the level needed for increasing cardiovascular fitness (USDHHS, 2008). Typical forms of vigorous activity include running, cycling, high-impact aerobics, and swimming (CDC, 2009).

Aerobic PA of any type, moderate or vigorous positively affects the cardiopulmonary system by strengthening the heart and the lungs. When a person engages in sustained movement, for instance consider a person walking for 45 minutes, their muscles will require added oxygen, or more oxygen than needed when resting, to produce energy for the muscles to sustain the activity. A person’s heart will pump oxygen filled blood to the muscles where the muscles will take the oxygen and other nutrients needed to continue walking and will place carbon dioxide and other waste products back into the blood where it return to the lungs where it will be filled with oxygen. For example, after a person has maintained a walking routine of 45 minutes for 15 weeks, he will build endurance meaning that walking will become easier for him to do because the heart has become stronger and can now deliver more oxygen to his muscles with fewer heart beats. The heart is working more efficiently by delivering more oxygen filled blood with each pump (Jackson et al., 2004).
2.1.2 Existing Levels of Physical Activity

Studies have shown that most Americans do not participate in sufficient levels of physical activity. One such study was the 2007 Behavioral Risk Factor Surveillance System (BRFSS) conducted by CDC. This study compared rates of participation in CDC recommended levels of physical activity and participation in vigorous physical activity. Results for the US overall, Texas, and El Paso are shown in Table 2.1. Over half (50.5\%) of adult Americans did not participate in the recommended levels of moderate-intensity physical activity. The percentage is higher for vigorous physical activity, as 71.7\% did not participate in recommended levels of vigorous physical activity (CDC, BRFSS, 2007).

Texans participated in even less physical activity when compared to national rates. For example, the same BRFSS survey showed 53.5\% of Texas residents did not meet the recommended levels of physical activity. Moreover, 74.5\% of Texans had not participated in the recommended levels of vigorous physical activity. In addition, 27.8\% of Texans reported no leisure-time physical activity in the previous month compared to the national average of 14\% (CDC, 2007). Thus, over one-fourth of Texan residents are inactive on a daily basis.

The same BRFSS survey showed that less than half (48.2\%) of El Paso residents met the recommended levels of physical activity, and only 27\% of them had participated in the recommended levels of vigorous physical activity. Further, 27\% of El Pasoans reported participating in no leisure-time physical activity in the previous month compared to the national average of 14\% (CDC, 2007). Thus, about one-fourth of El Paso residents are inactive on a daily basis consistent with the overall rates in Texas.
In summary, this Behavioral Risk Factor Surveillance System (BRFSS) study compared rates of participation in recommended levels of physical activity and participation in vigorous PA among the US overall, Texas, and El Paso. Results indicated that in general, half of the population is not meeting the required levels of physical activity. Results also showed that Texas was worse than the national average and that El Paso residents fell in between national figures and estimates for Texas.

2.2 THEORY OF PLANNED BEHAVIOR

The Theory of Planned Behavior is a social psychological theory designed to predict voluntary future behavior (Ajzen, 1985). The theory focuses on both social influences and personal factors as predictors of behavior (Rivis, & Sheeram, 2004). The TpB maintains that voluntary behavior can be predicted most proximally by a person’s intentions to perform a certain behavior (Fishbein & Ajzen, 1975). The theory, in turn, suggests three independent determinants of intention, which include attitude toward the behavior, subjective norm, and perceived behavioral control. The specific relationships among these variables are shown in Figure 2.2.
The Theory of Planned Behavior’s main constructs and principles are derived from the Theory of Reasoned Action (TRA), developed by both Ajzen and Fishbein (Fishbein & Ajzen, 2005). The TRA model was modified by Ajzen (1985) to include perceived behavioral control and was renamed the TpB.

The TRA attempts to explain the psychological determinants of volitional behavior; that is, behavior that is under complete control and will of the individual (Ajzen, 1985). Both rely on the assumption that a person’s actions are conducted in a sensible and rationale manner, at least in relation to the person’s beliefs at that period in time. Specifically, the TRA attempted to explain behavior by identifying personal (attitudes) and social factors (subjective norm) (Ajzen, 1985).

The central factor in both the TRA and the TpB is behavioral intention or a person’s willingness and desire to perform a given behavior (Ajzen & Fishbein, 1980). Intention reflects motivation toward the behavior by indicating how hard a person is willing to try and how much effort the person is willing to put into performing the behavior. The theory
maintains that the stronger an individual’s intention to perform a behavior, the more likely the person will actually perform the behavior. However, the TRA specifies that a person must have control over the situation in order for the process to be conceptualized as an intention; if the person is forced to participate in a certain behavior, their intention to perform that behavior cannot be measured. Moreover, intentions will be poor predictors of behavior that are impossible (i.e. intention to become President). Issues related to actual and perceived control over behavior prompted Ajzen to include perceived behavioral control in the TpB (Ajzen, 1985).

The TpB further hypothesizes that behavioral achievement depends on both intention (motivation) and ability (behavioral control). Intentions influence behavior to the extent that a person has and perceives adequate behavioral control. Therefore, intentions reflect exerted behavior and the more behavioral control a person has over the behavior, the greater the participation. However, this behavior depends on the person’s level of motivation (Ajzen, 1985). Therefore, a general rule regarding perceived behavioral control, intentions, and actual behavior is that behaviors can be predicted with a great amount of accuracy from intentions, but only when such behaviors are controllable (Ajzen, 2002).

According to the TpB, there are three independent determinants of intentions: attitudes, subjective norms, and perceived behavioral control (Ajzen, 2002). Attitude toward the behavior, refers to the degree to which a person has favorable or unfavorable feelings toward the specific behavior. The second, subjective norm is defined as a person’s perceived social pressure to abstain or participate in a behavior. The third, perceived behavioral control (PBC), is a person’s perceived ease or difficulty of performing a behavior. Perceived Behavioral Control is also assumed to reflect past experience as well as anticipated impediments and
obstacles to performing the behavior (Fishbein, 1975, Ajzen, 1985, 2002).

Within the TpB, in its simplest definition, attitude is the positive or negative evaluation of a behavior (Ajzenk, 1988). Attitudes have three basic features. First, attitudes are learned. Second, attitude predispose us to specific actions. Third, such actions are consistently favorable or unfavorable toward the object (Fishbein, 1975). Attitudes differ from mere beliefs in that the former reflects is an evaluation of a certain object or behavior, whereas the latter reflects the specific content information or knowledge a person holds regarding a behavior or an object. As such, attitude includes an affective or emotional nature toward an object, which accounts for the life versus dislike quality of attitudes. Attitudes and beliefs are related in that the beliefs one has toward that object are the bases of attitude formation toward the object (Fishbein, 1975).

