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# Identifying Determinants of Physical Activity in Maritime Union Members Using the Theory of Planned Behavior

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# IDENTIFYING DETERMINANTS OF PHYSICAL ACTIVITY IN MARITIME

# UNION MEMBERS USING THE THEORY OF PLANNED BEHAVIOR

by

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# ABSTRACT

Identifying Determinants Of Physical Activity In Maritime Union Members Using The
Theory Of Planned Behavior

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This study examined the usefulness of the Theory of Planned Behavior to predict

how attitude, subjective norm, perceived behavioral control, and intention are associated

with physical activity in longshoremen from the Hampton Roads Shipping Association-

International Longshoreman's Association (HRSA-ILA). The study was conducted in

two phases. In the first phase, five focus groups were conducted to elicit information

about the health behaviors of longshoremen. From the results of these focus groups, a

90-question, theory based, self-reported questionnaire was developed to identify beliefs,

attitudes, subjective norms, perceived behavioral control, and intentions that contribute to

longshoremen engaging in physical activity. In the second phase, the questionnaire was

used in an observational cross-sectional survey design. A convenience sample of 687

longshoremen was invited to participate; 404 longshoremen completed the survey for a

59% response rate.

The relationship of the theory constructs (direct and indirect attitudes, direct and

indirect subjective norms, and direct and indirect perceived behavioral control) and

relevant demographic variables to the dependent variable (physical activity, intention)

was tested with multiple linear regression models. The model was a significant predictor

of physical activity behavior with both active and retired members. The model was also a

significant predictor of intention to exercise. When the demographic variables of age,

gender, ethnicity, educational level, marital status, income, and years in the HRSA-ILA

were added to the physical activity multiple linear regression model for active and retired members, the model was statistically significant. There was an increase in the total amount of variance, suggesting that even though demographic variables were not part of the theory, they provide important information for this group.

Path analysis for physical activity for active male members was statistically significant with the path from direct perceived behavioral control and intention providing a direct effect. The results for retired male members were statistically significant with the path from direct subjective norm providing a direct effect. For intention, the results for active male members were significant with the path from direct attitudes, indirect attitudes, direct perceived behavioral control, and indirect perceived behavioral control providing a direct effect. Retired members were statistically significant with the path from direct attitudes, indirect subjective norm and direct perceived behavioral control achieving a significant relationship suggesting a direct effect. Direct perceived behavioral control provided a direct effect with 3 of the 4 groups with the exception of physical activity for retired members. These findings are consistent with the theory model.

Many health risks can be mitigated if physical activity behaviors are adopted and maintained. Further research is needed to study strategies to assist members to move from behavioral intentions to targeted actions that improve the likelihood of engaging in physical activity. When health beliefs that influence behavior are known, disease prevention and health promotion information and activities can be targeted to the population to help promote healthier more active lifestyles.

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## INTRODUCTION

### Purpose of the Study

This study seeks to test the ability of the Theory of Planned Behavior to model how the attitudes, subjective norms, perceived behavioral control, and intentions are associated with physical activity in longshoremen from the Hampton Roads Shipping Association-International Longshoreman's Association (HRSA-ILA). The Theory of Planned Behavior postulates that intentions to perform behaviors can be predicted from attitudes, subjective norms, and perceived behavioral control where intention, together with perceptions of behavioral control account for variance in the behavior (Ajzen, 1991). The expected predictors for regular physical activity include attitudes about engaging in regular physical activity, subjective norms regarding engaging in regular physical activity, perceived behavioral control toward regular physical activity, intention to engage in regular physical activity, and various demographic variables. The research questions and hypotheses are structured based on the Theory of Planned Behavior and a literature review of previous studies using the theory constructs with intention to engage in physical activity.

Physical activity is the leading health indicator in the Healthy People 2010 agenda and is associated with lower death rates for adults (U.S. Department of Health and Human Services, 2000). Unhealthy eating and lack of physical activity are second only to tobacco use as causes of preventable death in the United States, claiming 365,000 lives a year (Mokdad, Marks, Stroup & Gerberding, 2005; U.S. Department of Health and

Human Services, 2002). In 2000, lack of physical activity may have contributed as much as $75 billion dollars to medical costs in the United States (WHO, 2006).

Regular physical activity is critically important to promoting health and has been shown to reduce the morbidity and mortality of many chronic diseases and decrease the risk of cardiovascular disease, diabetes, cancer, and obesity (Centers for Disease Control and Prevention, 2007). Many health risks can be mitigated if regular physical activity behaviors are adopted and maintained. Despite the known benefits, the majority of Americans do not participate in regular physical activity, 50% do not engage in enough regular physical activity to derive health benefits; and 24% are not active in their leisure time (Centers for Disease Control and Prevention, 2007; Michels & Kugler, 1998). At particularly high risk of both chronic disease and physical inactivity are blue-collar workers, who are less likely to participate in supervised exercise programs than white-collar workers (Blue, Wilber, & Marston-Scott 2001; Heaney & Inglish, 1995).

Comprehensive health promotion programming within a worksite can target specific health behaviors. To provide effective interventions, the determinants associated with targeted health behaviors need to be investigated. Through the identification of determinants, interventions can be specifically tailored to meet the needs of the population.

Within the field of worksite health promotion, unions are an important, yet unevaluated, avenue for reaching working class populations (Barbeau, Goldman, Roelofs, Gagne, Harden, Conlan, Stoddard, & Sorensen, 2005). Several studies advocate for strengthening the role of workplace health promotion in trade unions to help protect the member's health and safety (Johansson & Partanen, 2002; Holman, Corti, Donovan &

Jalleh, 1998). However, only one study focused on physical activity of longshoremen on the job (Paffenbarger, 1975). The literature examining the regular physical activity habits of longshoremen is sparse, and more work remains to be done.

This study will use the Theory of Planned Behavior as a theoretical framework to study the factors that influence regular physical activity of marine union workers, who are largely blue-collar workers. The purpose of this study is to test the ability of the Theory of Planned Behavior to model how attitudes, subjective norms, perceived behavioral control, and intentions are associated with physical activity in longshoremen from the Hampton Roads Shipping Association-International Longshoreman's Association (HRSA-ILA). The results will be used to expand the limited body of knowledge regarding the physical activity behaviors of this population.

Background

*Working Class/Union Population*

In 2006, the Bureau of Labor Statistics reported that 1.5 million workers were affiliated with labor unions (U.S. Department of Labor, 2007). Most union members are considered to be working class as they are "the part of society made up of people who work for hourly wages, not salaries, especially manual or industrial laborers" (Encarta College Dictionary, 2001). The working class has more health risks and higher rates of illness and injury than administrative and professional employees, yet are under-represented in health promotion activities (U.S. Department of Health and Human Services, 2000).

*International Longshoremen's Association*

The International Longshoreman's Association (ILA) is a national labor union, which represents marine dockyard workers. Approximately 45,000 ILA members are employed along the eastern seaboard with 3,016 in the Hampton Roads area as members of the Hampton Roads Shipping Association – International Longshoremen's Association (HRSA-ILA)(J. McNamara, personal communication, June 24, 2005). The Hampton Roads metropolitan area consists of the cities of Virginia Beach, Norfolk, Gloucester County, Isle of Wight County, James City County, Mathews County, York County, Chesapeake, Hampton, Newport News, Poquoson, Portsmouth, Suffolk, Williamsburg, and Currituck County, NC with a population of 1.6 million people (U.S. Census, 2000).

The HRSA-ILA is an independent entity governed by a 14-member board comprised of seven representatives from the Shipper's Association and seven representatives from the ILA and situated within the Hampton Roads area (R. Armbruster, personal communication, June 25, 2005). HRSA-ILA union members are employed in the maritime industry in the ports of Hampton Roads at the Newport News Marine Terminals, Portsmouth Marine Terminals, Norfolk International Terminals, and Lambert's Point Terminals in Hampton Roads (D. Harrison, personal communication, August 8, 2005).

The International Longshoremen's Association (ILA) has a long history dating back to colonial America when the arrival of each new ship bearing goods from the Old World was greeted with cries for "Men 'long shore!" As the United States grew, men were drawn to coastal cities by the lure of the extra money the man could earn stevedoring cargo on and off ships. The work was hard and often dangerous but

immigrants and African-American men were able to get good pay for unskilled work. In the early days, longshoremen were not organized and their health and welfare was not taken into consideration.

During the 1950's, internal conflicts marked by stories of corruption and illegal activities plagued the union. Merchandise from many parts of the world flowed into the ports of Hampton Roads and the Union thrived. Employment was plentiful, however few policies actively promoted the health of the longshoreman. The 1960's ushered in a decade of social reform and the ILA negotiated contracts that focused on maintaining jobs and on the welfare of the ILA members. The 1980's brought in an era of automation and containerization with fewer and more specialized jobs demanding new knowledge and skills from the union members. To this day, the ILA remains a strong and powerful labor force and strives to provide a safe and healthy work environment for the members (ILA Union, 2003).

Most hospitalizations of HRSA-ILA members are for diseases influenced by lifestyle decisions. Within the HRSA-ILA, the leading cause of disability was injury/accidents and the second leading cause was muscular-skeletal/ connective tissue problems followed by mental disorders and infectious/parasitic diseases (Unum Provident, 2005). However, the top 4 diagnostic categories ranked by inpatient facility expense were diseases of the circulatory system, neoplasms, injuries, and digestive disorders (HRSA-ILA Welfare Fund, 1998). Nearly half of lifestyle-related disease inpatient facility expense was for diseases of the circulatory system, 17% was for accidents, and 11% was diabetes related (HRSA-ILA Welfare Fund, 1998). Health

promotion efforts that promote active lifestyles may reduce these diseases, which are influenced by unhealthy lifestyle choices.

*Prior Interventions with the Study Group*

The HRSA-ILA has used an outside vendor for wellness promotion activities for the past decade. The goals of the wellness activities are to increase awareness of self-care activities, to identify health risks, to foster healthy lifestyle behaviors. Specific programs have been developed to target the health risks of tobacco use, high blood pressure, physical inactivity, and obesity. The program begins with risk identification by promoting smoking cessation programs, cardiovascular risk reduction programs and healthy nutrition programs, and uses various merchandise incentives to encourage participation. Health fairs are regularly held at locations familiar to the members. Health promotion and disease prevention articles are featured quarterly in newsletters sent to all union members. Free flu shots are available annually to members and their dependents.

When health risks are identified, a registered nurse individually counsels the member on lifestyle modifications and provides educational information on the identified risk. During the risk identification process the member may be referred back to their primary care physician. Health information materials may be mailed to the member's home when health risks are identified.

To encourage physical activity, the Board of Trustees approved augmenting the wellness program by providing free YMCA membership for HRSA/ILA members with identified health risks. A corporate membership with the YMCA was negotiated for 600 high-risk HRSA-ILA members to attend any of 12 YMCA's within the Hampton Roads area without personal cost. To participate in the YMCA benefit the member must

complete a health risk appraisal annually and attend the YMCA a minimum of six times a month. Family membership is encouraged by a discounted rate. Throughout the year, approximately 2/3 of the 600 memberships are regular users, however 1/3 of the membership slots are filled with a rotating membership. Over the past year, a waiting list has developed with more members seeking the benefit than slots available. The trustees have been reluctant to increase the number of available slots, as the current expenditure for this benefit alone is over $200,000 annually.

*Exercise Behavior of United States Population*

For over thirty years the Secretary of the Department of Health and Human Resources has prepared a report for the President and Congress on the health status of Americans. *Health, United States, 2006*, monitored the health of Americans providing emerging trends on diseases, conditions, and risk factors that warrant study and intervention. The information on determinants of health is used for making health policy decisions and setting priorities for programs and research. Most of the HRSA-ILA members live and work in Virginia. The 2005 BRFSS prevalence estimates for physical activity in the state of Virginia showed that only 50.8% of adults engage in the recommended amount of physical activity (CDC, 2007). In addition, 39.3% Virginians had insufficient physical activity, 10% were inactive and 21.4% engaged in no leisure-time physical activity (CDC, 2007).

The 2004 National Health Interview Survey defined physical activity as "regular leisure-time physical activity reported at least 20 minutes of vigorous activity 3 or more sessions per week or at least 30 minutes of light/moderate activity 5 or more sessions per week" (USDHHS, 2006). Although regular leisure-time activity has remained relatively

stable over the last decade, the report found that only 30% of adults engaged in leisure-time activity. In addition, leisure-time activity was found to be more common in younger adults (33.1%) than older adults (29.7%), about the same among men (31.4%) and women (29.1%), and non-Hispanic white adults (31.3%) were more likely than African-Americans (23.3%) to report leisure-time activity (USDHHS, 2006).

Since 1984, the Centers for Disease Control and Prevention (CDC) has conducted the Behavioral Risk Factor Surveillance System (BRFSS), the world's largest, on-going telephone health survey system (CDC, 2006). BRFSS is a population-based, random-digit-dialed telephone survey of the civilian, non-institutionalized population and tracks health conditions and risk behaviors of people in the United States. The 2006 BRFSS measured health related lifestyle activities and physical activity during leisure time with state-specific prevalence estimates for adults. Participants were asked, "During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise?" with almost a quarter of the population (22.8%) responding in a negative manner to the question (CDC, 2006).

In 2005, 23.7% adults reported no leisure time physical activity and 49.1% of American adults did not engage in thirty or more minutes of moderate physical activity five or more days per week or twenty or more minutes of vigorous physical activity three or more days per week (CDC, 2005). Men (50.7%) were more likely to engage in activity than women (47.9%), younger people were more likely to be active than older people, White, non-Hispanics (51.1%) were more likely to be active than African-Americans (41.8%), and those with a college degree (53.2%) were most active (CDC,

2005). Most of the HRSA-ILA members live and work in Virginia. The 2005 BRFSS prevalence estimates for physical activity in the state of Virginia showed that only 50.8% of adults engage in the recommended amount of physical activity (CDC, 2007). In addition, 39.3% Virginians had insufficient physical activity, 10% were inactive and 21.4% engaged in no leisure-time physical activity (CDC, 2007).

In 1995, the American College of Sports Medicine (ACSM) and CDC convened a group of experts and developed recommendations for physical activity and public health. The 1995 recommendation stated, "Every United States adult should accumulate 30 minutes or more of moderate-intensity physical activity most, preferably all, days of the week" (JAMA, 1995). Questions arose from the recommendation regarding the frequency, types, and amounts of physical activity needed to positively affect American's quality of life. Numerous studies were undertaken to specify how by engaging in regular physical activity, adults can promote and maintain health, and reduce the risk of chronic disease and premature mortality.

In 2003, an expert panel of scientists convened to review the latest scientific evidence to update and clarify the original recommendation for adults 18 to 65 years old. Although few randomized trials of adequate design have been conducted, the 2007 report demonstrated that those who exercise regularly are less likely to experience cardiovascular disease, stroke, hypertension, type 2 diabetes mellitus, osteoporosis, obesity, colon cancer, breast cancer, anxiety and depression (Haskell, Lee, Pate, Powell, Blair, Franklin, Macera, Heath, Thompson, & Bauman, 2007). In September 2007, the updated recommendation was released as follows:

To promote and maintain health, all healthy adults aged 18 to 65 years old need moderate-intensity aerobic physical activity for a minimum of 20 minutes on three days each week. Combinations of moderate- and vigorous- intensity activity can be performed to meet this recommendation. Moderate-intensity aerobic activity, which is generally equivalent to a brisk walk and noticeably accelerates the heart rate, can be accumulated toward the 30 minute minimum by performing bouts each lasting 10 or more minutes. Vigorous-intensity activity is exemplified by jogging, and causes rapid breathing and substantial increase in heart rate. In addition, every adult should perform activities that maintain or increase muscular strength and endurance a minimum of two days each week (Haskell, et al., 2007).

At the same time, another expert panel deemed it appropriate to issue a separate recommendation on the types and amounts of physical activity needed to improve and maintain health in older adults over 65 years old (Nelson, Rejeski, Blair, Duncan, Judge, King, Macera & Castaneda-Steppe, 2007). The differences within the recommendations for older adults emphasizes moderate-intensity aerobic activity, muscle-strengthening activity, reducing sedentary behavior, and risk management. The recommendation also takes into account the current level of fitness of the older adult; activities that maintain or increase flexibility; and balance exercises to reduce falls. The new recommendations attempted to clarify the questions and misinterpretations that emerged from the 1995 recommendation.

*Consequences of Inactivity*

Problems related to a lack of physical activity have reached epidemic proportions in the United States (Rosenberger, Sneh, Phipps, & Gurvitch, 2005). More than 100

million Americans live with chronic disease (HealthierUS, 2002). Overall, two-thirds of all deaths in the United States are associated with five chronic diseases; obesity, heart disease, cancer, stroke, chronic obstructive pulmonary disease, and diabetes, all of which can be positively affected by regular physical activity (HealthierUS, 2002).

Numerous studies suggest that exercise and regular physical activity are associated with better quality of life and health outcomes (Penedo & Dahn, 2005). Physical activity affects the body's physiologic functioning by providing positive effects on the musculoskeletal, cardiovascular, respiratory, and endocrine systems and seems to reduce depression, improve mood, and enhance the ability to perform daily tasks (U.S. Department of Health and Human Services, 1996). Regular physical activity can help to mitigate the risk factors associated with cardiovascular disease, and has been shown to reduce the risk of being classified with metabolic syndrome (Rennie, Mc Carthy, Yazdgerdi, Marmot, & Brunner, 2003), to decrease the risk of coronary heart disease (Conroy, Cook, Manson, Buring & Lee, 2005), to reduce cardiovascular morbidity (George & Goldberg, 2001), to promote long-term weight loss (Jakicic, Marcus, Gallagher, Napolitano, & Lang, 2003), to lower body mass (Steffen, Arnett, Blackburn, Shah, Armstrong, Luepker & Jacobs, 2006) and positively influence insulin sensitivity (Cuff, Meneilly, Martin, Ignaszewski, Tildesley, & Frohlich, 2003; Goodpaster, Katsiaras, & Kelley, 2003).

In addition, regular physical activity has been shown to have a protective role in cancer etiology. A review of epidemiological studies on cancer demonstrated a large reduction in the risk of colon, breast and prostate cancer among physically active men and women (Friedenreich, 2001). Another study found exercise to be a safe intervention

that can have a positive effect on symptoms associated with cancer and its treatment (Visovsky & Dvorak, 2005).

Other studies demonstrate the psychological benefits of physical activity. Exercise provides a resilience to stress (Salmon, 2001), enhanced well-being (Hassmen, Koivula, & Uutela, 2001), reduced anxiety and depression (Ray, Mukhopadhyaya, Purkayastha, Asnani, Tomer, & Prashad, 2001), and improved mood (Dimeo, Bauer, Varahram, Proest, & Halter, 2001; Lee, Goldberg, Sallis, Hickmann, Castro, & Chen, 2001). Furthermore, risk reduction for other disease states has been associated with regular physical activity. High intensity physical activity was shown to have a positive influence on bone density (Kemmler, Engelke, Weineck, Hensen, & Kalender, 2003), low-impact aerobics was reported to improve fibromyalgia symptoms and physical function (Schachter, Busch, Peloso, & Sheppard, 2003), and erectile dysfunction was associated with lack of physical activity (Selvin, Burnett & Plaatz, 2007).

*Costs Related to Inactivity*

Throughout the nation, health care costs continue to escalate. In the United States, the cost of health care in 2004 was $1.8 trillion dollars and is projected to increase to $3.6 trillion dollars by 2014 (Heffer, 2005). Higher rates of physical inactivity among adults are associated with higher hospital expenditures for treatments of disease of the circulatory system (Rosenberger, Sneh, Phipps, & Gurvitch, 2005). One study reported that 5.4 billion dollars of the 41.3 billion dollars spent annually on medical expenditures for cardiovascular disease was associated with inactivity (Wang, Pratt, Macera, Zheng, & Heath, 2004). A large health plan, Blue Cross Blue Shield of Minnesota, found that total health plan expenditures attributable to inactivity were $83.6 million or $56 per member

(Garrett, Brasure, Schmitz, Schultz & Huber, 2004). Another study estimated that health care costs could be reduced by $29.2 billion to $76.6 billion dollars if the 88 million inactive Americans increased their participation in moderate-intensity physical activity (Pratt, Macera, & Wang, 2000). Overall, almost one-third of United States health care expenditures are for treatment and care of chronic diseases, which could be reduced through regular physical activity (HealthierUS, 2002).

These increases in health care costs, along with increases in preventable conditions, will cause health care costs and insurance premiums to rise. Ultimately, these increased costs may make it difficult for the ports in Hampton Roads to compete in the international market. Identifying factors that influence and promote regular physical activity can lead to health promotion activities that create a healthier workforce thereby reducing health care costs and allowing United States ports to be more competitive.

Policy Environment

*World Health Organization*

Physical activity is fundamental to improving the physical and mental health of individuals. The World Health Organization Global Strategy on Diet, Physical Activity, and Health report estimated that 2 million deaths worldwide were caused by physical inactivity (World Health Organization, 2004). In the last century, a shift in the major causes of disease, death and disability has occurred. During the 20th century, infectious diseases were the dominant cause of disease and mortality, but in the 21st century non-communicable diseases have taken the lead in the causes of disease and death. To emphasize this shift, in 2001, 60% of the 56 million deaths annually and 47% of the

global burden of disease was attributed to non-communicable diseases (World Health Organization, 2004).

Physical inactivity has become a global concern. In May 2004, the 57th World Health Assembly (WHA) endorsed the World Health Organization Global Strategy on Diet, Physical Activity, and Health. The report described how an unhealthy diet, physical inactivity, and tobacco use were the underlying determinants of non-communicable diseases and gave recommendations for remediation. Further, the WHA identified risk factors that often coexist, and interact and these risk factors include a high consumption of energy-dense, nutrient poor foods that are high in fat, sugar and salt; reduced levels of physical activity at home, at school, at work and for recreation and transport; and use of tobacco. The report recommended global development of national policies to promote physical activity guidelines that provide incentives to ensure that walking, cycling and other forms of physical activity are accessible and safe. This global focus on promoting regular physical activity is also evident in the United States with the development of health goals for the American people.

*Healthy People 2010*

The United States has long supported this global strategy on diet, exercise and health. Healthy People 2010 marked the third time the U.S. Department of Health and Human Services developed 10-year health objectives. The national planning process began with the 1979 Healthy People: *The Surgeon General's Report on Health Promotion and Disease Prevention* which was followed in 1990 by *Healthy People 2000.* Ten years later, *Healthy People 2010* provided national health objectives intended to identify the most significant preventable threats to the health of the nation and to create

national goals to reduce these threats (U.S. Department of Health and Human Services, 2000).

The leading health indicators mirror the major health concerns of Americans at the beginning of the 21st century. Although not ranked by order of importance, regular physical activity is listed first, followed by overweight and obesity, tobacco use, substance abuse, responsible sexual behavior, mental health, injury and violence, environmental quality, immunization, and access to health care. Thirteen physical activity and fitness objectives were developed to advance the goal of improving health, fitness, and quality of life through daily physical activity (Healthy People 2010, 2000). From these objectives, two were chosen as leading health indicators to measure the physical activity of the nation. The following physical activity objective, "Increase the proportion of adults who engage regularly, preferably daily, in moderate physical activity for at least 30 minutes per day," for adults was chosen based on the ability to promote action, the availability of data to measure progress, and the relevance of the information to a wide range of public health issues.

Significance

*Policy Support*

This study is important for several reasons. First, leading agencies and experts have recognized that regular physical activity is of major importance to the United States population. The World Health Organization, the American Alliance for Health, Physical Education, Recreation and Dance, the Surgeon General's Report on Physical Activity and Health (1996), and Healthy People 2010 recognize that all Americans could improve the quality of their lives by incorporating at least moderate physical activity into their lives

throughout their lifetime. A daily regimen of 30-45 minutes of brisk walking, bicycling or working around the house can reduce the risks of developing coronary artery disease, hypertension, colon cancer, and diabetes. Therefore, creating interventions to encourage regular physical activity could provide a whole range of health benefits.

Secondly, the population as a whole and, consequently, the workforce is aging which increases the likelihood of a rise in chronic diseases. The Centers for Disease Prevention and Control (CDC) acknowledged that chronic diseases, such as cardiovascular disease, cancer, and diabetes are among the most prevalent, costly, and preventable of all health problems (CDC, 2004). Regular physical activity positively affects many chronic diseases and helps maintain a healthy body, enhances psychological well-being, and prevents premature death (U.S. Department of Health and Human Services, 2000). These risks are especially pronounced for blue-collar workers, who, in general, have been an overlooked group in terms of exercise promotion. A study of the factors associated with motivating HRSA-ILA workers to exercise may have applications to other blue-collar groups.

*New Knowledge Expected From This Study*

This study fills a gap in the research by using a theoretical framework, the Theory of Planned Behavior, to identify psychosocial determinants of self-reported engagement in regular physical activity within a maritime union. By identifying and understanding the determinants that contribute to the initiation and maintenance of regular physical activity, programs and interventions can be designed to promote physical activity. To date, there have been no theory-based studies, which seek to determine the health

promotion and disease prevention needs of maritime union members. Therefore, studies

that target regular physical activity and the factors that influence the behavior are needed.

As a result this study will contribute to the body of knowledge explaining the macro and

micro determinants of regular physical activity in maritime union members.

Brief Overview of the Theory of Planned Behavior

The Theory of Planned Behavior is a conceptual framework for the study of

human action and has been used extensively by researchers due to the simplicity,

straightforwardness, and general applicability (Ajzen, 1991). The Theory of Planned

Behavior takes into account the factors that limit the amount of control a person has over

his behavior. As a result, the Theory of Planned Behavior is expected to be more

appropriate in situations where individuals do not have complete control over their

behavior. Figure 1 is a schematic representation of the Theory of Planned Behavior.

Figure 1: Schematic representation of the Theory of Planned Behavior (I)
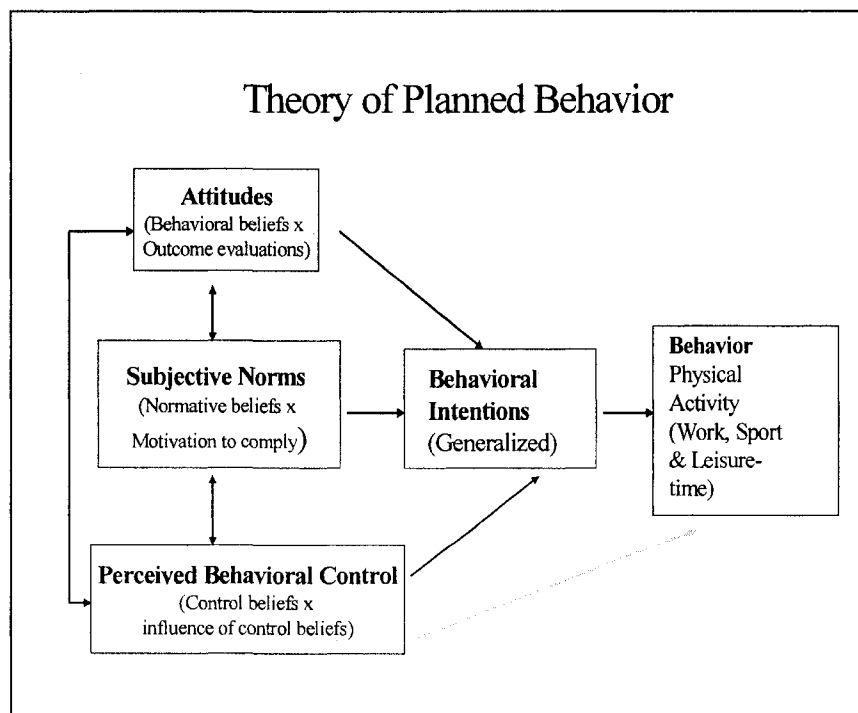
The Theory of Planned Behavior has been used in numerous studies to research health and physical activity behavior. The purpose of the Theory of Planned Behavior is threefold; to explain any human behavior, to predict and understand motivational influences on behavior that are not under the person's volitional control, and to identify how and where to target strategies that will predict the intention to perform a behavior. Figure 1 is a schematic representation of the constructs that comprise the Theory of Planned Behavior and how they interact with each other to facilitate a behavior.

The Theory of Planned Behavior proposes that human behavior is guided by at least three considerations: beliefs regarding the likely outcomes of the behavior and evaluation of these outcomes (behavioral beliefs), beliefs about the normative expectations of others and motivation to comply with these expectations (normative beliefs), and beliefs about the presence of factors that may facilitate or impede the performance of the behavior and the perceived power of these factors (control beliefs) (Ajzen, 2000).

Behavioral beliefs produce a favorable or unfavorable attitude toward the behavior; normative beliefs result in perceived social pressure or subjective norm; and control beliefs transform into perceived behavioral control (Ajzen, 2000). Combined together, the constructs of attitude toward the behavior, subjective norm, and perceived behavioral control, lead to the formation of behavioral intention. Generally, the more favorable the attitude and the subjective norm and the greater the perceived behavioral control, the stronger the individual's intention will be to perform the behavior under consideration.

Antecedent to perceived behavioral control are the weighted sum of control beliefs. These salient beliefs are related to the facilitating and obstructing factors, and the perceived power of a specific control factor to facilitate or impede behavioral performance. Consequently, those who have strong control beliefs or perceive they possess those factors that facilitate the behavior will have higher perceived behavioral control toward performing the behavior. Conversely, those who have strong control beliefs that they do not possess the factors that facilitate the behavior or the factors that impede performance of the behavior will have a lower perceived behavioral control.

In addition, The Theory of Planned Behavior states that perceived behavioral control has an indirect effect on behavior through intention as well as a direct effect on the behavior itself when the behavior is not completely under the person's control (Figure 1). The light grey line represents the direct effect of perceived behavioral control on the behavior. The relative weights of attitude, subjective norms, and perceived behavioral control for determining intention are expected to vary for different populations and behaviors (Ajzen, 2000).

The theory has been well studied with numerous health behaviors such as condom use, addictive behaviors, oral hygiene, HIV/AIDS, smoking cessation, dietary behaviors and physical activity and exercise behaviors (Armitage & Conner, 2001; Godin & Kok, 1996: Blue, 1995). Due to the importance of determining the factors that influence engaging in regular physical activity, several meta-analyses and critical reviews regarding the determinants have been accomplished (Kaewthummanukul & Brown, 2006; Armitage & Conner, 2001; Godin & Kok, 1996) and are reported in Chapter II.

Definition of Terms

The theory evolves around the description of the concepts. A person's behavior is driven by behavioral intentions where behavioral intentions are a function of a person's attitude toward the behavior, the subjective norms surrounding the performance of the behavior, and the perception of the ease with which one has control over the behavior to be performed (Ajzen, 1991). The conceptual definitions for the Theory of Planned Behavior as applied in this study are described below.

*Behavioral Beliefs*

Behavioral beliefs are a salient set of beliefs that performing the behavior will lead to a positive or negative outcome. Belief evaluation leads to the formation of attitude and indicates the attitude towards the behavior. Behavioral beliefs are antecedent to attitude (Fishbein & Ajzen, 1975). Behavioral beliefs multiplied by their outcome evaluations will determine indirect attitudes.

*Normative Beliefs*

Normative beliefs are the belief that important others approve or disapprove of one's performance of a particular behavior and the motivation to comply with the referents. The influence of normative beliefs is antecedent to subjective norm (Fishbein & Ajzen, 1975). Normative beliefs multiplied by the motivation to comply with other's wishes will determine indirect subjective norm.

*Control Beliefs*

Control beliefs are the beliefs in the ease or difficulty to perform a behavior and the perceived power of a specific control factor to facilitate or impede the performance of the behavior. The beliefs are based on past experiences, availability of required resources

and opportunities, and the anticipated barriers to performing the behavior. Control beliefs represent the external factors perceived to facilitate or obstruct behavior performance and are antecedent to perceived behavioral control (Ajzen, 1991). Control beliefs multiplied by the influence of these control beliefs will determine indirect perceived behavioral control.

## *Attitude*

Attitudes comprise the degree to which an individual has a favorable or unfavorable evaluation of the behavior. Attitude is a direct determinant of intention at the personal level (Fishbein & Ajzen, 1975).

## *Subjective Norm*

Subjective norms are the perception of social pressure to perform or not perform a behavior, representing the perception of what salient referent others think about the individual engaging or not engaging in the behavior (Fishbein & Ajzen, 1975).

## *Perceived Behavioral Control*

Perceived behavioral control reflects the personal beliefs regarding the ease or difficulty of performing a behavior (Fishbein & Ajzen, 1975).

## *Intention*

Intention is the antecedent to the behavior where behavior is a function of compatible intentions and perceptions of behavioral control. Intention is the likelihood that a person will engage in a behavior, influenced by attitude, subjective norm, and perceived behavioral control (Fishbein & Ajzen, 1975).

*Behavior*

The target behavior is the visible, observable response in a given situation. The behavior, in this case regular physical activity, is a specific action performed by an individual, which is influenced by the strength of the intention to perform the behavior (Fishbein & Ajzen, 1975). Physical activity was measured by a single question and by the physical activity index. Physical activity defined as activity done most days of the week, preferably daily; or 5 or more days of the week if moderate-intensity activities in bouts of at least 10 minutes for a total of at least 30 minutes per day; or 3 or more days of the week if vigorous-intensity activities for at least 20-60 minutes per session (CDC, 2005).

Research Questions

Based on the Theory of Planned Behavior, the research questions to be addressed by this study are:

1. What is the current level of regular physical activity among longshoremen?

2. To what extent does the Theory of Planned Behavior provide a good model of regular physical activity in longshoremen? In particular, when considered in one model how are attitudes, subjective norms, perceived behavioral control, and intentions related to longshoremen engaging in regular physical activity?

3. How are demographic variables (e.g., age, gender, ethnicity, educational level, marital status, income, years in the HRSA-ILA, and employment status) related to engaging in regular physical activity among longshoremen?

4. To what extent do the demographic factors moderate the performance of the Theory of Planned Behavior model in explaining regular physical activity among longshoremen?

CHAPTER II

REVIEW OF LITERATURE

Theoretical Framework: Theory of Planned Behavior

*Background and History of the Theory of Planned Behavior*

This study is based on the framework provided by the Theory of Planned

Behavior, which seeks to explain health behavior as a function of attitudes, subjective

norms, perceived behavioral control, and intention. In this study, the theory will be tested

to see how accurate a model it is for explaining factors that influence regular physical

activity among maritime union workers.

The Theory of Planned Behavior is an extension of the Theory of Reasoned

Action. Originally, the Theory of Reasoned Action was developed to explain volitional

behavior and is based on the assumption that people behave in a logical way by accessing

available information and considering the potential implications of their behavior

(Hausenblaus, Carron, & Mack, 1997). The underpinnings of the Theory of Reasoned

Action are based on the constructs of behavioral attitudes, subjective norms, and

intentions which predict and explain behavior under volitional control (Godin & Kok,

1996). The major assumption of the Theory of Reasoned Action proposed that people

were rational and capable of making systematic use of information available when

considering the implication of engaging in a behavior (Ajzen, 1991). The Theory of

Reasoned Action did not perform well with behaviors over which people did not have

complete volitional control.

In the late 1980's the Theory of Reasoned Action was modified to include the

concept of perceived behavior control and resulted in a newer theory known as The

Theory of Planned Behavior (Ajzen & Madden, 1986; Godin & Kok, 1996). Blue (1995) found that the Theory of Planned Behavior may be superior to the Theory of Reasoned Action for exercise intention over which the individual may not have complete volitional control.

A behavioral belief is the subjective probability that a behavior will produce a given outcome (Ajzen, 2005). According to the Theory of Planned Behavior, the antecedents prior to performing a behavior are intention, attitude, subjective norm, and perceived behavioral control. The underpinnings of these concepts are one's beliefs. Within the theory, attitude is composed of behavioral beliefs; subjective norm is composed of normative beliefs; and perceived behavioral control is composed of control beliefs. To predict if a person intends to do something, three questions need to be answered: 1) Is the person in favor of engaging in the behavior 2) How much social pressure does the person feel to perform the behavior and 3) Does the person feel in control of the behavior (Francis, et al., 2004). The answers to these questions are determined by the direct and indirect measures of beliefs that determine one's attitudes, subjective norm, and perceived behavioral control.

*Intention*

The central focus of the Theory of Planned Behavior is the intention of the person to perform a particular behavior. The intention to perform a behavior is the immediate determinant of actually performing the behavior. Intention is a motivational construct that represents how hard people are willing to try and how much effort they are planning to exert to perform a behavior (Hausenblaus, Carron, & Mack, 1997). According to the Theory of Planned Behavior, the formation of behavioral intentions depends on the prior

formation of attitudes, subjective norms, and perceived behavior control over the behavior of interest (Ajzen, 1991). The relationship between behavioral intention and actual behavior is not a perfect relationship, but intention can be used as a proximal measure of behavior (Francis, Eccles, Johnston, Walker, Grimshaw, Foy, Kaner, Smith, & Bonetti, 2004). Theoretically, intention is the direct determinant of behavior and is determined by the attitude toward engaging in the behavior and the perceived social pressures to engage in the behavior (Hausenblaus, Carron, & Mack, 1997). Intention has not been able to explain why a person did or did not perform a behavior, but a strong intention to perform the behavior has been shown to increase the likelihood that the behavior will be performed. The relationship of intention within the model can be used to determine the effectiveness of behavior even if an actual measure of the behavior is not available (Francis, et.al., 2004).