Salient behavioral beliefs reflect the subjective probability that a certain behavior will produce a known outcome. For example, walking will help me lose weight. Behavioral beliefs affect attitude toward the behavior according to the expectancy-value model (Fishbein & Ajzen 1975). Specifically the behavioral outcome contributes to attitude to the extent that it is valued or devalued by the individual (Ajzen 1988). Thus, a person may want to lose weight and believes that walking for exercise may help him or her lose weight and will therefore engage in walking.

Subjective norm reflects perceived social pressure to perform or not to perform in a certain behavior. In particular, subjective norm reflects perceptions of whether important (i.e. referent) others think one should or should not perform the behavior (i.e. My partner thinks I should walk more for exercise)
Specifically, subjective norm is determined by the accumulation of normative beliefs that pertain to the expectations of various important others, such as peers, parents, friends, and spouses (Ajzen, 1985). Two beliefs underlie subjective norms: normative beliefs and motivation to comply. Normative beliefs refer to a person’s belief about what a specific individual or group thinks she should do (Ajzen & Fishbein 1980).

Motivation to comply, in contrast, refers to the tendency of a person to behave accordingly to the will of the certain reference group or individual. Motivation to comply can be affected by the referent’s power to reward or punish the individual, the individual’s fondness for the referent, perceived expertise of the referent, and the extent to which it is justifiable for the referent to make demands of the person (Fishbein, Azjen, 1975). For example, a patient with diabetes complying with doctor’s orders to begin a walking program.

The third independent determinant of intentions is perceived behavioral control (PBC). PBC is a person’s perception of how easy or difficult it is to perform a behavior. Locus of control is a generalized expectancy that remains fairly stable across all situations and forms of actions, whereas perceived behavioral control changes across different situations and actions (Ajzen, 1991). Two beliefs are thought to underlie perceived behavioral control: control beliefs and perceived power (Ajzen, 1985 & 1991).

Control beliefs refer to the perceived existence of impeding or facilitative factors in performing a given behavior, whereas perceived power refers to strength of that impeding or facilitative factors may have on performing the given behavior (Hagger & Chatzisarantis, 2005). For example, a person may believe that she is able to walk for 30 minutes a day, on most days a week.
2.3  *Tpb Research in Relation to Predict Weight Loss and Physical Activity*

2.3.1 Schifter and Ajzen (1985)

Multiple studies have used the TRA and TpB in the context of obesity, weight loss and prediction of physical activity. For example, Schifter and Ajzen (1985) examined intentions to lose weight among college women. This longitudinal study examined TpB concepts as predictors of weight loss during two stages: At the beginning and at the end of a 6-week period. In the first stage, participants were weighed and surveyed regarding the TpB variables in relation to weight loss and in the second stage participants were weighed once more. The study found that amount of weight loss during a 6-week period was significantly correlated with behavioral intention to lose weight. In addition, all three TpB variables, including subjective norm, perceived behavioral control, and attitude made independent contributions to intentions. Among these variables, perceived behavioral control had the highest association with intentions and actual weight loss. Overall, the results supported the effectiveness of the theory for predicting weight loss intentions and actual weight loss.

2.3.2 Saltzer (1975)

Another study regarding weight loss intentions was conducted by Saltzer (1975) and this study explored the association of prior beliefs with actual behaviors in the context of weight loss. This prospective study examined 115 female patients from a medical weight-loss program who completed and returned a mailed questionnaire on intention to lose weight in the next 6 weeks. Weight and height information were gathered on the first visit with the physician and at six weeks following the beginning of the program. An indirect indicator of attitudes (i.e.,
participants’ behavioral beliefs about the total consequences of participation in the medical weight-reduction program), and their normative beliefs of about the behavior (i.e., beliefs about whether close friends or spouses think they should lose weight) were used as predictors of behavioral intentions to lose weight. Saltzer found that perceived normative beliefs about weight loss were a significant predictor of behavioral intentions and actual weight loss over the 6 weeks. In contrast, the indirect measure of attitudes did not predict behavioral intentions. Moreover, the study found a significant association between behavioral intentions and actual behavior; specifically, those people who intended to lose more weight, did lose more weight. In addition to finding that subjective norm was the strongest indicator in the prediction of actual weight loss behavior in this sample, Saltzer found that the most influential referent in predicting actual weight loss were perceived beliefs of close friends, while the perceived beliefs of spouses were the weakest.

2.3.3 Barnes et al. (2007)

A study conducted by Barnes et al. (2007) investigated constructs from the TpB in relation to weight loss maintenance in a group of 47 African American women. The study focused on content analyses of focus group transcripts centered on weight loss and maintenance in seven focus groups. Specifically, four focus groups were conducted with women successful at maintaining weight loss and three groups with woman who lost weight but were unsuccessful at maintaining it (i.e., regainers). Barnes et al. (2007) found that cultural norms regarding weight and food consumption, and concerns about being perceived as too thin or sick when weight is lost, had the strongest affect on weight loss maintenance. Specifically, successful maintainers held a strong belief in the importance of positive support from important others, whereas regainers did not report such support. Differences in the approaches to overcoming barriers (i.e.,
low perceived behavioral control) also existed among the two groups. Maintainers reported taking active opposition to barriers, whereas regainers did not. For instance, regarding the barrier of family and cultural expectations to eat high calorie food, maintainers reported refusing to attend social gatherings if healthy food was not available, demonstrating a skill to overcome barriers a skill lacking in the regainer group. Another difference noted in the study was the responses to weight regain from both groups. Maintainers reported having a plan of action to control their weight regain, whereas regainers reported they did not have such plans and could not overcome their laziness or lack of willpower. The study also supports the role of TpB constructs, particularly subjective norms and perceived behavioral control, in African American women as it related to weight loss and maintenance.

2.3.4 Guinn, et al., (2007)

The TpB has also been used in studies of physical activity. For example, in a cross-sectional study conducted by Guinn, et al., (2007) TpB constructs were used to explain the prediction of physical activity intentions among a sample of low-income Mexican American women. Data were collected to examine the relationship of the TpB variables of attitude, subjective norm, perceived behavioral control and intention with self-reported, present activity behavior. Data were analyzed using structural equation modeling. Results indicated that perceived behavioral control was the strongest predictor of intention to engage in physical activity among this group (Guinn, 2007), a finding that they report was contrary to other studies in this literature where attitudes have had the most pervasive influence on intentions. Similarly, subjective norms also did not have a significant influence on intentions. Regarding this pattern of findings, the authors explained that different values need to be placed on attitudes, subjective norms, and perceived behavioral control when persons are in certain
situational conditions, specifically low economic status, which explains why PBC was the greatest indicator of intentions in this study. In such cases, more immediate concerns regarding control over time, safety, and health factors become more relevant and important than their affective (i.e. attitudinal) feelings about physical activity. The authors concluded that interventions to promote voluntary physical activity should emphasize a sense of control over the behavior. The authors suggest making physical activity seem more desirable and convenient by first addressing such barriers as distance to facilities and safety of the environment (e.i. parks).