Intention involves 4 factors: the behavior, the target object at which the behavior is directed, the situation where the behavior is performed, and the time frame when the behavior is performed (Fishbein & Ajzen, 1975). These factors need to be considered when developing questions to measure intention. The other 3 antecedents (attitudes, subjective norms, and perceived behavioral control) are conceptually independent determinants of intention.

*Attitudes*

People develop attitudes from their beliefs. The Theory of Planned Behavior proposed that behavior is a function of the beliefs about the behavior which influence the attitudes towards the behavior (Ajzen, 1991). Attitudes are latent characteristics that can only be inferred from external, observable cues (Ajzen, 2005). Attitude toward a

behavior is a person's evaluation of the behavior (Francis, et al., 2004). Attitude toward performing a behavior, such as physical activity, is a function of a cognitive belief structure that has two subcomponents: the person's beliefs about the consequences of performing a behavior and the positive or negative evaluation of those consequences (Hausenblaus, Carron, & Mack, 1997). For example, one's beliefs about regular physical activity could be represented by improved stress levels (positive) and lack of time to engage in physical activity (negative) expectations.

In addition to the two subcomponents, there is also a strength component to behavioral beliefs, such as how much improvement in stress level; lack of time or both is expected. Therefore, one's attitude towards regular physical activity would be determined by the product of the evaluation of each expected outcome and the strength of the belief that would lead to the outcome (Hausenblaus, Carron, & Mack, 1997).

*Subjective Norms*

Subjective norms are an individual's own estimate of the social pressure to engage in or not engage in the behavior of interest (Francis, et.al., 2004). Normative beliefs are the underlying determinants of subjective norms (Ajzen, 1991). Normative beliefs are the perceived behavioral expectations of important individuals or groups such as the person's spouse, family, friends, coworkers, and doctor. The theory assumes that normative beliefs, in combination with the person's motivation to comply with the wishes of important individuals in their life determine the subjective norm. Therefore, subjective norm is a combined product of a person's normative beliefs, which are perceptions about the expectations of others important to them and the motivation to comply with those expectations (Hausenblaus, Carron, & Mack, 1997). Similar to attitudes, subjective

norms are composed of a strength element and a motivation to comply element. Subjective norm is determined by multiplying the evaluation of each motivation to comply by the strength of the expectations to comply with important other's wishes.

*Perceived Behavioral Control*

Perceived behavioral control is the degree to which a person feels able to perform the behavior and plays an important part in the Theory of Planned Behavior (Francis, et al., 2004). Control beliefs are a function of the person's perceived presence of factors that may facilitate or impede performance of a behavior (Ajzen, 1991). These factors are the resources and opportunities that are available to a person at any given time. The Theory of Planned Behavior views the control that people have over their behavior as a continuum of behaviors that are easily performed to those requiring considerable effort and resources (Ajzen, 1991). Control beliefs, along with the perceived power of each control factor, determine the perceived behavioral control. Perceived behavioral control has both a direct effect on behavior and an indirect effect through behavioral intentions (Hausenblaus, Carron, & Mack, 1997).

*Direct and Indirect Measures of the Constructs*

The variables in the Theory of Planned Behavior, with the exception of behavior, are psychological constructs. Each variable can be measured directly by asking questions about attitude, subjective norm, perceived behavioral control, or intention to engage in the behavior of interest or indirectly by asking questions about specific behavioral beliefs and outcome evaluations (Francis, et al., 2004). Although neither approach is perfect, asking questions about both direct and indirect measures make different assumptions about the underlying cognitive structures. Both methods are different ways of measuring

the same construct, and the scores are expected to be positively correlated. It is

recommended that both measures of the constructs be included in Theory of Planned

Behavior questionnaires (Francis, et al., 2004). Figure 2 shows the Theory of Planned

Behavior and how direct and indirect measures compose the constructs.

Figure 2: Schematic Representation of the Theory of Planned Behavior (II)

## Theory of Planned Behavior
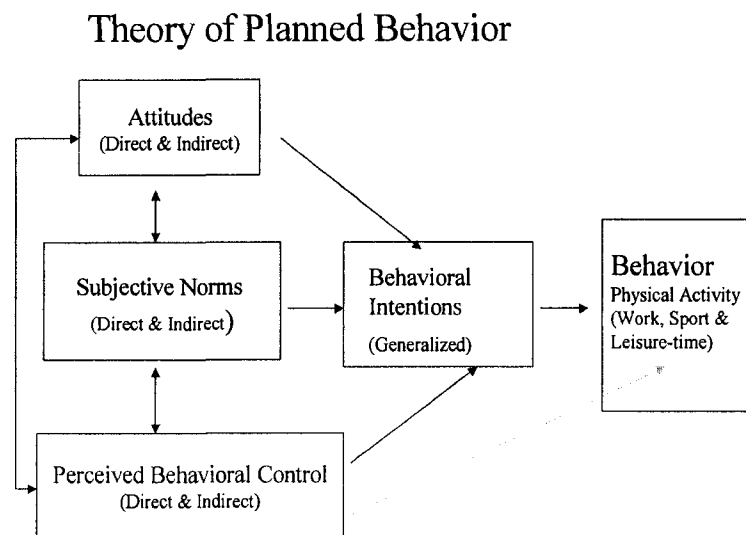


Application of the Theory of Planned Behavior

These studies were chosen because they illuminate the Theory of Planned

Behavior constructs in the domain of physical activity. The first three studies were meta-

analyses whose findings support the utility of the Theory of Planned Behavior to predict

physical activity behavior. The next two studies were chosen to review the usefulness of

the theory with different population ages. Since the members of the HRSA-ILA range in

age, one study used a younger age cohort and the other an older age group. The next two

studies used a union population. One did not use the Theory of Planned Behavior, but

did study a trade union population and the other applied the Theory of Planned Behavior

to blue-collar workers; although not maritime workers the study participants were a cross-section of skilled and unskilled workers.

*Support for Using the Theory*

Study 1: The Theory of Planned Behavior: A Review of Its Applications to Health-related Behaviors (Godin & Kok, 1996). This study reviewed the application of Ajzen's Theory of Planned Behavior regarding health behaviors and the efficiency of the theory to predict these health behaviors. The authors reviewed studies in which statistical information was given to predict intention from attitude, subjective norm and perceived behavioral control.

Of the 56 studies reviewed, 18 were classified into the exercise domain. The study confirmed that the Theory of Planned Behavior was able to explain intention and predict behavior across several health related behaviors and, in particular, exercise behavior. Within the exercise domain, reported average correlation coefficients, were: between intention and attitude .51(13), intention and subjective norm .30(13), intention and perceived behavioral control .50(13). The overall average correlation between behavior and intentions and perceived behavioral control were .52 (8) and .41 (8), respectively. The averaged $R^2$ values for exercise and intention was .424 and for behavior was .363. The higher the value of $R^2$ (range 0.00 to 1.00), the stronger the predictive potential of the model. The results indicated that the strongest predictive values for intention and exercise were attitude and perceived behavioral control. The authors also noted the lack of standard methods used to assess the constructs and recommended appropriate procedures to guide the development of research instruments.

Study II: The Predictive Capacity of the Theory of Reasoned Action and the Theory of Planned Behavior in Exercise Research: An Integrated Literature Review (Blue, 1995). This analysis evaluated studies using theory-driven measures of the constructs of the Theory of Reasoned Action and the Theory of Planned Behavior regarding exercise behavior. Of the 23 studies found, seven studies used the Theory of Planned Behavior. These seven studies suggest that physical activity is a non-volitional behavior, because the prediction of intention is improved with the addition of perceived behavioral control in the model. One study used intention to perform exercise as the dependent variable and four of the studies used exercise behavior as the dependent variable.

Even though a physical activity pattern is a comprehensive description of type, frequency, duration, and intensity over a specific period of time, the studies only included one or more of these components. Therefore, the comparison between the studies was complicated by the variation in the definition used for what constituted exercise or physical activity.

Coefficient alpha was used to measure internal consistency of the concepts. Cronbach's alpha estimates the proportion of variance that is systematic or consistent in a set of test scores and can range from 0.00 to 1.00 with the higher values reflecting a higher degree of internal consistency (Polit, 1996). The reliability of the belief components ranged from .56 to .97, direct measures of attitude and subjective norms had coefficient alphas ranging from .71 to .87, perceived behavioral control ranged from .81 to .87, and intention measures ranged from .73 to .96. A coefficient alpha of .70 is generally acceptable for an immature scale (Nunnally, 1978).

Seven of the studies used test-retest reliabilities, which ranged from .70 to .93 to assess the stability of the instruments. Intention to exercise was measured in two distinct ways. One way was to measure the extent to which the person "intends," "plans," "is determined," or "has decided" and the other way was to measure the "probability" or "likeliness" of performing the behavior. The latter, generally yielded higher correlations between intention to exercise and exercise behavior. The contribution of attitude to intention was significant in all studies. Linear structural equation modeling showed a direct and an indirect effect via intention of attitude on exercise behavior.

The correlation of subjective norm with intention was positive, although non-significant, in all but five studies. This suggested that intention to exercise is a personal choice and is not influenced by social pressure. Subjective norm also had a lower correlation with intention than attitude even though both were significant.

Indirect measures of attitude and subjective norm were included in 11 studies. Behavioral belief was predictive of attitude in all but one study. Normative beliefs were significantly correlated to subjective norms. Five studies found that beliefs were different between those who did and those who did not intend to exercise. Males and females seemed to have different beliefs about exercise with males having a higher intention to exercise than females.

The issue of statistical power was not addressed in any of these studies and the author recommended using power analyses to improve the outcome of the studies. Another consideration was the narrow definition and measurement of exercise by self-reports. A broader definition that included occupational, leisure, and home activities was suggested.

The findings suggest the Theory of Planned Behavior is superior to the Theory of Reasoned Action for studies of physical activity behavior. Furthermore, physical activity intention had more predictive qualities and did not assume that control for the behavior was directly and solely with the person. In addition, the author suggested a standardized measurement tool for methods and variables would improve the comparability of studies.

Study III: Determinants of Employee Participation in Physical Activity: Critical Review of the Literature (Kaewthummanukul & Brown, 2006).

This study provided a review of the literature related to factors that influence the level of employee participation in physical activity. Eleven studies, published from 1990 to 2002, that met the inclusion criteria were reviewed. The studies included both male and female workers and had sample sizes ranging from 131 to 598.

Measures for physical activity varied among the studies. Of note, one study used the Baecke Physical Activity Index (Baecke, Burema & Frijters, 1982). Items were answered on a 5-point scale of never-always obtaining an overall physical activity score. Test-retest reliability was 0.88 for the work scale, 0.81 for the sports scale, and 0.74 for the leisure scale. Generally, eight studies used standardized tools with adequate psychometric properties to measure physical activity and three studies used investigator-developed instruments without reliability and validity assessments.

Only two studies used the Theory of Planned Behavior as a theoretical framework. Seven studies examined demographics and suggested that physical activity declined with age, women are more sedentary than men, those with higher incomes and more education were less sedentary than those with lower educations and less income, and blue collar workers were more likely to have insufficient activity compared with

professionals. Three studies examined correlations between physical activity and other health risk behaviors with findings suggesting that decreased levels of physical activity were positively associated with smoking, obesity, and poor health status. Six studies measured self-efficacy and found it positively related to physical activity participation. Six studies investigated perceived health control with mixed findings. Two studies examined associations among attitude, social norms and intention to exercise. One of these studies used both direct and indirect measures of the variables and found intention the best predictor of exercise. Overall, self-efficacy (6 studies), age (5 of 6 studies), and gender (3 studies) were the strong determinants of participation in physical activity. The authors recommended further research to examine determinants of physical activity in a wide variety of settings and with diverse cultural groups.

*Age and the Theory of Planned Behavior*

Study IV: Predicting Exercise Intentions: The Theory of Planned Behavior (Gatch & Kendzierski, 1990). This study examined the utility of the Theory of Planned Behavior for predicting exercise intentions. The study findings demonstrated that attitude and subjective norm significantly predicted intention to exercise and that attitude contributed more to the prediction of intention than subjective norm. Although this study focused on females and many of the HRSA-ILA union members are male, it demonstrated measures of the constructs of the Theory of Planned Behavior that were similar to the measures used in the current study. The sample of 100 female university students between the ages of 18 and 26 completed a questionnaire based on Theory of Planned Behavior to measure their attitudes, subjective norms, perceived behavioral control, and intentions in regard to participating in aerobics regularly.

Eight measures of attitudes were obtained by responding to the phrase "doing my aerobics regularly" is: punishing-rewarding, useless-useful, unpleasant-pleasant, bad-good, harmful-beneficial, foolish-wise, sad-happy, and boring exciting. The sum of these scales constituted the attitude measure. Subjective norms were obtained by responding to the statement "Most people who are important to me would approve-disapprove of my doing aerobics regularly" and then rating their motivation to comply on a scale where $1 =$ not at all and $7 =$ very much. The product of the two was used as a measure of subjective norm. Perceived behavioral control was obtained by asking participants to rate, on a 7-point scale, their answers to the following: "How much control do you have over whether or not you do aerobics regularly?" (very little control-complete control) "For me to do aerobics regularly is difficult-easy, "If I wanted to I could easily do aerobics regularly" (extremely unlikely-extremely likely), "It is mostly up to me whether or not I do aerobics regularly" (true-false), "There is very little I can do to make sure I do aerobics regularly" (disagree-agree). The sum of these ratings was the measure of perceived behavioral control. Intentions were obtained by asking participants to rate: "I intend to do aerobics regularly" (extremely unlikely-extremely likely), "How regularly do you intend to do aerobics?"(not very regularly-very regularly), "I am determined to do aerobics regularly" (not at all- very much), "I will try my best to do aerobics regularly" (extremely unlikely-extremely likely), and " I am aiming at doing aerobics regularly" (definitely no-definitely yes). The sum of these ratings was the measure of intention. No measure of the behavior was used.

Internal consistency reliability was calculated for attitude, perceived behavioral control, and intention. A product was obtained for the subjective norm measure. The

resulting Cronbach's alpha of .79 was obtained for attitude, .81 for perceived behavioral control, and .93 for intention. Hierarchical regression analysis found that attitude and subjective norm contributed to the prediction of intention with standardized regression coefficients of .39 (p< .01) and .25 (p< .01), respectively. The research suggests that the Theory of Planned Behavior may be fruitful when applied in the exercise domain.

Study V: Predicting Exercise in Older Americans: Using the Theory of Planned Behavior (Michels, & Kugler, 1998). This study supports the Theory of Planned Behavior constructs that the intent to exercise predicts actual exercise behavior and that intent is directly influenced by attitude, social norms and perceived behavioral control. This research studied how accurately the Theory of Planned Behavior would predict intention to exercise and actual exercise behavior. The study sample consisted of 483 potential respondents: 431 responded to part one of the survey and 394 responded to part two for an overall response rate of 81.6%. The participants were 65 to 70 years old, 50% male, 90.8% white, 80.5% married, 56% college graduates.

Part one of a two-part survey was developed using the constructs of the Theory of Planned Behavior, demographic variables, and measures of general health status. Part two was mailed two weeks later, which consisted of the Paffenbarger Index, a validated and widely used measure of physical activity. The survey questions addressed all of the concepts, which were combined to represent variables for attitude, subjective norm, and perceived behavioral control. Chi square test was used for categorical variables and Student's t test for scales. Cronbach's alpha for each of the subcomponents of the scales ranged from 0.62 to 0.81, for attitude 0.68, and subjective norm 0.66. A multiple linear regression model for intention and correlation of intention with physical activity was

used. The base model showed an $R^2$ of 0.387, significant at $p<0.0001$ with all variables contributing significantly to the model. The final model showed a correlation between intention and behavior of 0.301 ($p \leq 0.01$) with intention being a significant predictor but perceived behavior control not being an insignificant predictor.

*Unions and Health Behaviors*

Study VI: A New Channel for Health Promotion: Building Trade Unions (Barbeau, Goldman, Roelofs, Gagne, Harden, Conlan, Stoddard, & Sorensen, 2005). Although this study did not use the Theory of Planned Behavior, the authors used focus groups and a self–reported questionnaire with union members to obtain the reported information. A similar format was used in the current study. This research tested the effectiveness of a tailored print and telephone based intervention in reducing smoking and increasing fruit and vegetable consumption. A self-administered survey and focus groups were parts of a randomized control trial of the Laborers' United for a Healthy Future project. A total of 1109 members responded to the survey for a 34% response rate. In the formative research phase, 16 focus groups were conducted with 88 participants. A semi-structured topic guide was developed to explore the participants' perceptions of the union's role in their lives and other health related concerns. Focus groups were audiotaped and professionally transcribed. Thematic and structural coding was used in the two-step coding process (Kreuger & Casey, 2000). The analysis found the following thematic domains: meaning of union membership, the union as a trusted source of information, and the perceptions of the limitations of the union. Interventions were tailored capitalizing on the information from the focus groups. The findings suggest that union membership plays an important role in the lives of members, union members

are predominately an at risk population, and union members can be a compelling channel for health promotion interventions.

Study VII: Exercise among Blue-Collar Workers: Application of the Theory of Planned Behavior (Blue, Wilber, & Marston-Scott, 2001). This study identified cognitive predictors of blue-collar workers' intention to exercise and exercise behavior. To examine the predictive capacity of blue-collar workers' attitudes, subjective norm, perceived behavioral control and intentions on self-reported exercise behavior, a descriptive cross-sectional survey design was used. A total of 472 surveys were returned with a response rate of 90.4%. The majority of the participants were male (73.9%), married (67.4%), completed high school (89.6%) and White (94.7%), with a mean age of 44.1 years (SD=11.2, range 20-69).

Measures for behavioral, normative, and control beliefs were used as indirect measures of attitude, subjective norm, and perceived behavioral control. A convenience sample of 21 blue-collar workers participated in an elicitation study to develop the belief questions. Indirect measure of attitudes was based on 12 statements for behavioral beliefs using a 5-point scale with very unlikely-very likely as endpoints. Seven items were positive, such as "gives me more energy" and 5 items were negative, such as, "is too time consuming". Each behavioral belief was multiplied by the corresponding outcome evaluation, and the products were summed for a weighted belief score. Behavioral belief measure scores ranged from 1 to 25. Correlations were between .30 and .75 with a Cronbach's alpha of .78. Direct measures of attitude were measured on a 7-point scale using the semantic differential adjectives of: pleasant/unpleasant,

interesting/boring, good/bad, useful/useless, valuable/worthless, and helpful/harmful. A Cronbach's alpha of .90 was reported.

Six questions measured indirect subjective norm and were based on normative beliefs regarding important referents identified from the elicitation study: spouse, family, boss, coworkers, friends, and physician. The items asked the participant what they thought the identified people think he/she should do regarding exercise. Responses were on a 5-point scale with definitely should not-definitely should endpoints. Six items correspondingly measured the motivation to comply. Scores from the normative beliefs were multiplied by the corresponding motivation to comply and the products summed. Cronbach's alpha for indirect measures of subjective norm was .86. Two items were used to directly measure subjective norm. Product scores were used as the direct measure of subject norm.

Seven control belief questions were developed to indirectly measure perceived behavioral control. Items were measured on a 5-point scale from very easy to very difficult yielding a Cronbach's alpha of .86. Two items were used to directly measure perceived behavioral control with an item range from 1 to 5. Higher scores indicated more control.

Two items measured intention. In question one, the subjects were asked if they "intended to perform exercise for 20 minutes each time at least 3 times a week" on a 5-point scale with definitely will not/definitely will endpoints. In question two, the subjects were asked "how likely or unlikely it was that they would exercise for 20 minutes each time at least 3 times a week" on a 5-point scale with not likely at all/extremely likely endpoints. The Godin Leisure Activity Questionnaire measured physical activity

behavior and was designed to access employee leisure activity. Reserachers reported test-retest reliabilities between .46 and .94.

The results indicated the indirect measure of attitude showed a fair amount of uncertainty that exercising regularly would lead to positive outcomes. However, the direct measure of attitude suggested there was a general positive attitude toward exercise. The direct measures of subjective norm showed only a modest amount of perceived social pressure to exercise. The direct and indirect measures of perceived behavioral control indicated only a modest amount of control over engaging in physical activity. Measures of intention showed the participants had only a moderate intention to exercise. The correlations among the measures of attitude, subjective norm, perceived behavioral control, intention, and behavior were highly significant. Furthermore, the measures of intention were strongly correlated with the measures of physical activity.

Overall, these 7 studies have applied the Theory of Planned Behavior to various ages, ethnic backgrounds, and populations. Union and other blue-collar workers, men and women were also studied. Although no studies were found using a maritime union population, the similarities of those used in the studies and the HRSA-ILA population provides support for using the Theory of Planned Behavior in this study.

*Attitudes and the Theory of Planned Behavior*

Attitudes are the first determinant of behavioral intention. Attitudes, both favorable and unfavorable, are one of the four antecedents to the performance of a behavior. Several studies used scales to measure attitudes with Cronbach's alpha ranging from .79 to .90 (Chatzisarantis, Frederick, Biddle, Hagger, & Smith, 2007; Guinn, Vincent, Jorgensen, Dugas, & Semper, 2007; Armitage, 2005; Latimer & Ginis, 2005;

Prapavessis, Maddison, Ruygrok, Bassett, Harper, & Gillanders, 2005; Blanchard,

Courneya, Rodgers, Fraser, Murray, Daub, & Black; 2003).

An attitude is formed from the salient beliefs about the intention to perform the

behavior and the consequences of performing the behavior (Ajzen, 2005). Several

studies correlated the behavioral beliefs to attitude and found behavioral beliefs were

significantly related to attitude (Norman & Conner, 2005; Blanchard, Courneya, Rodgers,

Fraser, Murray, Daub, & Black, 2003).

Numerous studies have found statistically significant correlations of attitudes and

with the intention to be physically active or exercise (Chatzisarantis, Frederick, Biddle,

Hagger, & Smith, 2007; Tolma, Reininger, Evans, & Ureda, 2006; Armitage, 2005;

Chatzisarantis & Hagger, 2005; Norman & Conner, 2005; Prapavessis, Maddison,

Ruygrok, Bassett, Harper, & Gillanders, 2005; Blanchard, Courneya, Rodgers, Fraser,

Murray, Daub, & Black, 2003), however, Blue, (2007) found attitude was not related to

the intention to be physically active. Other studies found statistically significant

correlations of attitudes with physical activity or exercise (Chatzisarantis, Frederick,

Biddle, Hagger, & Smith, 2007; Gretebeck, Black, Blue, Glickman, Huston, and

Gretebeck, 2007; Jones, Courneya, Vallance, Ladha, Mant, Belch, & Reiman, 2006;

Armitage, 2005; Chatzisarantis & Hagger, 2005; Prapavessis, Maddison, Ruygrok,

Bassett, Harper, & Gillanders, 2005). Additional studies with information on the

relationship of attitude and the concepts of the Theory of Planned Behavior are described

in Appendix C.

*Subjective Norms and the Theory of Planned Behavior*

Subjective norms are the second predictor of intention to perform a behavior and are the result of a person's perceptions of social expectation to engage in a behavior. When significant others view engaging in a behavior as positive and individuals are motivated to meet the expectations of others, then a positive subjective norm exists. The opposite can also be true giving rise to negative subjective norms.

Several studies used scales to measure subjective norms with Cronbach's alpha ranging from .65 to .92 (Chatzisarantis, Frederick, Biddle, Hagger, & Smith, 2007; Guinn, Vincent, Jorgensen, Dugas, & Semper, 2007; Armitage, 2005; Latimer & Ginis, 2005; Prapavessis, Maddison, Ruygrok, Bassett, Harper, & Gillanders, 2005; Blanchard, Courneya, Rodgers, Fraser, Murray, Daub, & Black; 2003). Some studies correlated the normative beliefs to subjective norms and found the concepts significantly related (Norman & Conner, 2005; Blanchard, Courneya, Rodgers, Fraser, Murray, Daub, & Black, 2003).

Other studies revealed statistically significant correlations of subjective norms and intention to exercise (Chatzisarantis, Frederick, Biddle, Hagger, & Smith, 2007; Tolma, Reininger, Evans, & Ureda, 2006; Armitage, 2005; Latimer & Ginis, 2005; Norman & Conner, 2005; Prapavessis, Maddison, Ruygrok, Bassett, Harper, & Gillanders, 2005; Blanchard, Courneya, Rodgers, Fraser, Murray, Daub, & Black, 2003; Mummery, Spence, & Hudec, 2000). However, some studies found that the correlation of subjective norms and intention to be physically active was not statistically significant (Gretebeck, Black, Blue, Glickman, Huston, & Gretebeck, 2007; Chatzisarantis & Hagger, 2005; Norman & Conner, 2005; Prapavessis, Maddison, Ruygrok, Bassett,

Harper, & Gillanders, 2005; Rhodes, Jones, & Courneya, 2002). One study found subjective norm to be the strongest predictor of intention to engage in physical activity (Tolma, Reininger, Evans, & Ureda, 2006).

Some studies found statistically significant correlations of subjective norm with physical activity or exercise (Chatzisarantis, Frederick, Biddle, Hagger, & Smith, 2007; Gretebeck, Black, Blue, Glickman, Huston, & Gretebeck, 2007; Jones, Courneya, Vallance, Ladha, Mant, Belch, & Reiman, 2006; Armitage, 2005; Courneya, Vallance, Jones, & Reiman, 2005; Latimer & Ginis, 2005). However, other studies found that subjective norm was not a significant predictor of physical activity (Chatzisarantis & Hagger, 2005; Prapavessis, Maddison, Ruygrok, Bassett, Harper, & Gillanders, 2005). Additional studies with information on the relationship of subjective norm and the concepts of the Theory of Planned Behavior are described in Appendix C.

*Perceived Behavioral Control and the Theory of Planned Behavior*

Attitudes and subjective norms are important components of the Theory of Planned Behavior, but a person may have very little control over his/her behavior. Perceived behavioral control is the third determinant of behavioral intention and is composed of the person's perception of how successfully he/she can perform the behavior combined with the person's control belief. For example, the more resources and opportunities available and the fewer anticipated obstacles, the greater the perceived behavioral control will be and the stronger the intention to perform the behavior.

Several studies used scales to measure perceived behavioral control with Cronbach's alpha ranging from .43 to .95 (Chatzisarantis, Frederick, Biddle, Hagger, & Smith, 2007; Armitage, 2005; Latimer & Ginis, 2005; Prapavessis, Maddison, Ruygrok,

Bassett, Harper, & Gillanders, 2005; Blanchard, Courneya, Rodgers, Fraser, Murray, Daub, & Black; 2003).

One study correlated control beliefs with perceived behavioral control and found them significantly related (Blanchard, Courneya, Rodgers, Fraser, Murray, Daub, & Black, 2003). One study found perceived behavioral control to be the strongest predictor of intention to engage in physical activity (Tolma, Reininger, Evans, & Ureda, 2006). Other studies revealed statistically significant correlations of perceived behavioral control and intention to exercise (Chatzisarantis, Frederick, Biddle, Hagger, & Smith, 2007; Guinn, Vincent, Jorgensen, Dugas, & Semper, 2007; Gretebeck, Black, Blue, Glickman, Huston, and Gretebeck, 2007; Armitage, 2005; Chatzisarantis & Hagger, 2005; French, Sutton, Hennings, Mitchell, Wareham, Griffin, Hardeman, and Kinmonth, 2005; Latimer & Ginis, 2005; Prapavessis, Maddison, Ruygrok, Bassett, Harper, & Gillanders, 2005; Blanchard, Courneya, Rodgers, Fraser, Murray, Daub, & Black, 2003; Mummery, Spence, & Hudec, 2000), however several studies found that the correlation of perceived behavioral control and intention to be physically active was not statistically significant (Latimer, Ginis & Arbour, 2006; Latimer & Ginis, 2005).

Some studies found statistically significant correlations of perceived behavior control and physical activity or exercise (Chatzisarantis, Frederick, Biddle, Hagger, & Smith, 2007; Gretebeck, Black, Blue, Glickman, Huston, & Gretebeck, 2007; Jones, Courneya, Vallance, Ladha, Mant, Belch, & Reiman, 2006; Armitage, 2005; Courneya, Vallance, Jones, & Reiman, 2005; Latimer & Ginis, 2005). Additional studies with information on the relationship of perceived behavioral control and the concepts of the Theory of Planned Behavior are described in Appendix C.

*Intention and the Theory of Planned Behavior*

The most important determinant of behavior is intention. Intention to engage in a behavior is the combination of attitude, subjective norm, and perceived behavioral control over engaging in the behavior. Several studies used scales to measure intention with Cronbach's alpha ranging from .70 to .92 (Chatzisarantis, Frederick, Biddle, Hagger, & Smith, 2007; Tolma, Reininger, Evans, & Ureda, 2006; Armitage, 2005; Prapavessis, Maddison, Ruygrok, Bassett, Harper, & Gillanders, 2005).

Several studies found strong positive correlations of intention and actual behavior (Chatzisarantis, Frederick, Biddle, Hagger, & Smith, 2007; Gretebeck, Black, Blue, Glickman, Huston, and Gretebeck, 2007; Armitage, 2005; French, Sutton, Hennings, Mitchell, Wareham, Griffin, Hardeman, and Kinmonth, 2005; Latimer & Ginis, 2005; Prapavessis, Maddison, Ruygrok, Bassett, Harper, & Gillanders, 2005; Mummery, Spence, & Hudec, 2000). Additional studies with information on the relationship of intention and the concepts of the Theory of Planned Behavior are described in Appendix C.

*Regular Physical Activity and the Theory of Planned Behavior*

Several studies did not measure behavior but used intention as a proximal measure of physical activity (Blue, 2007; Guinn, Vincent, Jorgensen, Dugas, & Semper, 2007; Tolma, Reininger, Evans, & Ureda, 2006; French, Sutton, Hennings, Mitchell, Wareham, Griffin, Hardeman, and Kinmonth, 2005; Mummery, Spence, & Hudec, 2000). Other studies measured physical activity by a single question (Armitage, 2005; Norman & Conner, 2005). A number of studies used Godin and Shephard's Leisure Time Exercise Questionnaire (Chatzisarantis, Frederick, Biddle, Hagger, & Smith, 2007; Jones,

Courneya, Vallance, Ladha, Mant, Belch, & Reiman, 2006; Chatzisarantis & Hagger, 2005; Courneya, Vallance, Jones, & Reiman, 2005; Prapavessis, Maddison, Ruygrok, Bassett, Harper, & Gillanders, 2005; Rhodes, Jones, & Courneya, 2002). Some studies used the Baecke Physical Activity Scale (Tsoebatzoudis, 2005; Conn, Tripp-Reimer, & Maas, 2003).

This study used questions for regular physical activity adapted from the Baecke Physical Activity Scale (BPAS) (Bawcke, Burema, & Frijters, 1982). The BPAS contained 16 questions, which measure: physical activity at work; sport during leisure time; and physical activity during leisure-time. Eight questions measure occupational physical activity, 4 questions measure physical activity during leisure time, and 4 questions assess leisure-time activities. The tool produced 3 physical activity scores when summed and divided by the items produced a score for physical activity.

The BPAS has been used with a variety of populations. Conn, Tripp-Reimer, and Maas (2003), used the BPAS in their study with older women and exercise. One study used the BPAS with 494 working class men and found that a higher physical work load in the workplace does not provide adequate intensity, volume, and duration of physical tasks to provide positive changes in aerobic capacity, strength, or flexibility (Ruzic, 2003). Another study using the BPAS with 636 men and women, found that female certified athletic trainers scored significantly higher than their male counterparts in total activity levels (Cuppett & Latin, 2002).

Although no information about the reliability and validity of the BPAS with union workers is available, the tool has been validated in numerous studies. A modification of the BPAS was tested for repeatability and relative validity in a population of 134 men

and women aged 20-70 years and showed good reliability and moderate validity when compared with an activity diary (Pols, Peeters, Bueno-de-Mesquita, Ocke, Wentink, Kemper, & Collette, 1995). Reliability was evaluated in one study of 25 outpatients living with HIV/AIDS and found a strong correlation in occupational physical activity, and physical activity during leisure, but not for leisure and locomotion activities (Florindo, Latorre, Santos, Negrao, Azevedo, & Segurado, 2006). Another study used the BPAS to assess leisure physical activity in 78 men and women aged 20-59 years and found high reliability and an accurate assessment of heavy and light intensity activity when compared to peak oxygen consumption and percent body fat (Richardson, Ainsworth, Wu, Jacobs, & Leon, 1995). Considering the length, ease of administration, overall reliability and validity from previous studies, the BPAS was an adequate tool to measure physical activity among marine union workers.

In summary, no research was found that studied regular physical activity using the Theory of Planned Behavior in a maritime union population. Numerous studies, as previously reported, have found the constructs of the theory useful in explaining the intention to engage in regular physical activity and the behavior of regular physical activity. In addition, some studies have used the theory with blue-collar populations (Blue, Wilber, & Marston-Scott; Richie, Herscovitch, & Norfor, 1994; Desmond, Conrad, Montgomery, & Simon, 1993). These studies provide enough evidence to suggest that the Theory of Planned Behavior may be a useful framework for understanding the important beliefs related to intention to engage in regular physical activity and the behavior of physical activity of maritime union members.

CHAPTER III

METHODOLOGY

Research Questions and Hypotheses

The research questions and hypotheses are based on the constructs of the Theory of Planned Behavior. The first question asks the current level of regular physical activity of longshoremen. The second question explored the extent to which the Theory of Planned Behavior provided a good model of how attitudes, subjective norms, and perceived behavioral control are related to longshoremen's intention to engage in regular physical activity and engage in the behavior of regular physical activity. The third question explored how the demographic variables (e.g. age, gender, ethnicity, educational level, marital status, income, years in the HRSA-ILA, and employment status) are related to longshoreman's intention to engage in regular physical activity and to engage in the behavior of regular physical activity. Lastly, the fourth question defined to what extent the demographic factors moderated the performance of the Theory of Planned Behavior model in explaining intention to engage in regular physical activity and to engage in the behavior of regular physical activity among longshoremen. A comprehensive listing of the research questions with the main hypotheses are found in Appendix D.

Study Design

An observational cross-sectional survey research design was used to examine how the constructs from the Theory of Planned Behavior are associated with longshoremen's attitudes, subjective norms, perceived behavioral control, and intentions of their self-reported physical activity behaviors. This type of design uses statistical controls to establish associations between variables. Although no causal relationships can be derived

because the data was collected at one point in time, valuable information regarding the physical activity of longshoremen can be obtained. In this study, the major threats to internal validity were selection bias, social desirability, and instrumentation. Measures were taken to reduce these threats.

This study was conducted in two phases. Phase 1 consisted of 5 focus groups conducted with members of the HRSA-ILA. This elicitation study identified beliefs about physical activity, which were used as a basis for the development of the self-administered questionnaire used in Phase II. This approach is consistent with Montano & Kasprzyk's (2002) method for applying the Theory of Planned Behavior to identify attributes or outcomes of a behavior. In addition, Ajzen recommended using elicitation groups for the selection of appropriate items in the formative stages of investigation to secure reliable, internally consistent measures for the identified population (Ajzen, 2002, 2006).

Phase II consisted of developing and conducting a self-administered survey. The survey items were constructed to reflect the health beliefs regarding physical activity of the HRSA-ILA members. Items were developed to assess attitudes, subjective norms, perceived behavioral control beliefs, intentions, and physical activity behaviors of longshoremen. Physical activity, both at work and during leisure time, was measured by questions adapted from the Baecke Physical Activity Scale (BPAS) (Bawcke, Burema, & Frijters, 1982). Demographic variables measuring age, gender, race, educational level, marital status, income, and years with the HRSA-ILA were included.

Information obtained during the focus groups was used, in part, to develop the survey tool. The questionnaire was constructed to ensure ease of completion and

maximum return rate. A pilot study was conducted to provide comments on the questions, stems, and formatting of the questionnaire. The survey packet included an explanation of the study in 14-point type, an instruction sheet, and primarily closed ended questions.

*Elucidation Study  – Phase 1*

Five focus groups at various locations and times were held. Snowball sampling was used to recruit the 30 active and retired HRSA-ILA members who participated. To encourage participation, refreshments were provided and each participant was given a $25 gift certificate to a local store. A moderator's guide was developed to direct the conversation (Appendix B). The groups were audiotaped and transcribed by the researcher, and hand-coded by two researchers using the constant comparative method (Krueger & Casey, 2000).

The purpose of the focus groups was to explore longshoreman's knowledge, beliefs, and attitudes regarding healthy lifestyles. The main health topics of interest centered on nutrition and maintaining a healthy diet, accessing healthcare, promotion of an active lifestyle, smoking cessation, and the need for stress management options. To create a manageable questionnaire, it was necessary to narrow the area of interest. Regular physical activity was chosen to explore further due to the culture of the group, the potential for future health promotion interventions, and the likelihood of members embracing the potential recommendations.