2.3.5 Blanchard (2008)

Blanchard (2008) also conducted a study examining physical activity and the TpB in the context of cardiac rehabilitation (CR). Seventy-six patients receiving 6 months of home-based CR completed two questionnaires at the three different time points, at the baseline, 3 months and at the end of the six-month treatment period in an effort to explain significant variation in exercise intentions and behavior from baseline to 3 months and 3 months to 6 months. The questionnaires consisted of TpB items and a physical activity scale assessed at all three time points. They found that perceived behavioral control and attitude had moderate to large effects on intention to exercise at both 3 and 6 month follow-up, however, subjective norm predicted intention only between the first and third month but had no effect on intentions to exercise at sixth months. Blanchard interpreted these results as suggesting that perceived social pressure is most important when engaging in exercise in the beginning stages of a home-based CR program and that attitude and PBC are important in the later stages. This longitudinal study found that the TpB may be a useful framework for understanding exercise behavior, specifically in a home-based cardiac rehabilitation (CR) program.
2.3.6 Caperchione et al. (2008)

Finally, a study by Caperchione et al. (2008) discussed relationships among body mass index (BMI), direct measures of the TpB constructs, and physical activity intentions. A random, representative, cross-sectional study of 1,062 Australians participated in a computer-assisted telephone interview survey that included questions regarding the TpB and physical activity and self-reported weight and height information used to calculate BMI. The study hypothesized that being overweight or obese is a barrier to physical activity, and in some cases, being overweight or obese can be a deterrent to engaging in public forms of physical activity such as walking. The study found that attitude and perceived behavioral control mediated the relationship between BMI and physical activity intentions with attitude having the strongest prediction of physical activity intention, however, subjective norms did not significantly affect intentions. Consistent with expectations, those with high BMI had more negative attitudes toward PA and lower perceived behavioral control, beliefs that resulted in less intention to participate in physical activity.

In summary, the research suggests that the TpB is a useful framework for understanding weight loss and participation in physical activity. The present study adopted this framework for predicting physical activity among adult participants in a Worksite Wellness setting. The specific aim of this study was to predict walking intentions and walking behavior using the TpB. It was hypothesized that behavioral intentions will predict actual walking behavior, and that attitudes, subjective norms, and perceived behavioral control would predict intentions.
Chapter 3: Methods

3.1 OVERVIEW

This study was a secondary analysis of data collected on a sample of 118 employees enrolled in a Worksite Wellness Program from a large southwestern university who completed a self-administered questionnaire regarding TpB constructs, and actual physical activity behaviors. The questions from the survey were derived from the TpB. Participants completed the measures as part of their participation in a Worksite Wellness Program, see appendix A.

3.1.1 Employee Health and Wellness Program at the University of Texas at El Paso

The Employee Health & Wellness Program (EHWP) at the University of Texas at El Paso (UTEP) is designed to help incorporate and increase physical activity into the University’s employees’ workday. The program includes a number of wellness components that are offered to employees aimed to improve the individual’s level of physical activity such as one-on-one fitness consultations and weigh-ins, beginner jogging groups, walking groups, yoga classes, and moderate to vigorous aerobics. The EHWP promotes regularly scheduled and socially supported campus walks, the use of stairs instead of elevators by increasing poster visibility encouraging this method, and yoga and calisthenics classes scheduled within the workday.

Also incorporated in the employee wellness program is a one-on-one counseling style intervention aimed at promoting and adhering change in levels of physical activity. The purpose of this proposed study was to investigate constructs from the Theory of Planned Behavior (TpB) as predictors of physical activity among participants in a worksite wellness program.
3.2 PARTICIPANTS

The primary unit of analysis and the priority population for this proposed study was full-time or part-time employees of the University of Texas at El Paso (UTEP), a federally designated Hispanic-serving institution. UTEP is a university located on the southwestern border region of Texas, which employs approximately 2547 faculty and staff. UTEP employs 1,153 faculty, 46% are men and 54% are women and 1,737 staff, 57% of men and 43% female; in total UTEP employs 2890 people, 50% men and 50% women. Thirty percent of the employee population are minorities. UTEP employs 46% A total of 118 employees participated in the study by completing a survey about their beliefs, intentions, and behaviors regarding physical activity, specifically walking, when they first joined the program. Inclusion criteria for the Wellness Program and the study included benefits eligible employees working either full or part time and over the age of 18 years. Exclusion criteria included non-benefit eligible employees (i.e. work-study and hourly positions) and self-report of pregnancy status. Other exclusion criteria included anyone experiencing symptomatic coronary heart disease that would prohibit physical exertion. Also excluded from the study was any person experiencing immobility that restricted walking because the program emphasizes walking as the main component.

All participants self-selected into the study as part of joining the Wellness Program. Participants were informed about the program through different means (campus wide electronic bulletins, informational e-mails, flyers, presentations and one-on-one visits). Recruitment strategies included active enrollment methods presentations at new-employee orientation [which is a requirement for all benefit-eligible employees to attend], department meetings, employee health fairs, and stationed booths at heavy populated sites on campus).
Passive enrollment methods included flyers, pay-check stuffers, online campus bulletins, and e-mails. Included in these messages was information about the program, who to contact, and where to register and information on the website. For their participation, they were given a “Welcome Bag” that included a pedometer, finger towel, and water bottle.

3.3 MEASURES

This study used constructs from the Theory of Planned Behavior (TpB) as predictors of physical activity among participants in a worksite wellness program. Specifically, attitudes, subjective norms, and perceived behavioral control towards walking were used to predict behavioral intentions to walk and concurrent walking behavior in a sample of adult university employees. This study was a secondary analysis using these variables. Variables included in the analyses are described below.

3.3.1 International Physical Activity Questionnaire-7 (IPAQ-7)

The International Physical Activity Questionnaire (IPAQ-7) is a tool that assesses current levels of physical activity using seven questions. The IPAQ-7 assesses vigorous activity, moderate activity, and walking performed in the past 7 days and the amount of time spent on that activity on one of those days (Appendix B). The IPAQ has reasonable measurement properties for monitoring population levels of physical activity among 18- to 65-yr-old adults in diverse settings (Craig et al., 2003).

3.3.2 TpB Constructs

The following measures of TpB constructs specifically related to walking were also measured (Appendix B).
3.3.2.1 *Attitudes Toward Walking*

Attitudes toward walking was measured using a three-dimension semantic differential scale. Specifically, the behavior of “Walking 3-times a week for exercise” was rated on three 7-point scales with the following anchors: pleasant vs. unpleasant, good vs. bad, and enjoyable vs. unenjoyable.

3.3.2.2 *Subjective Norms toward Walking*

Subjective norms toward walking were measured using a 7-point scale ranging from definitely true to definitely false. Three specific questions included: “Family members who are important to me encourage me to walk 3-times a week for exercise;” “Friends who are important to me encourage me to walk 3-times a week for exercise;” and “Most people important to me walk for exercise”.

3.3.2.3 *Perceived Behavioral Control over Walking*

PBC toward walking was measured using a 7-point scale, which ranged from strongly agree to strongly disagree. The following two items were assessed, “I feel confident I can walk for exercise in the next 30 days;”, which measured controllability and “It is up to me whether or not I walk 3-times per week over the next 30 days”, which measured self-efficacy.

3.3.2.4 *Behavioral Intentions Toward Walking*

Behavioral intentions were measured with the statement, “I plan to walk for exercise purposes at least 3-times per week over the next 30 days.” The question was measured using a 7-point scale from extremely unlikely to extremely likely.
3.4 PROCEDURES

The proposed study took place at the University of Texas at El Paso located along the Mexico/U.S. border. All material was made available in both Spanish and English because most staff are of Mexican-American decent. The questionnaires were completed through December 2006 and August 2008 in El Paso, Texas. As noted, the study included employees from the local university.

Employees from the University of Texas at El Paso, who were benefit eligible, voluntarily signed up for worksite wellness program entitled the Employee Health and Wellness Program (EHWP). Employees interested in becoming a member of the EHWP registered online or in person and paid a onetime fee of $10.00. The EHWP provided participants with fitness classes, one-on-one fitness consultations, health and wellness lectures, and an overall social support system for employees.

Surveys were completed during one-on-one fitness consultations, which were scheduled by the program’s intervention coordinator after a participant registered for the program. I served as the program’s intervention coordinator. The private and confidential consultations were held in the program’s office located in a central area on the main campus. At the beginning of the consultation, the participant was asked to fill out the 10-15 minute survey.

3.5 APPROACH TO ANALYSIS

Descriptive statistics. Following data preparation and screening, a table of descriptive statistics (e.g., means, standard deviations, or percentages) was created that includes all study variables including demographics, TpB variables, and physical activity variables.
Inferential statistics. Results were analyzed using correlation and multiple regression analyses. First a table of all intercorrelations among the variables was be created. Second, hierarchical linear regression (i.e., path analysis) was used to examine the independent associations between TpB concepts, behavioral intention, and walking behavior. It was anticipated that the TpB constructs (attitude, subjective norm and perceived behavioral control) will predict walking behavior. Specifically, the following model will be tested:

Figure 3.1: Theory of Planned Behavior Model
Chapter 4: Results

4.1 DATA REDUCTION

A single measure of attitudes toward walking was created by combining the three-seven semantic differential scale items and then averaging all seven of the items to create a single attitude score that ranged from 1 to 7, with lower numbers indicating negative attitudes toward walking and higher values indicating positive attitudes toward walking. These attitude scales included “For me, walking 3 times a week for exercise is pleasant-unpleasant, good-bad, enjoyable-unenjoyable”. Cronbach’s alpha reliability coefficient was .92.

The three Likert-scaled items for subjective norm toward walking fit together reliably into a single total score (alpha = .78), therefore a single measure was created. The subjective norm scales ranged from “definitely false to definitely true” and included, “Family members/friends who are important to me encourage me to walk three-times a week for exercise,” and “Most people important to me walk for exercise”.

Perceived behavioral control measured two different dimensions, perceived control and self-efficacy, and therefore did not fit together into a single item score. As such, they were used separately. “I feel confident that I can walk for exercise in the next 30 days” was used to represent PBC Self-Efficacy, and “It is up to me whether or not I walk 3x per week over the next 30 days” represented PBC Control.

4.2 DESCRIPTIVE STATISTICS

Means and standard deviations (or percentages) for all the major study variables are displayed in Table 4.1. The average age in this sample was approximately 38 years of age, and
women represented a larger portion of the sample than men. Most participants reported Hispanic ethnicity. Attitudes toward walking were generally positive (i.e., above the scale midpoint) as were ratings of PBC and self-efficacy. Behavioral intentions to walk were also above the scale midpoint. Only subjective norm ratings were closer to neutral (the scale midpoint). Walking days were greatest in number followed by moderate PA days and vigorous PA days. Approximately the same number of minutes a day were reported for walking and participation in moderate PA, however fewer minutes of time spent in vigorous PA was reported.
Table 4.1: Descriptive table displaying Means/Percentages of age, gender, ethnicity, TPB, constructs, and levels of physical activity (N=118)

<table>
<thead>
<tr>
<th></th>
<th>Mean/% (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>38.30 (9.72)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>83%</td>
</tr>
<tr>
<td>Male</td>
<td>17%</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>59%</td>
</tr>
<tr>
<td>Caucasian</td>
<td>36%</td>
</tr>
<tr>
<td>Asian</td>
<td>4%</td>
</tr>
<tr>
<td>African American</td>
<td>1%</td>
</tr>
<tr>
<td>Employment Category</td>
<td></td>
</tr>
<tr>
<td>Faculty</td>
<td>20%</td>
</tr>
<tr>
<td>Staff</td>
<td>80%</td>
</tr>
<tr>
<td>TPB Constructs</td>
<td></td>
</tr>
<tr>
<td>Attitude Toward Walking (1-7)</td>
<td>5.73 (1.53)</td>
</tr>
<tr>
<td>Subjective Norm (1-7)</td>
<td>4.11 (1.85)</td>
</tr>
<tr>
<td>PBC Control (1-7)</td>
<td>6.74 (0.62)</td>
</tr>
<tr>
<td>PBC Self-Efficacy (1-7)</td>
<td>5.77 (1.83)</td>
</tr>
<tr>
<td>Behavioral Intention to Walk (1-7)</td>
<td>5.60 (1.73)</td>
</tr>
<tr>
<td>Walking Days Per Week</td>
<td>3.53 (2.27)</td>
</tr>
<tr>
<td>Walking Minutes Per Day</td>
<td>25.85 (31.02)</td>
</tr>
<tr>
<td>Moderate Days Per Week</td>
<td>1.91 (1.99)</td>
</tr>
<tr>
<td>Moderate Minutes Per Day</td>
<td>25.88 (34.23)</td>
</tr>
<tr>
<td>Vigorous Days Per Week</td>
<td>1.19 (1.54)</td>
</tr>
<tr>
<td>Vigorous Minutes Per Day</td>
<td>19.95 (29.80)</td>
</tr>
</tbody>
</table>
4.3 INFERENTIAL STATISTICS