Focus group transcripts were examined to determine longshoreman's behavioral, normative and control beliefs used in the development of the questionnaire. Questions q08 through q23 were the behavioral beliefs that composed the measure of indirect

attitudes (Table IV). The behavioral beliefs that emerged were that regular physical activity was: 1) good for their health, 2) helped to reduce stress, 3) helps to control their weight, 4) helps them to feel better, 5) helps prevent heart disease, 6) prevented by lack of time, 7) is inconvenient, and 8) is difficult because they are too tired. The representative comments that follow are the words of longshoremen about their behavioral beliefs regarding healthy lifestyles.

Physical activity is good for your health.

"To stay healthy - watch what you eat, balance your meals out ... exercise every day, maybe after you eat dinner or something, maybe walk down the block sometimes and come into the house, watch some TV and relax."

Physical activity helps to reduce stress.

"There is also the stress. A lot of longshoremen get stressed out, you know worrying about bills and if this is going to get paid... and when we're going to work next. Cause stress - that's another thing, its take a toll on people."

Physical activity helps to control weight.

"Of course most people would probably imagine that longshoreman is a physically active job but sounds like what you are saying it is mostly mechanical and that you're driving and it's not a physically active job. You might have to occasionally do something physically active but it's kind of in spurts not like you are always doing it and keeping in shape."

Physical activity helps you feel better.

> "I feel good now... eat the right kinds of foods and exercise ...I go to the Y
> everyday. I never did smoke – I don't even be around people that smoke, that's
> second hand smoke."

Physical activity is difficult because I am too tired.

> "Longshoremen don't sleep that much but I think that longshoremen will go to
> sleep anywhere. I really do because the hours – it might not be the proper- but
> you're going to sleep sooner or later ... it might not be what you call a healthy
> sleep but if you get anywhere relaxed you are going to sleep."

Physical activity is difficult because I don't have time.

> "Only 24 hours in the day, you know you got your job, and you got maybe one or
> two chores at home. Then you got your wife to deal with and maybe a couple of
> kids or whatever and then the day is gone."

Physical activity is inconvenient:

> "Sometimes it hard to take off because you don't know if there is going to be
> work. There are many times that I have a doctor's appointment and I cancel it
> because I found out there was a ship coming in the next day and my gang is on it.
> My wife says you need to go to the doctor – look I ain't worked but two days last
> week – I got to catch this job and many times I've called up and cancelled that
> appointment. I think – I'll make it next week. Sometimes next week don't
> come."

Physical activity helps prevent heart disease:

> "My father died of a heart attack and my mother she is deceased as well. She had
> high blood pressure… they both died in the early 70's. I've been more aware of
> that and trying to make sure that I do the proper things to maintain my life and try
> to make sure that I have a long life."

The referent groups that were important to longshoremen in regards to their normative beliefs were their wives, family members, friends, coworkers, and doctors. Questions q29 through q38 show the strength of each normative belief and the motivation to comply with the pressure from each reference group. The score derived from these questions comprises the indirect subjective norm score. The representative comments that follow are the words of longshoremen about their normative beliefs regarding important referent groups.

Importance of my wife's beliefs.

> "My wife is real health conscious, like I said, she's more or less a healthy type
> person, she walks all the time, she cooks the right foods…and I'm married to her
> so what choice do I have."

Importance of family member's beliefs.

> "I have a daughter …I tried to sneak a bowl of ice cream a couple of nights ago
> and my daughter walked in just reached over her hand and snatched it out of my
> hand and picked it up and walked away with it … I got kind of offended by it… I

felt like I was a child being picked on ... I started to say something to her but well

she is only trying to help me so I left it alone."

Importance of friend's beliefs.

"Most of us try to maintain a healthy lifestyle of course but as far as the weight is

concerned we get off kilter – sometimes because of our friends, the way we work

and the few places that are open during the times we eat…"

Importance of co-worker's beliefs.

"I think it takes somebody to do something positive to motivate somebody else

and then it just takes – you know what I mean - You wonder why this guy is

feeling good all the time and motivates everyone else."

Importance of my doctor's beliefs.

"Go to a specialist or doctor and sit there and talk. I always like to talk to my

doctor he going to put everything on the table cause I think they going to tell you

what's right."

The beliefs that were important to longshoremen in regards to their ability to

control their engagement in regular physical activity were: lack of places to exercise at

work; not enough time; lack of planning; other obligations; and working long hours.

Questions q43 through q52 show the strength of each control belief and the power of

these control factors to influence physical activity. These questions comprise the

measure of indirect perceived behavioral control. The representative comments that

follow are the words of longshoremen about their control beliefs regarding healthy

lifestyles.

Lack of places to exercise at work.

> "Now everything is in computers and containers so it's not so physically hard
> now. They are taking all the space to put containers so there is no place to
> exercise...So now a lot of times you could go in there (referring to an exercise
> room on the piers) on a break you could ride the bicycle, lift weights, or walk the
> treadmill."

Not enough time.

> "It's hard to be family oriented for me because I don't know what day I might
> have a shift well you see I work 40 hours guaranteed and I also have a rotation
> and I work about 3-4 shifts a week on a rotation."

Lack of planning.

> "That's when the problem comes up for me because I don't know what night I'm
> going to be up and what night I'm not going to be up to work. It's hard to plan
> things."

Other obligations.

> "I painted the house inside and out – that's quite a job now I'm going to paint the
> inside again. My wife she wants to do the kitchen in Tuscany so that's going to
> be a job. My favorite activity is working in my garden. I raise tomatoes,
> vegetables, and peppers and I can them and sell them at the church in the fall and
> in the spring. My wife and I love to travel and I do like my TV. I spend some
> time watching TV."

Working long hours.

"We have a hard time – we don't have a set time  - we can't go home to eat the

proper meals ...we go to work and sometimes don't get off... we have to work it

because we don't know when the jobs coming back... so if you got that job you

stick with it till you finished."

*Development of the Survey Instrument –Phase II*

The survey questionnaire was developed using the guidelines outlined in

Constructing Questionnaires Based on the Theory of Planned Behavior: A Manual for

Health Services Researchers and information obtained from Phase 1 (Francis, Eccles,

Johnston, Walker, Grimshaw, Foy, Kaner, Smith, & Bonetti, 2004).  According to

Frances, et al., 2004, the phases of survey construction are: 1) define the population of

interest; 2) define the behavior under study; 3) determine how intention will be measured;

4) identify the advantages and disadvantages of the behavior; 5) identify the most

important groups or people who would approve or disapprove of the behavior; 6) identify

the perceived barriers and facilitating factors which could make it easier or more difficult

to engage in the behavior; 7) develop a draft of the questionnaire in which all constructs

are measured; and 8) pilot the questionnaire (Francis, et. al. 2004).

Behavioral, normative and control beliefs have a central role in the Theory of

Planned Behavior.  These beliefs provide the cognitive and affective foundations for

attitudes, subjective norms, and the perceptions of behavioral control (Ajzen, 2006).

Theoretically, by measuring a person's beliefs, one can explore why people hold certain

attitudes, subjective norms, and perceptions of behavioral control.

The questionnaire developed for use in this study included the following categories: measures of participation in regular physical activity, intention to engage in regular physical activity, direct and indirect measures of attitudes, direct and indirect measures of subjective norm, direct and indirect measures of perceived behavioral control, and demographic variables.

All direct and indirect measures of attitudes, subjective norms, perceived behavioral control and intentions were measured by a 7-point semantic differential scale. The particular content and phrasing of questions were drawn, in part, from themes, which emerged from the focus groups conducted with longshoremen in the summer of 2006 (Tweed, Houseman, & Plichta, 2006). Instrument items were specific to the target at which the behavior is directed, the action of the behavior under study, and the context and time in which the behavior was carried out. Demographic characteristics were measured with standard variables drawn from the 2006 Behavioral Risk Factor Surveillance System and include items about gender, age, race, marital status, educational level, income level, and years in the union.

In accordance with the first stage, the population of interest was defined as the active and retired members of the HRSA-ILA. The general characteristics of this population have been described in the previous section. All focus groups, pilot test and the final instrument distribution were conducted with members of this group.

As specified in the second stage, the primary behavior under study was regular physical activity. In particular, this study employs the definition of physical activity espoused by the Centers for Disease Control and Prevention (CDC, 2005). Specifically, "regular physical activity is activity that you do most days of the week, preferably daily;

or 5 or more days of the week if moderate-intensity activities in bouts of at least 10 minutes for a total of at least 30 minutes per day; or 3 or more days of the week if vigorous-intensity activities for at least 20-60 minutes per session." In this study, regular physical activity was measured by questions adapted from the Baecke Physical Activity Scale (BPAS) (Bawcke, Burema, & Frijters, 1982). The BPAS is a short comprehensive tool that measures physical activity at work, sports during leisure time, and leisure-time physical activity.

As specified in the third stage, generalized intention was measured. Francis, et.al., (2004) described three possible ways to measure intention: 1) intention performance, 2) generalized intention, and 3) intention simulation. This study asks questions about an individual's own health-related behavior therefore generalized intention is the method most commonly used to illicit this kind of data. Both intention performance and intention simulation are not practical for this study due to time and financial considerations. Intention to engage in physical activity is used as a proximal measure for engaging in physical activity (Francis, et al., 2004). Three questions measure generalized intention and are described later.

The fourth, fifth, and sixth stages of the survey process were constructed based upon a series of focus groups held with this population in the summer of 2006 (Appendix A; Tweed, Houseman & Plichta, 2006). Themes included the advantages and disadvantages of engaging in physical activity; those who were the most important referent groups or people who would approve or disapprove of the member engaging in physical activity; and what the union members perceived as barriers and facilitating factors that could make engaging in physical activity easier or more difficult.

As specified in the seventh stage of the process, a draft of the questionnaire was developed to measure all relevant constructs including attitudes towards regular physical activity, subjective norms regarding engaging in regular physical activity, perceived behavioral control about engaging in regular physical activity, the member's intention to engage in regular physical activity, and regular physical activity at work and during leisure time. Items used to assess generalized intention are interspersed with items measuring attitudes, subjective norms, and perceived behavioral control.

Concurrent with the eighth stage, the draft survey was piloted. The purpose of the pilot was to test the administrative procedures and evaluate if the questions were clear and understandable. The draft questionnaire was sent to an expert panel consisting of a professor from Eastern Virginia Medical School, and professors in Community Health and Health Services Research at Old Dominion University, an Administrator and Director of Participants Benefits at HRSA-ILA, a union local president, and several union members. Each panel member was asked to complete the questionnaire and comment on the following questions: 1) Are the items ambiguous or hard to answer? 2) Are the items too repetitive? 3) Does the survey seem too long? 4) Is the survey interesting or boring? 5) Are there any annoying features, wording, or formatting? Minor revisions to the questionnaire were made from the comments by the panel of experts.

Survey Sampling

*Target Population*

In the past, being an HRSA-ILA union member was largely unskilled, yet highly paid labor in which heavy physical work was required. As members of the union, African Americans could earn a good living. Although the waterfront is a hard and dangerous

place to earn a living, the HRSA-ILA attracts practical men and women that take pride in

the hazards and hardships of loading and unloading ships. With the rise in

containerization more heavy equipment is used and less physical work is required.

Mechanization of the port has changed the quality and quantity of union employment

creating an environment in which complex knowledge and skills are requirements for

union members.

A distribution of the population of HRSA-ILA members, stratified into active and

retired members in 2007, is represented in Table 1 (L. Cobb, personal communication,

October 21, 2007). More than half (54%) of the retired members are between the ages of

60 – 74 years old and over two-thirds (64%) of the active members are between 35 and

54 years old. Females comprise only 9 % of the active members in the union. HRSA-

ILA does not track the ethnicity of union members (L. Cobb, personal communication,

October 15, 2007).

Table 1: Age and Gender Distribution of Active and Retired HRSA-ILA Member, 2007

| Category | Retired N | % | Active N | % |
| --- | --- | --- | --- | --- |
| Age | | | | |
| Under 20 | 0 | 0 | 7 | 0 |
| 20-24 | 0 | 0 | 86 | 4 |
| 25-34 | 0 | 0 | 350 | 18 |
| 35-44 | 3 | 0.3 | 642 | 33 |
| 45-54 | 68 | 6 | 604 | 31 |
| 55-59 | 147 | 13 | 157 | 8 |
| 60-64 | 222 | 20 | 70 | 4 |
| 65-74 | 374 | 34 | 10 | 0.5 |
| 75-84 | 210 | 19 | 20 | 1 |
| >85 | 71 | 6 | 0 | 0 |
| Gender | | | | |
| Female | 16 | 1 | 166 | 9 |
| Male | 1079 | 99 | 1755 | 91 |

The age and gender distributions of the sample participants were similar to the distribution of the population as shown in Tables 1and 2. The largest age group for active members was between age 35 and 44, representing 33% of the population and 30.8% of the sample participants. The largest age group for retired members was between 65 and 74 years old, representing 37.8% of the population and 34% of the sample. A larger percentage of female members were represented in the sample than in the population; they were excluded from the analysis. Demographics of the study participants are described in Table 2.

More than three quarters of the participants were African-Americans (79.4% active, 75.5% retirees). Most of the active members (89.3%) had a high school or better education while only 67.5% of the retirees had a high school or better education. Almost two-thirds (60.4%) of the active members and 64.9% of the retired members were married. The biggest difference was evident in annual income with 55.3% of the active members and 24% of the retirees making over $65,000 a year.

Table 2: Demographic Characteristics of Active and Retired HRSA-ILA Study Participants

| Category | Retired N 111 | % | Active N 283 | % |
|---|---|---|---|---|
| Age | | | | |
| Under 20 | 0 | | 1 | .4 |
| 20-24 | 0 | | 1 | .4 |
| 25-34 | 0 | | 33 | 12.7 |
| 35-44 | 3 | 3 | 81 | 30.8 |
| 45-54 | 8 | 8 | 89 | 33.8 |
| 55-59 | 10 | 10 | 40 | 15.1 |
| 60-64 | 23 | 22.9 | 13 | 5.0 |
| 65-74 | 38 | 37.8 | 4 | 1.6 |
| 75-84 | 15 | 15 | 1 | 0.4 |
| >85 | 4 | 4 | | |
| Missing | 10 | | 20 | |
| Gender | | | | |
| Female | 15 | 14.3 | 29 | 10.5 |
| Male | 90 | 85.7 | 247 | 89.5 |
| Ethnicity | | | | |
| White | 26 | 23.6 | 50 | 17.7 |
| African-American | 83 | 75.5 | 224 | 79.4 |
| Asian | 0 | 0 | 5 | 1.8 |
| Hispanic | 0 | 0 | 2 | 0.7 |
| Other | 1 | .9 | 1 | 0.4 |
| Educational level | | | | |
| Did not complete high school | 36 | 32.4 | 30 | 10.6 |
| High school diploma or GED | 43 | 38.7 | 116 | 41.1 |
| Some post high training | 18 | 16.2 | 82 | 29.1 |
| College graduate | 14 | 12.6 | 54 | 19.1 |
| Marital status | | | | |
| Married | 72 | 64.9 | 171 | 60.4 |
| Divorced/Separated | 18 | 16.2 | 46 | 16.3 |
| Widowed | 15 | 13.5 | 8 | 2.8 |
| Never married | 6 | 5.4 | 58 | 20.5 |
| Annual income | | | | |
| 25,000 – 34,999 | 38 | 36.5 | 31 | 11.4 |
| 35,000 – 44,999 | 18 | 17.3 | 23 | 8.4 |
| 45,000 – 54,999 | 14 | 13.5 | 25 | 9.2 |
| 55,000 – 64,999 | 9 | 8.7 | 43 | 15.8 |
| > 65,000 | 25 | 24 | 151 | 55.3 |

## *Sample Recruitment*

A systematic recruitment procedure was used. The survey participants consisted of two subgroups: active HRSA-ILA members and retired/disabled HRSA-ILA members. Convenience sampling of active members and random sampling of retirees was used to recruit study participants. Inclusion and exclusion criteria defining the program participants were set apriori. Inclusion criteria for active members included: (a) current HRSA-ILA member; and (b) over 700 hours of work in the 2006 contract year. The exclusion criterion for active members was: (a) not a current HRSA-ILA member; and (b) less than 700 hours of work in the 2006 contract year. Inclusion criteria for retirees included: (a) current HRSA-ILA retired or disabled member and (b) receiving HRSA-ILA welfare benefits. Exclusion criteria for retired members included: (a) not retired from the HRSA-ILA or (b) not receiving HRSA-ILA welfare benefits.

To encourage participation of all members, an article about the study with an opportunity to participate was included in the HRSA-ILA quarterly newsletter. The information included the purpose of the study, how members can get involved, a call to action, and the name and contact information of the researcher. Confidentially of members was ensured. Only one member contacted the researcher about participating in the study.

Active members were recruited from three separate venues: 1) regularly scheduled health fairs in the summer and fall 2007; 2) regular local union meetings at three union halls; and 3) paydays at the two separate locals. Many active members participate in these activities and it is believed that a representative sample of active

members was given the opportunity to participate in the survey process. A small incentive was offered to further encourage participation.

HRSA-ILA health fairs were one of the venues to recruit union members to participate in the survey process. Health fairs were held at the Welfare Fund Participants Benefits office and scheduled to coincide with payment of container royalty checks. The credit union for HRSA-ILA members is housed in the lobby of the Benefits Building so the member must walk through the health fair activities to obtain their monthly checks. The health fairs provide free health prevention and disease prevention materials and screening for blood pressure, total cholesterol, blood glucose, and glaucoma along with important health and health benefits information.

The researcher and an assistant set up a table in the lobby and invited members to participate in the survey process. Members, consenting to participate, were given a packet containing an introduction letter, survey directions, HRSA-ILA Physical Activity Survey questionnaire and a pencil. The participant was asked to complete the questionnaire. If the member had any problem filling out the survey, the researcher or the assistant read the questions to the member and filled in the survey. Once the questionnaire was complete, the member was given a small incentive. Confidentiality of the participants was maintained. The questionnaires contained no identifiers and no way to trace information back to the participant. Data was stored in a password protected computer program.

Retired members were recruited by three methods: 1) survey participation as described below, 2) participation at the monthly retirees meeting, and 3) attendance at a health fair. A survey packet was mailed to 200 retired HRSA-ILA members randomly

selected from the 2007 participants list. Randomization ensured a non-biased cross section of retired members to allow an equal chance of selection (Polit, 1996). Members who did not respond to the mailing were contacted by phone to complete the survey. The researcher attempted to contact the retired member three times to ensure adequate representation of retired members. A small incentive was sent to the participant in appreciation of their time.