Table 4.2 contains correlations between demographic variables and TpB variables and PA outcomes. As shown, age was positively related to subjective norm, self-efficacy, behavioral intentions to walk, and number of walking days. These correlations suggest that relatively older participants reported greater normative encouragement to walk for exercise, reported greater self-efficacy for walking, and greater intentions to walk for exercise. Consistent with these beliefs, they also reported walking on more days than relatively younger participants did. The only other significant association was a positive relationship between faculty/staff status and minutes of moderate physical activity. Because staff/faculty status variable was coded 1 for staff and 2 for faculty, this correlation suggests that faculty reported more moderate minutes of PA on average than staff did. No other correlations approached significance suggesting that none of the variables differed as a function of gender or ethnicity.
Table 4.2: Correlations between demographic variable, TpB constructs and PA outcomes

<table>
<thead>
<tr>
<th></th>
<th>Age</th>
<th>Gender</th>
<th>Hispanic Ethnicity</th>
<th>Staff/Faculty Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td>.16</td>
<td>-.07</td>
<td>-.15</td>
<td>.13</td>
</tr>
<tr>
<td>Subjective Norm</td>
<td>.20*</td>
<td>.06</td>
<td>.03</td>
<td>.09</td>
</tr>
<tr>
<td>PBC Control</td>
<td>.11</td>
<td>.05</td>
<td>.04</td>
<td>-.06</td>
</tr>
<tr>
<td>PBC Self Efficacy</td>
<td>.20*</td>
<td>.05</td>
<td>-.10</td>
<td>.01</td>
</tr>
<tr>
<td>Behavioral Intention</td>
<td>.35**</td>
<td>.01</td>
<td>-.10</td>
<td>.08</td>
</tr>
<tr>
<td>Walking Days</td>
<td>.20*</td>
<td>.07</td>
<td>-.08</td>
<td>.12</td>
</tr>
<tr>
<td>Walking Minutes</td>
<td>.17</td>
<td>.10</td>
<td>-.08</td>
<td>.10</td>
</tr>
<tr>
<td>Moderate Days</td>
<td>.02</td>
<td>.02</td>
<td>.07</td>
<td>.14</td>
</tr>
<tr>
<td>Moderate Minutes</td>
<td>.02</td>
<td>.03</td>
<td>.02</td>
<td>.19*</td>
</tr>
<tr>
<td>Vigorous Days</td>
<td>.03</td>
<td>.05</td>
<td>.07</td>
<td>.08</td>
</tr>
<tr>
<td>Vigorous Minutes</td>
<td>.00</td>
<td>.12</td>
<td>.05</td>
<td>.09</td>
</tr>
</tbody>
</table>

*p<.05; **p<.01; N = 118
Table 4.3 contains the intercorrelations between TpB variables and PA outcomes. As displayed, Attitudes Toward Walking was positively correlated with Subjective Norm, PBC Self-Efficacy, Behavioral Intentions, and Walking Days. Subjective Norm was also positively correlated with PBC Self-Efficacy, Behavioral Intentions, and Walking Days. Self-Efficacy was correlated with behavioral intention and Walking Days, Walking Minutes and Moderate Days. As expected, Behavioral Intention to walk was positively correlated with walking days and walking minutes. Finally, other than the association between Walking Minutes and Moderate Minutes, the moderate and vigorous variables only correlated with each other and were unrelated to TpB variables.

Overall, these correlations show that (a) Behavioral Intentions to walk were associated with Walking Days and Minutes, (b) the TpB variables were intercorrelated, and (3) the TpB variables, designed to assess beliefs regarding walking, did not relate to other forms of PA including moderate and vigorous PA.
Table 4.3: Intercorrelations between TpB and PA outcomes

<table>
<thead>
<tr>
<th></th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Attitude</td>
<td>.28**</td>
<td>.14</td>
<td>.28**</td>
<td>.41**</td>
<td>.18*</td>
<td>.17</td>
<td>-.04</td>
<td>.01</td>
<td>.02</td>
<td>.00</td>
</tr>
<tr>
<td>2. Subjective Norm</td>
<td>.02</td>
<td>.44**</td>
<td>.38**</td>
<td>.22*</td>
<td>.18</td>
<td>.02</td>
<td>-.13</td>
<td>.06</td>
<td>-.05</td>
<td></td>
</tr>
<tr>
<td>3. PBC Control</td>
<td>.10</td>
<td>.17</td>
<td>.03</td>
<td>.11</td>
<td>-.06</td>
<td>-.02</td>
<td>-.04</td>
<td>-.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. PBC Self-Efficacy</td>
<td></td>
<td>.65**</td>
<td>.36**</td>
<td>.38**</td>
<td>.20*</td>
<td>.05</td>
<td>.02</td>
<td>.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Behavioral Intention</td>
<td></td>
<td>.37**</td>
<td>.39**</td>
<td>.09</td>
<td>-.01</td>
<td>.03</td>
<td>.05</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Walking Days</td>
<td></td>
<td></td>
<td>.58**</td>
<td>.16</td>
<td>.10</td>
<td>.15</td>
<td>.10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Walking Minutes</td>
<td></td>
<td></td>
<td>.07</td>
<td>.20*</td>
<td>.13</td>
<td>.16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Moderate Days</td>
<td></td>
<td></td>
<td></td>
<td>.66**</td>
<td>.18</td>
<td>.16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Moderate Minutes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.26**</td>
<td>.32**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Vigorous Days</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.84**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Vigorous Minutes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<.05; ** p<.01
4.4 MULTIPLE REGRESSION ANALYSIS

Table 4.4 shows the results of three hierarchical multiple regression analyses. The top panel used attitudes, subjective norm, and the two PBC variables (self-efficacy and controllability) as predictors of behavioral intention to walk three times per week. As shown attitudes and self-efficacy had significant unique (non-redundant) influences on behavioral intentions, however subjective norms and PBC controllability did not predict behavioral intention, the former despite having a significant univariate association. These analyses suggest that attitude and self-efficacy are independent predictors of behavioral intention to walk in this sample.

The second and third panels used attitude, subjective norm, the two PBC variables, and behavioral intention as predictors of walking minutes and walking days. As shown in the second panel, Behavioral Intention related to Walking Minutes. Attitude did not relate to Walking Minutes nor did Subjective Norms independent of Behavioral Intention. Finally, with Behavioral Intention in the model, Self-Efficacy still had a near significant independent relationship with Walking Minutes. As shown in the third panel, the results for Walking Days were similar to the results for Walking Minutes, except that the association between Behavioral Intention and Walking Days only approached significance.

Taken together, these last two analyses show that Behavioral Intention predicts walking behavior; that Attitudes Toward Walking do not predict walking behavior independent of intention, and that Self-Efficacy predicts walking independent of Behavioral Intentions.
Table 4.4: Results of Hierarchical Multiple Regression Analysis Predicting Behavioral Intentions and Walking Minutes, and Days.

### DV= Behavioral Intentions to Walk Three Times per Week

$R^2 = .49$, $F(4,113) = 27.27$, $p < .001$

<table>
<thead>
<tr>
<th>Predictor</th>
<th>$\beta$</th>
<th>$r$</th>
<th>SP $r$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude Toward Walking</td>
<td>.23**</td>
<td>.41</td>
<td>.21</td>
</tr>
<tr>
<td>Subjective Norm</td>
<td>.07</td>
<td>.37</td>
<td>.06</td>
</tr>
<tr>
<td>PBC Self –Efficacy</td>
<td>.55***</td>
<td>.65</td>
<td>.48</td>
</tr>
<tr>
<td>PBC Controlability</td>
<td>.09</td>
<td>.17</td>
<td>.09</td>
</tr>
</tbody>
</table>

### DV= Walking Behavior, Walking Minutes

$R^2 = .18$, $F(5,112) = 4.91$, $p < .005$

<table>
<thead>
<tr>
<th>Predictor</th>
<th>$\beta$</th>
<th>$r$</th>
<th>SP $r$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude Toward Walking</td>
<td>.00</td>
<td>.17</td>
<td>.00</td>
</tr>
<tr>
<td>Subjective Norm</td>
<td>-.02</td>
<td>.18</td>
<td>-.02</td>
</tr>
<tr>
<td>PBC Self –Efficacy</td>
<td>.22†</td>
<td>.38</td>
<td>.17</td>
</tr>
<tr>
<td>PBC Controlability</td>
<td>.04</td>
<td>.11</td>
<td>.05</td>
</tr>
<tr>
<td>Behavioral Intention to Walk</td>
<td>.25*</td>
<td>.39</td>
<td>.19</td>
</tr>
</tbody>
</table>

### DV= Walking Behavior, Walking Days

$R^2 = .17$, $F(5,112) = 4.44$, $p < .01$

<table>
<thead>
<tr>
<th>Predictor</th>
<th>$\beta$</th>
<th>$r$</th>
<th>SP $r$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude Toward Walking</td>
<td>.03</td>
<td>.18</td>
<td>.03</td>
</tr>
<tr>
<td>Subjective Norm</td>
<td>.04</td>
<td>.22</td>
<td>.04</td>
</tr>
<tr>
<td>PBC Self –Efficacy</td>
<td>.20†</td>
<td>.36</td>
<td>.16</td>
</tr>
<tr>
<td>PBC Controlability</td>
<td>-.03</td>
<td>.03</td>
<td>-.03</td>
</tr>
<tr>
<td>Behavioral Intention to Walk</td>
<td>.22†</td>
<td>.37</td>
<td>.17</td>
</tr>
</tbody>
</table>

+p < .10, *p < .05, **p<.01, ***p, <.001; SP = semi-partial
Figure 4.1: Hierarchical Multiple Regression Analyses Model, Walking Minutes

Figure 4.2: Hierarchical Multiple Regression Analyses Model, Walking Days
Chapter 5: Discussion

The purpose of this study was to examine the use of the Theory of Planned Behavior to predict walking intentions and walking behavior in a worksite wellness setting. Overall the results were consistent with the study hypothesis. Specifically, results of correlation and multiple regression analyses showed that Behavioral Intention to Walk was associated with actual walking days and minutes. Moreover, Attitudes Toward Walking and PBC Self-Efficacy were significant predictors of behavioral intention. PBC Self-Efficacy also predicted walking behavior directly. Somewhat surprisingly, subjective norm was unrelated to behavioral intention and walking behavior.

Support for the model applied only to walking behavior and did not generalize to variables related to moderate or vigorous physical activity. Although lack of generalizability may be considered a limitation, this pattern is consistent with Ajzen’s (2002) recommendation that TpB variables and behaviors be assessed consistently and in relation to specific behaviors. Thus, just as attitudes toward the birth control pill should not predict condom use, attitudes toward walking should not predict moderate or vigorous physical activity. Conversely, we would not expect attitudes toward vigorous physical activity to predict walking behavior.

Other notable trends included significant correlations between age and TpB constructs. For example, in the context of this study older participants reported greater intention to walk, and reported greater self-efficacy for walking than the younger participants. Further, older participants reported greater normative encouragement to walk for exercise. Consistent with these beliefs, older participants reported walking on more days than relatively younger participants did. One other interesting finding is the correlation suggesting that faculty reported more moderate minutes of PA on average than staff. Although this was the only
difference observed between staff and faculty, it might reflect differences in education level or work demands. People with greater education may have greater knowledge of the benefits of physical activity. Alternatively, they may have more flexibility in their schedules to include forms of moderate physical activity.

The negative results for subjective norm were not totally unexpected. In previous research, subjective norm has been found to be a strong predictor of behavioral intention in general in younger populations, however as this trend is diminishes as the population ages (Rhodes et al., 2006). Taken together, the results of the Rhodes et al. and the present study may suggest that as we age, we become less concerned with social influences, at least as regards participation in physical activities such as walking. In contrast, other factors, such as individual attitudes and self-efficacy, may become more important or relevant, particularly in adult samples.

The results in this study are also consistent with Blanchard (2008), Caperchione (2008) who found that attitudes and PBC were the strongest predictors of physical activity. For example, Blanchard found that attitude and PBC has moderate to large effects on intention to exercise in his sample of seventy-six cardiac rehabilitation patients. Caperchione found that attitude and PBC predicted physical activity intentions in his sample of 1,062 Australians. Both studies found that subjective norms had no significant effects on intentions to exercise. The results in the present study replicate the findings in a study conducted by Scott et al. (2007) concerning the single-item measure of walking, which could be predicted by behavioral intention and PBC. Specifically, Scott et al., found that the TpB correctly predicted behavioral intentions to walk, however the constructs did not predict actual step count measured by a pedometer.
However, self-efficacy did predict walking independent of intention meaning that self-efficacy had a direct and significant relationship to predicting actual walking behavior. This is consistent with previous research cited, specifically Blanchard, (2008).