Three local halls for longshoremen are located in Hampton Roads; two in Norfolk and one in Newport News. Besides recruitment at the health fairs, the researcher asked the locals' Presidents to allow the researcher and assistants to attend one of the local meetings in the Summer/Fall 2007. An overview of the purpose and process of the study was presented. Members were given the opportunity to participate. The survey process mimicked the process used during the health fair.

*Data Collection and Response Rate*

Convenience samples of active members were recruited from health fair attendance, regular monthly union local meetings, and paydays at union halls. Health fairs were held in April, June, September, October, and December 2007, which yielded 125 participants and 60 refusals for a response rate of 68%. Three local union halls were attended to recruit survey participants. The Newport News local was attended in May 2007 yielding 38 participants with 3 refusals for a response rate of 93%. Norfolk locals were attended in May 2007 and November 2007 yielding 31 and 71 participants respectively for a total of 102 participants and 29 refusals yielding a response rate of 78%. Two union locals physically hand out paychecks and were attended to recruit participants. The Newport News local yielded 28 participants with 16 refusals for a

response rate of 64%. The Southside local yielded 45 participants with 11 refusals for an 80% response rate.

Retirees were recruited from the monthly Retirees meeting and a random sample of 202 survey packets was mailed to retirees' homes. The retirees' meeting was attended in May 2007 yielding 22 study participants and 6 refusals for a response rate of 79%. The random sample of retirees yielded 44 participants for a response rate of 22%. One hundred and seven members could not be contacted after 3 attempts by telephone and 51 members refused to participate. In addition to the 66 retirees recruited through the methods above, 45 retirees were recruited during the health fairs.

A broad cross-section of HRSA-ILA members was found via the efforts described above (survey for retirees, recruitment at health fairs, union meetings, and on union paydays). The final sample used in the analysis for this study consisted of 255 active male longshoremen and 90 retired male longshoremen. The demographic characteristics of the survey participants and the overall demographic characteristics of the population are comparable.

*Power*

The size of the sample is the number of members that need to be surveyed in order for the findings to be precise and reliable (Fink, 2003). Power analysis was the basis for determining the sample size needed for survey distribution. According to Cohen (1988), sample size is a function of effect size, significance criterion, and power. Effect size is a measure of the strength of the relationship between two variables, by calculating the proportion of the variance that can be explained by differences between the variables (Lane, 2002). An a-priori sample size calculator calculated the minimum required

sample size for this study. Using an alpha level of .05 with 8 – 10 predictor variables, an anticipated medium effect size of .15 with a desired statistical power level of 0.8, the minimum required sample size is between 108 (8 variables) and 118 (10 variables) (Soper, 2007).

A convenience sample of 687 longshoremen was invited to participate in the survey process. Of these, 404 completed the survey for a response rate of 59%. Nine surveys were excluded due to the large amount of incomplete responses. The analysis was performed on the male members only; therefore another 44 participants were excluded from the analysis due to gender. In addition, 17 cases were excluded after checking for multivariate outliers. Due to sample size, the power was adequate for active members but not for retired members.

## The Physical Activity Survey

The HRSA-ILA Physical Activity Survey packet was divided into three sections. The first section told the participant the purpose of the survey, defined regular physical activity, and ensured confidentiality of the information. The next section provided instructions on how to complete the questionnaire. The last section was the survey questions which was divided into nine sections: 1) 16 questions measured work, sport and leisure-time physical activity; 2) 3 questions measured intention; 3) 5 questions measured direct measures of attitude 4) 16 questions measured indirect measures of attitude 5) 4 questions measured direct measures of subjective norm 6) 10 questions measured indirect measures of subjective norm 7) 4 questions measured direct measures of perceived behavioral control; 8) 10 questions measured indirect measures of perceived behavioral control; and 9) 8 questions measured demographic variables. For simplicity and ease of

use, all items measuring the constructs used a 7-point semantic differential scale with negative endpoints on the left and positive endpoints on the right. A copy of the survey is provided in Appendix E.

<div align="center">Variable Definition and Measurement</div>

<div align="center">*Physical Activity Index*</div>

Two of the three dependent variables, physical activity and intention indices, used in this study were composed of index scores. The final physical activity index was measured by 13 questions adapted from the Baecke Physical Activity Scale (Bawcke, Burema, & Frijters, 1982). Table 3 describes the scoring procedure for the 11 indexes used in this study.

Questions on the physical activity index measured: a) physical activity at work; b) involvement in sport activity during leisure time; and c) physical activity during leisure-time. The work index comprised questions q62 through q69. Due to missing data and lack of variability of the participant's answers question q62 could not be used. To assess whether the remaining seven items created a reliable work index scale, Cronbach's alpha was computed. The alpha for the final seven items was .69 for active members and .54 for retired members.

The sport index comprised questions q70, q71, q72, and q73. To assess whether the 4 items created a reliable scale, Cronbach's alpha was computed. After dropping one item q70, the 3 remaining items were summed to create the revised sport index scale. The alpha for the 3 items in the revised sport index was .60 for active members and .39 for retired members.

The leisure-time index comprised questions q74, q75, q76, and q77. To assess whether the 4 items formed a reliable scale, Cronbach's alpha was computed. To improve the reliability of the index, one item, q74, was dropped. The remaining 3 items were summed to create the revised leisure-time index scale with an alpha of .54 for active members and .52 for retired members.

The scores of the revised work, sport, and leisure-time indexes were summed to create the physical activity index. To assess whether the three subscales formed a reliable scale, Cronbach's alpha was computed. The sum of these three indexes produced a physical activity index score with an alpha of .65 for active members and .59 for retired members.

*Intention Index*

Intention to engage in physical activity can be used as a proximal measure of engaging in physical activity (Francis, et al., 2004). The intention index was created and used as the second dependent variable. Three questions; q01, q07, and q24 measured generalized intention: 1) I expect to engage in regular physical activity; 2) I want to engage in regular physical activity; and 3) I intend to engage in regular physical activity. Intention index score was obtained by summing the scores and dividing by 3. To assess whether these items formed a reliable scale, Cronbach's alpha was computed. The Cronbach's alpha for the intention index was .78 for active members and .73 for retired members.

*Physical Activity - Single Question*

One question assessing exercise from the 2006 BRFSS Questionnaire - section 4 was the third dependent variable used to evaluate the participant's current level of

physical activity (Nelson, Holtzman, Bolen, Stanwyck, & Mack, 2001). This question

was: During the past month, other than your regular job, did you participate in any

physical activities or exercises such as running, calisthenics, golf, gardening, or walking

for exercise ? The possible answers were in a Yes, No, Don't Know/Not sure format.

*Direct Attitude Index*

Direct attitude toward the behavior is an individual's overall evaluation of

engaging in physical activity (Francis, et al., 2004). Direct attitude was measured by

questions q02, q03, q04, q05, and q06. These questions were summed to create the direct

attitude index. Five items, using a single stem, included both instrumental (whether the

behavior achieves something) and experiential items (how it feels to perform the

behavior). The use of a bipolar scale (e.g., harmful/beneficial, bad/good, etc.) captured

the evaluation of the behavior. Cronbach's alpha was computed to assess if these items

formed a reliable scale. The alpha for direct attitude index score was .88 for active

members and .76 for retired members.

*Indirect Attitudes Index*

Indirect measurement of attitude calculated behavioral beliefs and outcome

evaluations. These beliefs were extracted from the transcripts of the focus groups. The

major advantages of physical activity were that it: 1) was good for their health; 2) helped

relieve stress; 3) helped to control their weight; 4) made them feel better; and 5) helped

prevent heart disease. The major disadvantages of physical activity were: 1) they were

too tired; 2) there was not enough time; and 3) it was inconvenient. These eight beliefs

were converted into brief statements using strongly disagree/strongly agree as endpoints.

The eight outcome evaluation statements were converted into brief statements using

extremely undesirable/extremely desirable as endpoints. The measures of indirect

attitudes consisted of eight items; q0816, q0917, q1018, q1119, q1220, q1321, q1422 and

q1523. The behavioral belief score was multiplied by the relevant evaluation score and

the resulting products summed then divided by 8 to create an overall indirect attitude

score. Cronbach's alpha was computed to assess if these items formed a reliable scale.

The alpha for indirect attitudes was .83 for active members and .84 for retired members.

*Direct Subjective Norm Index*

Subjective norms are an individual's own estimate of the social pressure to

perform or not perform a behavior (Francis, et al. 2004). Direct measurement of

subjective norm generally measured opinions of people important to the participant. The

first direct subjective norm question was: 1) Most people who are important to me think

that I should/should not participate in physical activity on a regular basis. The next three

questions were: 2) It is expected of me to participate in physical activity on a regular

basis; 3) I feel under social pressure to participate in physical activity on a regular basis;

and 4) People who are important to me think I should engage in physical activity on a

regular basis use strongly disagree/strongly agree as end points. The mean of the item

scores were calculated and provided an overall direct subjective norm score. Questions

q25 through q28 in Table 3 show the scoring procedure for direct measure of subjective

norms.

Direct subjective norm was measured by questions q25, q26, q27, and q28.

Question q27 was dropped from the index to improve internal consistency. The 3

remaining questions were summed then divided by 3 to create the revised direct

subjective norm index. Cronbach's alpha was computed to assess if these items formed a

reliable scale. The alpha for direct subjective norm index was .75 for active members and .75 for retired members.

*Indirect Subjective Norm Index*

Indirect subjective norm questions measured the normative beliefs and motivation to comply with engaging in regular physical activity. Individuals who may be likely to exert social pressure on the participant were identified. These referent groups consisted of spouse or significant other, family members, friends, other union members, and their doctor. The question statements which measured normative beliefs were: 1) My wife or significant other thinks I should not/should participate in physical activity on a regular basis 2) My family members disapprove/approve of my participation in physical activity on a regular basis; 3) My friends do not/do participate in physical activity on a regular basis; 4) My HRSA-ILA coworkers do not/do participate in physical activity on a regular basis; and 5) My doctor thinks that I should not/should participate in physical activity on a regular basis. The additional five questions to measure motivation to comply with social pressure are: 1) My wife's or significant other's approval of my participation in physical activity is important to me; 2) My family's approval of my participation in physical activity is important to me; 3) What my friends think I should do matters to me; 4) What my coworkers think I should do matters to me; and 5) Doing what my doctor wants me to do is important to me. A 7-point scale with endpoints of not at all/very much was used.

Indirect attitudes consisted of questions q2934, q3035, q3136, q3237, and q3338. Each normative belief score was multiplied by the corresponding motivation to comply score then summed to create an overall indirect subjective norm score. Cronbach's alpha

was computed to assess if these items formed a reliable scale with an alpha for indirect subjective norms of .81 for active members and .84 for retired members.

*Direct Perceived Behavioral Control Index*

Perceived behavioral control is the extent to which one feels able to engage in physical activity (Francis, et al. 2004). Direct measurement of perceived behavioral control reflected the person's confidence that he/she was capable of engaging in regular physical activity. This measure was reflected in four questions; two questions that considered self-efficacy and two questions that considered controllability. The first three questions were: 1) I am confident that if I wanted to, I could engage in physical activity on a regular basis; 2) The decision to engage in regular physical activity is beyond my control; and 3) Whether or not I engage in regular physical activity is entirely up to me. Strongly disagree/ strongly agree were used as endpoints. The final question was: 4) For me to engage in physical activity on a regular basis is difficult/easy.

The mean of the item scores were calculated and provided an overall direct perceived behavioral control score. Direct perceived behavioral control was measured by questions q39, q40, q41, and q42. For this study, question q41 was dropped from the index to improve internal consistency. Three questions were summed then divided by 3 to create the revised direct perceived behavioral control index. Cronbach's alpha was computed to assess if these items formed a reliable scale. The alpha for the revised direct perceived behavioral control index was .70 for active members and .66 for retired members.

*Indirect Perceived Behavioral Control Index*

Measures of indirect perceived behavioral control considered control beliefs and their perceived power to influence behavior. The five major control beliefs were: 1) lack of availability of places to engage in physical activity; 2) lack of time to engage in regular physical activity; 3) inability to plan to engage in regular physical activity due to irregular work hours; 4) other obligations that prevented them from engaging in regular physical activity; and 5) working too many hours to participate in regular physical activity. These five beliefs were converted into brief statements using unlikely/likely endpoints. The items to assess the power of these factors were as follows: 1) If there were more places to exercise at work, it would be much more difficult/much easier to engage in regular physical activity; 2) Having more free time would make it much more difficult/much easier to engage in regular physical activity; 3) Making plans in advance to engage in regular physical activity would be much more difficult/much easier; 4) Having many other obligations makes it much more difficult/much easier to engage in regular physical activity; and 5)Working long hours makes it much more difficult/much easier to engage in regular physical activity. First, the belief score was multiplied by the score of the corresponding items and then, to assess the power of these factors, the products were summed to create an overall indirect perceived behavioral control score.

Indirect attitudes consisted of five items; q4348, q4449, q4550, q4651, and q4752. These questions were summed to create the indirect perceived behavioral control index. Cronbach's alpha was computed to assess if these items formed a reliable scale. An indirect perceived behavioral control index of .78 for active members and .87 for retired members was determined.

The demographic questions were adapted from the 2006 Behavioral Risk Factor

Surveillance System for use with the union population. Seven questions measured age,

gender, race/ethnicity, educational level, marital status, age, income level, years with the

HRSA-ILA, and work status. Table 3 shows details of the variable scoring method for the

variables used in the survey, the model constructs, and the interpretation of scoring

procedure.

Table 3: HRSA-ILA Physical Activity Survey Map

| Variable Name Variable Label | Variable Scoring | Model Construct | Interpretation |
|---|---|---|---|
| **DEPENDENT VARIABLES** | | | |
| **Behavior – Actual Physical Activity** | | Physical Activity | |
| PA index | Work index + Sport index + Leisure-time index | Overall PA index | Scores range from 3.5 – 9. Higher scores indicate higher levels of PA. |
| Work index Work index | [q62 + q63 + q64 + q65 + q66 + q67 + q68 + q69]/8 | Physical Activity - Work | Score ranges from 1.5-4.5. Higher scores indicate more PA at work. |
| q62 Occupation | 1=light 3=moderate 5=heavy | Physical Activity - Work | Based on the typical amount of exertion to do the work the main occupations will be classified into 2 categories. |
| q63 Sit at work | 1=always 2=often 3=sometimes 4=seldom 5=never | Physical Activity - Work | Score ranges from 1 (always) – 5 (never) Higher score indicates less sitting at work. |
| q64 Stand at work | 1=never 2=seldom 3=sometimes 4=often 5=always | Physical Activity - Work | Score ranges from 1 (never) –5 (always) Higher score indicates more standing at work. |
| q65 Walk at work | 1=never 2=seldom 3=sometimes 4=often 5=always | Physical Activity - Work | Score ranges from 1 (never) –5 (always) Higher score indicate more walking at work. |

| Variable Name Variable Label | Variable Scoring | Model Construct | Interpretation |
|---|---|---|---|
| q66 Lift heavy loads at work | 1=never 2=seldom 3=sometimes 4=often 5=always | Physical Activity - Work | Score ranges from 1 (never) –5 (always) Higher score indicate more lifting of heavy loads at work. |
| q67 Tired after work | 1=never 2=seldom 3=sometimes 4=often 5= very often | Physical Activity - Work | Score ranges from 1 (never) –5 (very often) Higher score indicates more fatigue after work. |
| q68 Sweat at work | 1= never 2=seldom 3=sometimes 4=often 5=very often | Physical Activity - Work | Score ranges from 1 (never) –5 (very often) Higher score indicate more sweating at work. |
| q69 Compared to others my work is | 1=much lighter 2= lighter 3=as heavy 4=heavier 5=much heavier | Physical Activity - Work | Score ranges from 1 (much lighter) –5 (much heavier) Higher score indicates more PA at work. |
| Sportindex Sport index | [(q70 + q70a + q70b) + q71 + q72 + q73]/4 | Physical Activity - Sport | Scores range from 0-5. Higher scores indicate more sport PA. |
| q70 Play sport Q70a Q70b | Yes=1 No=0 1-5 | Physical Activity - Sport | A score of 0 will be given to those who do not play a sport. The PI will assign a score based upon the (intensity x time x proportion) of the total number of activities. Higher scores indicate more types, intensity, and time of sport PA. |
| q71 Compared to others my Leisure-time PA is | 1=much less 2=less 3=same 4=more 5=much more | Physical Activity - Sport | Score ranges from 1 (much less) –5 (much more) Higher scores indicate more sport PA compared to others. |

| Variable Name<br>Variable Label | Variable Scoring | Model Construct | Interpretation |
|---|---|---|---|
| q72<br>Leisure-time<br>sweat | 1=never<br>2=seldom<br>3=sometimes<br>4=often<br>5=very often | Physical Activity<br>Sport | Score ranges from 1<br>(never) –5 (very often)<br>Higher scores indicate<br>more sweating during<br>leisure-time PA |
| Leisure-time<br>index<br>Leisure-time<br>index | [(q74) + q75 +q76<br>+ q77]/4 | Physical Activity<br>Leisure-time | Scores range from 2.0 –<br>4.0. Higher scores<br>indicate more physical<br>activity at leisure time. |
| q74<br>Watch TV<br>during leisure | 1=never<br>2=seldom<br>3=sometimes<br>4=often<br>5=very often | Physical Activity<br>Leisure-time | Score ranges from 1<br>(never) –5 (very often)<br>Higher scores indicates<br>more TV watching<br>during leisure-time. |
| q75<br>Walk during<br>leisure | 1=never<br>2=seldom<br>3=sometimes<br>4=often<br>5=very often | Physical Activity<br>Leisure-time | Score ranges from 1<br>(never) –5 (very often)<br>Higher scores indicates<br>more walking during<br>leisure-time. |
| q78<br>Cycle during<br>leisure | 1=never<br>2=seldom<br>3=sometimes<br>4=often<br>5=very often | Physical Activity<br>Leisure-time | Score ranges from 1<br>(never) –5 (very often)<br>Higher scores indicates<br>more cycling during<br>leisure-time. |
| q77<br>Minutes walking<br>or cycling each<br>day | 1= 0.5<br>2 = 0.01-<4<br>3 = 4 - <8<br>4 = 8 - <12<br>5 = =or>12 | Physical Activity<br>Leisure-time | Scores range from 1 (0.5)<br>to 5 (= or >12)<br>Higher scores indicate<br>more walking or cycling<br>each day. |
| Q61 | 1 = yes<br>0 = no<br>2 = don't know | Physical Activity | Scores range from 0 to 3<br>Higher scores indicate<br>more PA than on the job. |
| **Behavior- Intentions to Exercise** | | **Exercise<br>Intentions** | |
| Intent score<br>Overall Intention<br>to exercise | Calculate the mean<br>of the three<br>intention scores (<br>q01+ q07+ q24)/3. | Intention | Scores range from 0 – 21.<br>Higher scores indicate<br>greater intention to<br>engage in PA. |
| q01<br>Expect to engage<br>in PA | 1-7 | Intention | Score ranges from 1<br>(strongly disagree) –7<br>(strongly agree)<br>Higher score indicates a<br>greater expectation to<br>engage in PA. |

| Variable Name Variable Label | Variable Scoring | Model Construct | Interpretation |
|---|---|---|---|
| q07 Want to engage in PA | 1-7 | Intention | Score ranges from 1 (strongly disagree) –7 (strongly agree) Higher score indicate a greater want to engage in PA. |
| q24 Intend to engage in PA | 1-7 | Intention | Score ranges from 1 (strongly disagree) –7 (strongly agree) Higher score indicate a greater intention to engage in PA. |
| **INDEPENDENT VARIABLES** | | | |
| **Attitude Measures** | | Attitude | |
| Attitdir Overall Direct Attidute towards PA | (q02+ q03+ q04+ q05+ q06)/5. | Attitude direct towards PA | Scores range from 0 – 35. Higher score indicates a more positive overall direct attitude towards PA |
| q02 PA is harmful/bene-ficial | 1 - 7 | Attitude direct towards PA | Score ranges from 1 –7 (beneficial) Higher score indicate a greater belief that PA is beneficial. |
| q03 PA is bad/good | 1 - 7 | Attitude direct towards PA | Score ranges from 1 (bad) –7 (good) Higher score indicate a greater belief that PA is good. |
| q04 PA is unpleasant/pleasant | 1 - 7 | Attitude direct towards PA | Score ranges from 1 (unpleasant) –7 (pleasant) Higher score indicate a greater belief that PA is pleasant. |
| q05 PA is worthless/useful | 1 - 7 | Attitude direct towards PA | Score ranges from 1 (worthless) –7 (useful) Higher score indicates a greater belief that PA is useful. |
| q06 PA is boring/fun | 1 - 7 | Attitude direct towards PA | Score ranges from 1 (boring) –7 (fun) Higher score indicate a greater belief that PA is fun. |

| Variable Name Variable Label | Variable Scoring | Model Construct | Interpretation |
|---|---|---|---|
| Indirect Attitude | q08 thru q15 are the 8 behavioral beliefs. q16 thru q23 are the outcome evaluations relating to each behavioral belief. The resulting products are summed across all beliefs to create an overall attitude score. | | Higher score indicates a more positive overall indirect attitude towards PA. |
| Attitind – Overall Indirect Attitude towards PA | ( q08 x q16) + (q09 x q17) + (q10 x q18) + (q11 x q19) + (q12 x q20) + (q13 x q21) + (q14 x q22) + (q15 x q23) | Attitude indirect towards PA | Possible total range of scores is (7 x 7) x 8 questions = 384. Higher scores mean more positive attitude toward PA |
| q0816 Indirect belief - PA and health | q08 * q16 | Attitude indirect towards PA | Score ranges from 1-49 Higher scores mean a more positive belief in PA and health |
| q0917 PA and stress | q09 * q17 | Attitude indirect towards PA | Score ranges from 1-49 Higher scores mean a more positive belief that PA helps stress. |
| q1018 PA and weight | Q10 * q18 | Attitude indirect towards PA | Score ranges from 1-49 Higher scores mean a more positive belief that PA affects weight. |
| q1119 PA and feeling good | Q11 * q19 | Attitude indirect towards PA | Score ranges from 1-49 Higher scores mean a more positive belief that PA helps feeling good. |
| q1220 PA and tiredness | Q12 * q20 | Attitude indirect towards PA | Score ranges from 1-49 Higher scores mean a more positive belief that PA combats tiredness. |

| Variable Name Variable Label | Variable Scoring | Model Construct | Interpretation |
|---|---|---|---|
| q1321 PA and lack of time | Q13 * q21 | Attitude indirect towards PA | Score ranges from 1-49 Higher scores mean a more positive belief that lack of free time affects PA. |
| q1422 PA and inconvenience | q14 * q22 | Attitude indirect towards PA | Score ranges from 1-49 Higher scores mean a more positive belief inconvenience affects PA. |
| q1523 PA and preventing heart disease | q15 * q23 | Attitude indirect towards PA | Score ranges from 1-49 Higher scores mean a more positive belief that PA helps to prevent heart disease. |
| **Subjective Norm Measures** | | | |
| Subject norms dir Subjective Norms – Direct Questions: | (q25 + q26 + q27 + q28)/4 Calculate the mean of the item scores to give an overall subjective norm score. | Subjective Norms – Direct | Higher the score indicates a higher level of subjective norm |
| q25 Most people think I should participate in PA | 1-7 | Subjective Norms – Direct | Score ranges from 1 (should not) –7 (should) Higher scores mean a greater subjective norm regarding participation in PA. |
| q26 Expected to Participate in PA | 1-7 | Subjective Norms – Direct | Score ranges from 1 (strongly disagree) –7 (strongly agree) Higher scores mean a greater expectation from others to engage in PA. |
| q27 Under social pressure to participate in PA | 1-7 | Subjective Norms – Direct | Score ranges from 1 (strongly disagree) –7 (strongly agree) Higher scores mean more social pressure to participate in PA. |

| Variable Name Variable Label | Variable Scoring | Model Construct | Interpretation |
|---|---|---|---|
| q28 Important people to me think I should participate in PA | 1-7 | Subjective Norms – Direct | Score ranges from 1 (strongly disagree) – 7 (strongly agree) Higher scores mean more people expect member to participate in PA. |
| Subjective normsind<br><br>Subjective Norms – Indirect Questions: q29 thru q38 | q29 thru q33 are the 5 normative beliefs q34 thru q38 are the motivation to comply relating to each source of social pressure. The resulting products are summed across all beliefs to create an overall subjective norm score.<br>Total normative belief score =<br>[( q29 x q34) + (q30 x q35) + (q31 x q36) + (q32 x q37) + (q33 x q38)] | Subjective Norms – Indirect | Possible total range of scores is (7 x 7) x 5 questions = 245 (Interpretation of weak, moderate, and strong subjective norms will be determined by the range) Higher scores mean greater SN to engage in regular PA. |
| q2934 Wife or SO and participation in PA | q29 * q34 | Subjective Norms – Indirect | Score ranges from 1-49 Higher scores mean greater the wife or the SO influence in engaging in regular PA. |
| q3035 Family members and participation in PA | Q30 * q35 | Subjective Norms – Indirect | Score ranges from 1-49 Higher scores mean greater the family members influence in engaging in regular PA. |
| q3136 Friends and participation in PA | Q31 * q36 | Subjective Norms – Indirect | Score ranges from 1-49 Higher scores mean greater the friends influence in engaging in regular PA. |

| Variable Name Variable Label | Variable Scoring | Model Construct | Interpretation |
|---|---|---|---|
| q3237 ILA brothers and participation in PA | Q32 * q37 | Subjective Norms – Indirect | Score ranges from 1-49 Higher scores mean greater ILA brothers influence in engaging in regular PA. |
| q3338 Doctor and participation in PA | Q33 * q38 | Subjective Norms – Indirect | Score ranges from 1-49 Higher scores mean greater doctors influence in engaging in regular PA. |
| **Perceived Behavioral Control** | | | |
| PBCdir Perceived Behavioral Control – Direct Questions: q39 thru q42 | (q39 +q40 +q41 +q42)/4 | Percevied Behavior Control | Scores range from 4-28 Higher score indicates a higher PBC Scores range from 1 to 14 for self-efficacy Higher score indicates a higher self-efficacy Scores range from 1 to 14 for controllability Higher score indicates a higher controllability |
| q39 Self-efficacy Confident could engage in PA | 1-7 | Perceived Behavior Control – Direct (Self-efficacy) | Score ranges from 1 – 7 Higher score indicates greater confidence in engaging in PA. |
| q40 Self-efficacy Engaging in PA difficult /easy | 1-7 | Perceived Behavior Control – Direct (Self-efficacy) | Score ranges from 1 (difficult) – 7 (easy) Higher score indicates the ease of engaging in PA. |
| q41 Controllability Engaging in PA beyond control | 1-7 | Perceived Behavior Control – Direct (Controllability) | Score ranges from 1 (strongly disagree) – 7 (strongly agree). Higher score indicates the control over engaging in PA. |
| q42 Controllability PA entirely up to me | 1-7 | Perceived Behavior Control – Direct (Controllability) | Score ranges from 1 (strongly disagree) – 7 (strongly agree). Higher score indicates the individual control of engaging in PA. |

| Variable Name Variable Label | Variable Scoring | Model Construct | Interpretation |
|---|---|---|---|
| PBCind Perceived Behavioral Control – Indirect Questions: q43 thru q52 | q43 thru q47 are the 5 IPBC beliefs q48 thru q52 are the power of these factors to influence the behavior. The resulting products are summed across all beliefs to create an overall PBC score. Total IPBC = ( q43 x q48) + (q44 x q49) + (q45 x q50) + (q46x q51) + (q47 x q52) | Perceived Behavior Control – Indirect | Possible total range of scores is (7 x 7) x 5 questions = 245 (Interpretation of weak, moderate, and strong SN will be determined by the range) Higher score indicates the belief and the factors that influence the ability to control engaging in PA. |
| q4348 Places at work to engage in PA | q43 * q48 | Perceived Behavior Control – Indirect | Score ranges from 1-49 Higher score indicates places at work influence the ability to control engaging in PA. |
| q4449 More free time would engage in PA | q44 * q49 | Perceived Behavior Control – Indirect | Score ranges from 1-49 Higher score indicates that the amount of free time influences the ability to control engaging in PA. |
| Q4550 Plan to engage in PA | q45 * q50 | Perceived Behavior Control – Indirect | Score ranges from 1-49 Higher score indicates that planning to engage in PA influences PA. |
| q4651 Other obligations and engaging in PA | q46 * q51 | Perceived Behavior Control – Indirect | Score ranges from 1-49 Higher score indicates that other obligations influence the ability to engage in PA. |
| q4752 Didn't work so many hours | q47 * q52 | Perceived Behavior Control – Indirect | Score ranges from 1-49 Higher score indicates working overtime influences engaging in PA. |

| Variable Name Variable Label | Variable Scoring | Model Construct | Interpretation |
|---|---|---|---|
| **Demographic Variables** | | | |
| q53 Age | Age in years | SES | |
| Q53a | 1=Male 0=Female | Gender | |
| q54 Race/Ethnicity | 1=White 2=Black or African American 3=Asian 4=Hispanic or Latino 5=Other | Race | |
| q55 Educational level | 1=Did not complete high school 2=High school diploma or GED 3=Some post-high school training 4=College graduate | Education Level | |
| q56 Marital Status | 1=Married or a member of an unmarried couple 2=Divorced/Separated 3=Widowed 4=Never Married | Marital Status | |
| q57 Income | 1=$25,000-$34,999 2=$35,000-$44,999 3=$45,000-$54,999 4=$55,000-$64,999 5= above $65,000 | Income | |
| q58 Years in ILA | Years in ILA | Years in ILA | |
| q59 Employment | 1=Actively working 2=Retired 3=On permanent disability 4=On temporary disability | Work Status | |
| q60 Belongs to a gym | 1=Yes 0=No | Gym Member | |

Pilot Testing the Questionnaire

A convenience sample of HRSA-ILA members and relevant experts were asked to complete the questionnaire and to make comments on the formatting, the language, and the ease or difficulty with understanding what was being asked. Ten people completed the questionnaire. The researcher verbally queried these people. From the written and verbal responses, the participants indicated that the questions were clearly stated and the answer choices were adequate. Several persons indicated that the questions seemed repetitious. Each of the belief items (behavioral, normative, and perceived control) measured both direct and indirect concepts. As a result, the questions may have seemed redundant. Otherwise, no major comments were made about the questions on the survey. Only minor changes were made to the formatting of the questionnaire. The time required to answer the questions was between 8 and 11 minutes.

Procedures

*Protection of Human Subjects*

Both Phase I and Phase II of this study received exempt status from the College of Health Sciences, Old Dominion University, and Institutional Review Board (Appendix A). Each subject was informed in writing that participation in the study was voluntary and that they could choose not to participate in the study with no ill effect. No identified risks were associated with this research. Confidentiality of the participant was strictly maintained. The questionnaire contained no identifiers and no way to trace the information back to participants.

## Limitations

The study participants were a convenience sample recruited from health fairs and union locals, limiting the generalizability of the study results. The participants who responded to the researcher's requests may have been more motivated or concerned about physical activity than those that did not participate. In addition, the study sample was small and the majority of participants were Black. Perhaps, the beliefs of other ethnic groups would be different than those expressed in this study. Survey completion of a larger and more diverse sample may further the understanding of the determinants of physical activity among maritime union workers. This study was cross-sectional; therefore, causal relationships between attitude, subjective norm, perceived behavioral control, and intention could not be established. Although work, sport, and leisure-time activity were included in the physical activity index, answers were self-reported and participants may not have been accurate or may have answered questions in a socially acceptable manner. In future research, more direct measures of physical activity and examination of constructs over time may provide additional important information on the beliefs of maritime union members on physical activity and intention to engage in physical activity.

## Data Analysis

Data was entered by the researcher and analyzed using the Statistical Package for Social Science (SPSS version 16.0: SPSS INC, Chicago IL). Data was summarized to determine that all data points fell within acceptable limits. Surveys were spot checked on a random basis to ensure accuracy of data entry. Frequencies of the data were examined to locate missing data, any out-of-range codes, and skewness of the data. Corrections

were made until a clean data set was obtained. Missing data problems were addressed through imputation. Scale index scores were constructed as described in a prior section. Analysis of the data was performed including descriptive statistics, bivariate and multivariate analyses.

*Data Imputation*

A variety of statistical techniques are available to treat missing data. Nine cases were deleted because over 50% of the data was missing making the surveys unusable in the analysis. To preserve sample size, mean substitution was used for missing values. In Likert scales, case mean substitution can be used to impute missing data (Fox-Wasylyshyn & El-Masri, 2005). This technique was applied to each self-reported measure of the theory constructs. The advantage of this technique is that it accepts differences across cases by using data provided by a case to estimate its own missing data. A determination of the amount of missing values was performed for each group of questions measuring a specific construct. Data reflecting the results of frequencies, measures of central tendency, and Cronbach's alpha of male participants without imputed values are shown in Appendix G for active members and Appendix H for retired members.

For this study, the scales are presented with imputed values. The same analysis was conducted without imputed values and the results are similar providing further evidence that the imputation method is sound. Data reflecting the results of frequencies, measures of central tendency, and Cronbach's alpha of male participants with imputed values are shown in Appendix I for active members and Appendix J for retired members.

Evaluation of Assumptions

*Normality*

Normality, linearity, and homoscadasticity are statistical assumptions of special significance for multivariate analyses. Normality refers to the shape of the distribution and should correspond to a normal distribution (Meyers, Gamst, & Guarino, 2006). Before proceeding with the data analysis, variables were screened for potential statistical assumption violations, as well as missing values and outliers, with SPSS frequencies, explore, plot and regression procedures.

*Linearity and Homoscedasticity*

Linearity assumes that the variables are related to each other in a linear way (Meyers, Gamst, & Guarino, 2006). To assess for linear relationships, bivariate scatter plots of the dependent variables against the independent variables residual plots were inspected to assess for linearity. Oval shaped patterns were found indicating a random distribution in a horizontal band around the zero point indicating linearity. Examination of the normal Q-Q plot of each variable revealed the data points fell on or very near the diagonal line indicating a normal distribution.

*Univariate Outliers*

Variables were evaluated for skewness. If variables have a skewness of less than plus or minus one, the variable is approximately normal (Leech, Barrett, & Morgan, 2008). A log transformation of the direct measures of attitude (-1.37), subjective norm (-1.02), and perceived behavioral control (-1.10) were accomplished with a base-10 logarithm. Results showed that the negative skewness remained after the log transformation. As a result, the variables were not transformed for this data analysis.

Homoscedasticity suggests that the dependent variables have equal levels of variability across a range of independent variables (Meyers, Gamst, & Guarino, 2006). Levene's test for homogeneity of variance showed a nonsignificant result (p > .05) for each of the variables (attitudes .309, direct subjective norm .309, indirect subjective norm .112, direct perceived behavioral control .971, and indirect perceived behavioral control .622) indicating homogeneity of variance.

### Multicollinearity

Multicollinearity exists when more than two independent variables correlate very strongly. Variables that correlate at or above .75 should not be used together in a regression or other multivariate analysis (Meyers, Gamst, & Guarino, 2006). Correlations for the physical activity index and the constructs of the theory with active male members ranged from a low of .06 on indirect attitude to a high of .28 on intention and with retired members ranged from a low of .01 on direct subjective norm to a high of .36 on indirect attitude. Correlations for the intention index and the constructs of the theory with active male members ranged from a low of .46 on indirect subjective norm to a high of .64 on direct attitude and with retired members ranged from a low of .30 on indirect subjective norm to a high of .76 on direct attitude. Table II details how the dependent and independent variables for active male members are correlated to each other and Table III details how the dependent and independent variables for retired male members are correlated to each other. These ranges indicate an absence of multicollinearity and all variables were used in the regression model.

*Bivariate Analyses*

Bivariate relationships between the independent and the dependent variables were explored. A correlation is a nonparametric procedure, which produces a single number that describes the degree of relationship between two variables and will always be between -1.0 and +1.0 (Trochim, 2001). Spearman correlation coefficient determines the strength of the relationship between two variables with correlations less than .3 considered weak, between .3 and .7 moderate, and greater than .7 considered strong (Cronk, 1999). Correlations of the items in the questionnaire of direct and indirect attitudes, direct and indirect subjective norm, direct and indirect perceived behavioral control, and intention were analyzed using Spearman's rho. Appendix K features the dependent and independent variables and appropriate statistical test.

*Internal Consistency*

To assess the reliability of the measures, Cronbach's alpha was performed on the scales of the dependent and independent variables. Reliability was used to indicate the extent to which the different items are consistent with each other and how well the set of items measure the same construct. A reliability coefficient of .70 or higher is considered acceptable, however a very high alpha (e.g., greater than .90) may mean the items are repetitious or there are too many items in the scale (Leech, Barrett & Morgan, 2008).

The physical activity index and the intention index were the two dependent variables measured by a scale. Physical activity index was derived from the sum of the work index, the sport index, and the leisure-time index. Question q62 was dropped from the work index, q70 was dropped from the sport index and question q74 was dropped from the leisure-time index to improve the internal consistency for the respective index.