5.1 IMPLICATIONS FOR INTERVENTIONS

The results for attitudes and self-efficacy may have implications for intervention. Specifically, after examining the TpB constructs, it was found that self-efficacy had the most significant influence on behavioral intentions, followed by attitudes. Self-efficacy also predicted walking behavior directly. Overall, the results suggest that interventions toward increasing walking in a sample of university employees may be most effective if they are designed to directly affect attitudes and self-efficacy. For example in a workplace, self-efficacy may be enhanced by providing an environment that is conducive to efforts to be physically active and in turn increasing an employee’s perceived power over becoming more active. Such efforts may include allowing employees 30 extra minutes of time for physical activity or on “company time”. Further, giving employees discounts and incentives for joining gyms may also raise self-efficacy by eliminating perceived inhibiting conditions, such as cost. Self-efficacy may also improve by learning vicariously through others by watching one co-worker succeed; success may be taking a walking break everyday at 10 am. Efforts such as these may also lead to a favorable impact on attitudes.

The results also show that, in this case, an intervention based on subjective norms may have little to no effect on the population. Furthermore, due to the continual rise in obesity rates and obesity related diseases, an implementation of intervention in the worksite is needed. Interventions are needed to motivate people to initiate behavioral changes, and attitudes and self-efficacy are beliefs that are directly related to motivation and behavior.
5.4 LIMITATIONS

This study had a number of limitations. One major limitation was the way the variables of walking and physical activity were assessed. Specifically, in addition to being all self-reported, the structure of the questions may have reduced their reliability and/or validity. For example, one question asked, “During the last seven days on how many days did you walk for physical activity”, similarly the question for moderate and physical activity was stated as, “During the last seven days on how many days did you participate in moderate/vigorous physical activity”. Because of the wording, these questions may have lead to misrepresentation of true reports of average individual activity. For example, if a person was ill or on vacation and unable to be physically active a week prior to participating in the study the person reported zero activity; however in reality the person is usually active and walks three-times a week for exercise. In cases such as these, this person’s average activity was not represented correctly.

Another limitation might be that participants self-selected into the Worksite Wellness program and hence this study, instead of being chosen through random selection. This weakens the external validity or generalizability of the findings. As such, the results may not generalize to the entire working population. For example, it is likely that participants self-selecting into a Worksite Wellness have more positive attitudes and higher self-efficacy toward beneficial physical activity such as walking when compared to those that did not self-select into the study. Random selection may have alleviated this limitation and provided greater generalizability to the results.

Another limitation to the study was the assumption that walking was everyone’s chosen form of physical activity. The study was not selective and thus did not limit the study to
‘walkers’ but instead allowed anyone participating in any type of physical activity to join. All the TpB questions were centered on walking and did not consider other forms of physical activity. Therefore this study does not give a clear representation of walking for the specific purpose of physical activity. For future walking studies, a screening tool to include only people who are interested in walking as a form of physical activity will help alleviate this problem.

Finally another limitation to the present study was that all data collected was collected via self-reports and may have created bias to misrepresentation, dishonesty, or a desire to satisfy the researcher. Future studies might look at collecting data that is not self-reported, such as physiological or anthropometric measures as study outcomes.

5.3 SUMMARY AND CONCLUSIONS

The present study examined the constructs from the TpB as predictors of walking behavior among adult university employees in a worksite wellness program. Specifically, attitudes, subjective norms, and perceived behavioral control towards walking were used to predict behavioral intentions to walk and concurrent walking behavior. The study found that relatively older participants reported greater normative encouragement to walk for exercise, reported greater self-efficacy for walking, and greater intentions to walk for exercise and consistent with these beliefs, they also reported walking on more days than their younger counterparts did. Also found was that the TpB variables were intercorrelated. Further, behavioral intention successfully predicted walking behavior and consistently predicted walking days and walking minutes. The TpB variables did not successfully predict moderate or vigorous physical activity as hypothesized. The analyses suggest that attitudes and self-efficacy were important predictors of behavioral intention to walk in this sample.
Additionally, it was found that attitudes toward walking did not predict walking behavior independent of intention, and that self-efficacy predicted walking independent of behavioral intentions. Specifically, the results suggest that interventions designed to promote physical activity, specifically walking in this population should focus on the development of a positive attitude as well as developing an enhanced sense of self-efficacy.
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Centers for Disease Control and Prevention. National Center for Chronic Disease Prevention
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Appendix A: Physical Activity and Theory of Planned Behavior Assessment

The University of Texas at El Paso Employee Health and Wellness Program Physical Activity Assessment

NOTE: Informed Consent Introductory Paragraph

The UTEP Employee Health and Wellness Program is conducting a survey to look at your health status and physical activity preferences because the program is designed to promote a healthier life/workstyle for UTEP employees. Your participation is voluntary and welcome. The approximate time for completion of this survey is 5 minutes. Your input is vital to evaluate employee views and commitment to physical fitness. The following information is strictly confidential, and will not be shared or used for any other purposes other than this study. If you have any questions regarding this survey, please contact Dr. Joe Tomaka at 915-747-7237 or Lola Norton (regarding research subjects’ rights) at 915-747-8939. We thank you in advance for your participation in this survey.

☐ Yes, I have read the preceding statement and understand that participation in this survey is voluntary. Furthermore, I acknowledge that this information can only be used for the purposes of this study.

_____________________________                                       ________________
Participant Signature                                                             Date

1. In the past 30 days, did you participate in any physical activity or exercise (such as walking, jogging, swimming, golf, calisthenics, etc.)?
   ☐ No.
   ☐ Yes. If yes:
   Number of days per week on average (1-7) _____ days
   For how many minutes each time on average (e.g., 10 mins, 15 mins, 30 mins) _____ minutes
   At what intensity: ☐ low intensity ☐ moderate ☐ vigorous

2. At your present job, do you mostly sit, stand, walk or do manual labor or physically demanding work?
   ☐ Sit ☐ Stand ☐ Walk
   ☐ Manual Labor (describe) ____________________________
   ☐ Physically demanding work (describe) ____________________________

3. On how many days per week do you engage in moderate physical activity. Moderate physical activities include those things that cause noticeable increases in breathing, but during which you could still maintain a conversation. Brisk walking or light cycling are examples.
Number of days per week on average (0-7) ______ days
For how many minutes each time on average (e.g., 10 mins, 15 mins, 30 mins) ______ minutes
Activity: _____________________

4. On how many days per week do you engage in **vigorous physical activity**. Vigorous physical activity refers to those things that cause large increases in breathing or heart rate. Jogging, faster cycling are examples
   Number of days per week on average (0-7) ______ days
   For how many minutes each time on average (e.g., 10 mins, 15 mins, 30 mins) ______ minutes
   Activity: _____________________

5. Have you had a physical exam within the past 6 months?
   ☐ No  ☐ YES

6. Are you currently taking any medications that may affect your heart rate or blood pressure?
   ☐ No  ☐ Yes or maybe. If your answer is yes or maybe, please list medications:

7. Please select the following moderate physical activities you have done within the past 30 days for at least 10 minutes without stopping. Check all that apply.
   ☐ Fast walking  ☐ Bowling  ☐ Fishing (while standing)  ☐ Bicycling  ☐ Dancing  ☐ Golf
   ☐ Carpentry  ☐ Frisbee  ☐ Horseback riding  ☐ Gardening (planting, raking, weeding)
   ☐ Gymnastics  ☐ Ping Pong  ☐ Housework (mopping, sweeping, vacuuming)  ☐ Mowing lawn
   ☐ Skateboarding  ☐ Lifting, turning, carrying less than 50 pounds  ☐ Rowing, sailing  ☐ Yoga
   ☐ Playing with children (walking, kneeling, lifting)  ☐ Volleyball  ☐ Weightlifting
   ☐ Tai Chi  ☐ Washing car  ☐ Water aerobics  ☐ Low impact aerobics  ☐ Walking downstairs
   ☐ Calisthenics  ☐ Other:___________________

8. Please select the following vigorous physical activities you have done within the past 30 days for at least 10 minutes without stopping. Check all that apply.
   ☐ Jogging, Running  ☐ Walking upstairs  ☐ Aerobics (high impact)  ☐ Carrying loads more than 50 pounds  ☐ Basketball  ☐ Calisthenics (vigorous)  ☐ Fast Bicycling  ☐ Judo, Karate, Kick Boxing  ☐ Jumping rope  ☐ Roller skating, roller blading  ☐ Stair climbing/Stairmaster
   ☐ Soccer  ☐ Ski machine (Nordic Track)  ☐ Lap swimming  ☐ Tennis, racquetball  ☐ Other:___________________

To be considered physically active and to meet the criteria, **you must get at least**:
- 30 minutes of moderate physical activity on 5 or more days a week, **OR**
- 20 minutes of vigorous physical activity on 3 or more days a week, **OR**
- 150 minutes of moderate and physical activity combined each week
9. According to this definition:
   ☐ I am physically active
   ☐ I am not physically active

10. If you are physically active, what kinds of changes did you make to become physically active:

11. If you are not physically active, what kinds of things would help you to become physically active?

12. How physically active do you plan to be over the next months? *(Choose the best answer that applies and choose only one.)*
   ☐ I am not currently active and do not plan to become physically active in the next 6 months.
   ☐ I am thinking about becoming more physically active.
   ☐ I intend to become more physically active in the next 6 months.
   ☐ I have been trying to get more physical activity.
   ☐ I am currently physically active and have been for the last 1-5 months.
   ☐ I have been regularly physically active for the past 6 months or more.

13. On a scale of 1 to 10, **how important** is it to you be or become physically active (circle one number)?

```
1-----2-------3-------4-------5-------6------7------8------9-------10
Not at all important                  Extremely important
```

14. On a scale of 1 to 10, **how confident** are you that you could become or stay physically active, if you want to (circle one number)?

```
1-----2-------3-------4-------5-------6------7------8------9-------10
Not at all Confident                 Extremely Confident
```

The following questions pertain to walking as a form of exercise. Circle the number that best describes you:

15. I plan to walk for exercise purposes at least three times per week over the next 30 days.

   extremely unlikely:____1____2____3____4____5____6____7____: extremely likely

16. For me, Walking three times a week for exercise is:
17. Family members who are important to me encourage me to walk three times a week for exercise
definitely false: _______ 2  3  4  5  6  7 : definitely true

18. Friends who are important to me encourage me to walk three times a week for exercise
definitely false: _______ 2  3  4  5  6  7 : definitely true

19. Most people important to me walk for exercise.
definitely false: _______ 2  3  4  5  6  7 : definitely true

20. I feel confident I can walk for exercise in the next 30 days
strongly disagree : _______ 2  3  4  5  6  7 : strongly agree

21. It is up to me whether or not I walk three times per week over the next 30 days
strongly disagree : _______ 2  3  4  5  6  7 : strongly agree

Appendix B: International Physical Activity Questionnaire

NAME________________________________ PHONE_____________________

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives.
1. Currently are you engaging in an organized physical activity program?

☐ Yes  →  Skip to question 1a
☐ No   →  Skip to question 2

1a. If yes, what is the name of the program? _______________________

1b. How often do you attend the program? _____ days per week

1c. How many minutes do you usually spend exercising during one of these sessions? _____ minutes per session

The following questions will ask you about the time you spent being physically active in the last 7 days. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

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. Think only about those physical activities that you did for at least 10 minutes at a time.

2. During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling?

_____ days per week

☐ No vigorous physical activities  →  Skip to question 4

3. How much time did you usually spend doing vigorous physical activities on one of those days?

_____ minutes per day

☐ Don’t know/Not sure

Think about all the moderate activities that you did in the last 7 days. Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

4. During the last 7 days, on how many days did you do moderate physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

_____ days per week

☐ No moderate physical activities  →  Skip to question 6

5. How much time did you usually spend doing moderate physical activities on one of those days?

_____ minutes per day
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 might do solely for recreation, sport, exercise, or leisure.

6. During the last 7 days, on how many days did you walk for at least 10 minutes at a time?

   _____ days per week

   □ No walking

7. How much time did you usually spend walking on one of those days?

   _____ minutes per day

   □ Don’t know/Not sure

Please state your:

Date of Birth_________________________

Ethnicity____________________________

Length of Service at UTEP______________

Department__________________________

Faculty or Staff_______________________

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Curriculum Vita

Lucia Hernandez was born in El Paso, Texas. The first daughter of Gerardo and Lucia Hernandez, she graduated from Socorro High School in El Paso, Texas, in the spring of 2002 and entered The University of Texas at El Paso (UTEP) that summer. While pursuing a bachelor’s
degree in health promotion, she worked for the Border Research Services (BRS) as an assistant to the evaluators for the BASICS (Brief Alcohol Screening and Intervention for College Students) Program on the UTEP campus for a year. In spring 2007, she entered the Graduate School at the University of Texas at El Paso and began working as the Program Coordinator for the Employee Health and Wellness Program (EHWP) at UTEP. Meanwhile, in 2007, she interned with the Pan American Health Organization (PAHO) where she gained valuable experience researching diabetes. In addition, she presented her work entitled *Prevalence of obesity and other risk factors for cardiovascular disease among young adults residing in the US-Mexico Border, 2000-01* at the Annual Preventive Medicine conference in February 2008, which received an award for best in its category and at the Texas Tech Health Sciences Center, 2nd Annual Research Colloquium in May 2008. From 2009 to 2010, Ms. Hernandez worked concurrently for the EHWP and the El Paso Independent School District (EPISD) for the Health and Wellness Program.

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