Cronbach's alpha for the dependent measures ranged from a low of .39 to a high of .78 indicating a minimally adequate to a high correlation for the items within the indexes.

The independent variables measured by a scale were: direct and indirect measures of attitude, subjective norm and perceived behavioral control. Cronbach's alpha ranged from a low of .66 for direct perceived behavioral control of retired participants to a high of .87 for indirect perceived behavioral control of retired participants indicating a moderately high to high correlation for the items within these indexes.

*Multivariate Analyses*

Multivariate analysis improves the predictive power of analyses by using two or more independent variables to predict a dependent variable (Polit, 1996). Standard multiple linear regressions was used to test the relationship of physical activity and intention on the independent variables of direct and indirect attitudes, direct and indirect subjective norms, and direct and indirect perceived behavioral control. Mahalanobis distance was computed for each case to assess for multivariate outliers by evaluating residuals that were greater than three standard deviations. The Mahalanobis distance indicated 17 potential outliers. Twelve outlier cases were detected in the active male members: two for physical activity (188, 26), 2 for intention (127, 200), 3 for direct attitudes (75,147, 193), 1 for indirect attitudes (83), 3 for direct perceived behavioral control (142,193, 82), and 1 for indirect perceived behavioral control (218). Five outlier cases were detected in the retired male members: 1 outlier was found for direct attitudes (226), 1 for indirect attitudes (114), 2 for subjective norm (229, 85), and 1 for indirect perceived behavioral control (218). These 17 cases were excluded from the regression analysis eliminating the outliers and creating a better fit by the regression equation.

The single, dichotomized, categorical variable question measuring physical activity was used as the dependent variable. The independent variables (intention, direct attitudes, indirect direct attitudes, direct subjective norms, indirect subjective norms, direct perceived behavioral control, and indirect perceived behavioral control) were dichotomized into high (6 and 7) and low (5 and below) measures of physical activity. Logistic regression was used to determine the association of these variables.

## Path Analysis

Path analysis was used to assess the direct and indirect effects of some variables that were theorized to be causes of other variables by setting up a prediction model interrelating three or more variables (Meyers, Gamst, & Guarino, 2006). Multiple regression was computed on the dependent and independent variables to determine the path coefficients. The standardized beta coefficients were examined to determine if the hypothesized causal model had statistical viability. A multistage model, which contained two endogenous or dependent variables (physical activity and intention) were used in the regression analysis. A value below .2 is considered a low beta weight and above .3 is a high value (Meyers, Gamst, Guarino, 2006).

CHAPTER IV

RESULTS

Research Questions and Hypotheses

*Research Question 1*

The first research question, "What is the current level of regular physical activity among longshoremen?" was answered by the analysis of the physical activity index and the single physical activity question. Appendix F provides specific information on the means, standard deviations, and coefficients of the items that composed the indices for active and retired members. Table 4 provides percentages, means, and standard deviations for the dependent variables for active and retired members.

Almost 70% of active members and 70.3% of retired members reported they participated in physical activity during the past month. For active members, the physical activity index score mean was 8.61 (SD = 1.72) with a range of 10.24, minimum of 5.86 and maximum of 14.10. For retired members, the physical activity index score mean was 8.73 (SD = 1.30) with a range of 5.48, minimum of 5.9 and maximum of 11.38. .

Work, sport, and leisure-time indices composed the physical activity index. For active members, the work index mean score was 2.97(SD=.62) with a range of 2.43, minimum of 2, and maximum of 4.43. The retired members were similar to active members in the work index with a mean score of 3.04 (SD=.50), a range of 2.43, minimum score of 2, maximum of 4.43. The revised sport index mean, for active members, was 2.99 (SD = .81) with a range of 4.0, minimum of 1 and maximum of 5.0 and for retired members' the mean was 2.79 (SD = .67) with a range of 3.67, minimum of 1.33 and maximum of 5.0. For active members, leisure-time index mean was 2.66, (SD

= .81) with a range of 4.0 and a minimum of 1 and a maximum of 5 and for retired

members the mean was 2.89 (SD =.79) with a range of 3.67, a minimum of 1.33 and

maximum of 5.0.

Table 4: Percentages, Means, and Standard Deviations of Dependent Variables

| Variable | Active | Retired |
|---|---|---|
| PA in past month | N (%) | N (%) |
| Yes | 198 (69.8) | 71 (70.3) |
| No | 85 (29.9) | 30 (30.3) |
| | Mean(SD) | Mean(SD) |
| Physical Activity Index | 8.61 (1.72) | 8.73 (1.30) |
| Work index | 2.97 (.62) | 3.04 (.50) |
| Sport index | 2.99 (.81) | 2.79 (.67) |
| Leisure-time index | 2.66 (.81) | 2.89 (.79) |
| Intention Index | 16.70 (4.01) | 17.33 (3.47) |

*Research Question 2*

The second research question, "To what extent does the Theory of Planned

Behavior provide a good model to predict intention to engage in regular physical activity

and also the behavior of physical activity? In particular, when considered in one model

how are attitudes, subjective norms, perceived behavioral control, and intentions related

to longshoremen engaging in regular physical activity?" Appendix I for active members

and Appendix J for retired members provides a comprehensive picture of the questions

and the means, standard deviations, median, range, minimum, maximum and Cronbach's

alpha of the theory constructs.

Table 5 examined the bivariate relationships of intention, direct and indirect

attitude, subjective norms, and perceived behavioral control with the single physical

activity question for active members. Indirect attitude had the highest means. Intention

(p = .001) and direct perceived behavioral control (p=.003) provide statistically

significant relationships.

Table 5: Bivariate Relationships of Constructs of the Theory of Planned Behavior to
Single Physical Activity Question q78 – Active male members only.

| Variable | N | Mean(SD) or Median (IQR) | T-test or Mann-Whitney U with q78 |
| --- | --- | --- | --- |
| Intention | No=75 Yes=180 | 5.03(1.50) 5.75(1.21) | p=.001* |
| Direct Attitude | No=75 Yes=180 | 116.14 132.94 | p=.094 |
| Indirect Attitude | No=74 Yes=180 | 229.03(81.0) 237.94(71.37) | p=.386 |
| Direct Subjective Norm | No=74 Yes=176 | 115.84 129.56 | p=.164 |
| Indirect Subjective Norm | No=75 Yes=180 | 151.36(54.99) 161.69(54.96) | p=.173 |
| Direct Perceived Behavioral Control | No=75 Yes=180 | 106.81 136.83 | p=.003* |
| Indirect Perceived Behavioral Control | No=73 Yes=179 | 139.24(50.40) 144.99(50.51) | p=.413 |

* Significant at a .05 level (2-tailed)

Table 6 examined the bivariate relationships of intention, direct and indirect

attitude, subjective norms, and perceived behavioral control with the single physical

activity question for retired members. Indirect attitude had the highest means. Only

direct attitude (p = .010) showed statistically significant relationships.

Table 6: Bivariate Relationships of Constructs of the Theory of Planned Behavior to Single Physical Activity Question q78 – Retired male members only.

| Variable | N | Mean(SD) or Median (IQR) | T-test or Mann-Whitney with q78 |
|---|---|---|---|
| Intention | No=28 | 5.29(1.24) | p=.449 |
| | Yes=62 | 5.95(1.11) | |
| Direct Attitude | No=28 | 35.14 | p=.010* |
| | Yes=62 | 50.18 | |
| Indirect Attitude | No=28 | 243.77(76.38) | p=.379 |
| | Yes=62 | 259.60(79.59) | |
| Direct Subjective Norm | No=28 | 40.07 | p=.174 |
| | Yes=62 | 47.95 | |
| Indirect Subjective Norm | No=25 | 160.85(60.16) | p=.260 |
| | Yes=62 | 175.51(52.14) | |
| Direct Perceived Behavioral Control | No=26 | 36.85 | p=.065 |
| | Yes=62 | 47.71 | |
| Indirect Perceived Behavioral Control | No=73 | 125.70(61.17) | p=.066 |
| | Yes=179 | 153.12(62.99) | |

* Significant at a .05 level (2-tailed)

Table 7 shows the means, standard deviations, medians, and ranges of the

constructs indices for active male members. Direct and indirect attitudes had the highest

means. Direct and indirect perceived behavioral control had the lowest means.

Table 7: Means, Standard Deviations, Medians, and Ranges of the Constructs of the Theory (active male members)

| Variable | Mean(SD) | Median (IQR) | Range | Min Max |
|---|---|---|---|---|
| Direct Attitude Index | 28.67 (6.97) | 6.2 | 6.0 | 1 - 7 |
| Indirect Attitude Index | 228.67 (72.12) | 251 | 374 | 18 - 396 |
| Direct Subjective Norms | 17.22 (3.83) | 6.0 | 6.0 | 1 - 7 |
| Indirect Subjective Norms | 158.49 (54.93) | 161 | 224 | 21 - 245 |
| Direct Perceived Behavioral Control | 17.05 (3.56) | 6.0 | 6.0 | 1 - 7 |
| Indirect Perceived Behavioral Control | 144.49 (6.97) | 147 | 224 | 21 - 245 |

Table 8 shows the means, standard deviations, medians, and ranges of the constructs indices for retired male members. Direct and indirect attitudes had the highest means. Direct and indirect perceived behavioral control had the lowest means.

Table 8: Means, Standard Deviations, Medians, and Ranges of the Constructs of the
Theory (retired male members)

| Variable | Mean(SD) | Median (IQR) | Range | Min Max |
|---|---|---|---|---|
| Direct Attitude Index | 30.26 (4.65) | 6.2 | 3.8 | 3.2 - 7 |
| Indirect Attitude Index | 249.09 (76.97) | 255 | 344 | 85 - 392 |
| Direct Subjective Norms | 17.96 (3.57) | 6.3 | 5.0 | 2.7 - 7 |
| Indirect Subjective Norms | 168.42 (54.18) | 172 | 225 | 67 - 245 |
| Direct Perceived Behavioral Control | 17.56 (3.48) | 6.3 | 4.7 | 2.7 - 7 |
| Indirect Perceived Behavioral Control | 143.04 (6.97) | 144 | 236 | 9 - 245 |

*Physical Activity – Single Question*

Table 9 presents the logistic regression model that examines the Theory of

Planned Behavior predictors of physical activity using the single physical activity

question for active members. The model was not statistically significant. In addition, no

effects were significant.

Table 9: Logistic Regression for Testing the Theory of Planned Behavior for Active
Male Members

| Variable | B | S.E. | Wald | Sig. | Exp(B) | 95.0% C.I for Exp(B) | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | | | | | Lower | Upper |
| Intention | .604 | .347 | 3.028 | .082 | 1.83 | .927 | 3.614 |
| Direct Attitude | -.091 | .372 | .059 | .807 | .913 | .440 | 1.894 |
| Indirect Attitude | -.269 | .385 | .488 | .485 | .764 | .360 | 1.625 |
| Direct Subjective Norm | .173 | .369 | .221 | .638 | 1.189 | .577 | 2.451 |
| Indirect Subjective Norm | -.167 | .398 | .177 | .674 | .846 | .388 | 1.845 |
| Direct PBC | .675 | .346 | 3.795 | .051 | 1.964 | .996 | 3.872 |
| Indirect PBC | -.013 | .360 | .001 | .971 | .987 | .487 | 1.999 |
| Physical Activity (constant) | .587 | .313 | 3.525 | .060 | 1.799 | | |

* Significant at a .05 level (2-tailed)

Table 10 presents the logistic regression model to test the Theory of Planned
Behavior using the single physical activity question. For retired male members, the
model was not a statistically significant. In addition, no effects were significant.

Table 10: Logistic Regression for Testing the Theory of Planned Behavior for Retired Male Members

| Variable | B | S.E. | Wald | Sig. | Exp(B) | 95.0% C.I for Exp(B) Lower | Upper |
|---|---|---|---|---|---|---|---|
| Intention | .692 | .671 | 1.063 | .302 | 1.998 | .536 | 7.442 |
| Direct Attitude | .776 | .656 | 1.40 | .237 | 2.172 | .601 | 7.851 |
| Indirect Attitude | -1.297 | .826 | 2.469 | .116 | .273 | .054 | 1.379 |
| Direct Subjective Norm | .046 | .691 | .004 | .947 | 1.047 | .270 | 4.056 |
| Indirect Subjective Norm | 1.217 | .728 | 2.792 | .095 | 3.377 | .810 | 14.071 |
| Direct PBC | .663 | .596 | 1.240 | .266 | 1.941 | .604 | 6.238 |
| Indirect PBC | .006 | .627 | .001 | .992 | 1.006 | .295 | 3.438 |
| Physical Activity (constant) | -.247 | .637 | .150 | .698 | .781 | | |

* Significant at a .05 level (2-tailed)

*Physical Activity Index*

Table 11 shows the relationship of the constructs of the Theory of Planned Behavior for active and retired male members. For active member's, correlations indicated intention ($r = .237$, $p < .001$), direct attitude ($r = .120$, $p = .039$), indirect subjective norm ($r = .118$, $p = .041$), direct perceived behavioral control ($r = .215$, $p = .001$), and indirect perceived behavioral control ($r = .120$, $p = .039$) were highly correlated and statistically significant. For retired members, correlations indicated intention ($r = .237$, $p = .031$), direct attitudes ($r = .283$, $p = .012$), indirect attitudes ($r = .357$, $p = .002$), direct perceived behavioral control ($r = .321$, $p = .005$), and indirect perceived behavioral control ($r = .357$, $p = .002$) were statistically significant.

Table 11: Relationship of Constructs of the Theory of Planned Behavior to the Physical Activity Index of Active and Retired Male Members

| Independent Variable | Active Members N=236 | Retired Members N=66 |
| --- | --- | --- |
| Intention | .237** .001 | .237* .031 |
| Direct Attitude | .120* .039 | .283** .012 |
| Indirect Attitude | .041 .273 | .357** .002 |
| Direct Subjective Norm | .057 .203 | .009 .471 |
| Indirect Subjective Norm | .118** .041 | .134 .148 |
| Direct Perceived Behavioral Control | .215** .001 | .321** .005 |
| Indirect Perceived Behavioral Control | .120** .039 | .357** .002 |

** Correlation is significant at .01 level (2-tailed)
* Correlation is significant at .05 level (2-tailed)

Table 12 illustrates the multiple linear regression for testing the Theory of

Planned Behavior with the physical activity index for active male members. The multiple

linear regression indicated a statistically significant model (F(7, 209) = 3.197, p <.003, $R^2$

= .097). The $R^2$ indicated that the model accounted for only 9.7% of the total variance.

In this model, intention (p = .009) and direct perceived behavioral control (p = .036) were

statistically significant for predicting physical activity. The strongest influence was

intention (ß = .255, p = .009). Indirect attitude and direct subjective norm were close to significance.

Table 12: Multiple Linear Regression for Testing the Theory of Planned Behavior with the Physical Activity Index for Active Male Members

| Variable | B | S.E. | Standardized B | t | Sig. |
|---|---|---|---|---|---|
| Physical Activity (constant) | 6.927 | .675 | | 10.259 | .000 |
| Intention | .352 | .133 | .255 | 2.644 | .009* |
| Direct Attitude | -5.513E-02 | .140 | -.039 | -.394 | .694 |
| Indirect Attitude | -3.879E-03 | .002 | -.160 | -1.713 | .088 |
| Direct Subjective Norm | -.222 | .137 | -.161 | -1.621 | .106 |
| Indirect Subjective Norm | 1.801E-03 | .003 | .057 | .559 | .577 |
| Direct PBC | .339 | .160 | .225 | 2.115 | .036* |
| Indirect PBC | 4.493E-04 | .003 | .013 | .138 | .891 |

* Significant at a .05 level (2-tailed)

Table 13 illustrates the multiple linear regression for testing the Theory of Planned Behavior with the physical activity index for retired male members. The multiple linear regression indicated a statistically significant model (F(7, 55) = 2.957, p = .011, $R^2$ = .273) with the $R^2$ indicating that the model accounted for almost 28% of the total variance. Although the model was statistically significant, no predictors achieved significance. Direct subjective norm was close to significance.

Table 13: Multiple Linear Regression for Testing the Theory of Planned Behavior with the Physical Activity Index for Retired Male Members

| Variable | B | S.E. | Standardized B | t | Sig. |
|---|---|---|---|---|---|
| Physical Activity (constant) | 7.519 | 1.272 | | 5.910 | .000 |
| Intention | -.235 | .322 | -.184 | -.729 | .469 |
| Direct Attitude | .188 | .310 | .135 | .605 | .547 |
| Indirect Attitude | 6.235E-03 | .004 | .334 | 1.667 | .101 |
| Direct Subjective Norm | -.386 | .199 | -.323 | -1.937 | .058 |
| Indirect Subjective Norm | -3.247E-03 | .005 | -.121 | -.690 | .493 |
| Direct PBC | .326 | .236 | .243 | 1.383 | .172 |
| Indirect PBC | 6.115E-03 | .004 | .282 | 1.569 | .122 |

* Significant at a .05 level (2-tailed)

*Intention*

The higher number indicates greater intention to engage in physical activity. For active members, the intention index score mean was 5.53 (SD = 1.34) with a range of 6.0 and a minimum of 1 and a maximum of 7. For retired members, the intention index score mean was 5.75 (SD=1.19) with a range of 4.33 and a minimum of 2.67 and a maximum of 7.

Table 14 illustrates the relationship of constructs of the Theory of Planned Behavior to the intention index and retired male members. Correlation of the intention index showed all variables were highly correlated and statistically significant for both

active and retired male members. The highest correlation for active members was for direct behavioral control (r = .658) and for direct attitudes (r = .782) for retired members.

Table 14: Relationship of Constructs of the Theory of Planned Behavior to the Intention Index of Active and Retired Male Members

| Independent Variable | Active Members N=236 | Retired Members N=66 |
|---|---|---|
| Direct Attitude | .638** .001 | .782** .001 |
| Indirect Attitude | .584** .001 | .597** .001 |
| Direct Subjective Norm | .528** .001 | .531** .001 |
| Indirect Subjective Norm | .507** .001 | .302** .003 |
| Direct Perceived Behavioral Control | .658** .001 | .636** .001 |
| Indirect Perceived Behavioral Control | .537** .001 | .477** .001 |

** Correlation is significant at .01 level (2-tailed)

Table 15 illustrates the multiple linear regression for testing the Theory of Planned Behavior with the intention index for active male members. The model was statistically significant (F(6,221) = 43.961, p<.001, $R^2$ = .544) with the $R^2$ indicating 54.4% of the total variance was explained in the model. Direct perceived behavioral control (ß = .314, p < .001) was the highest correlation followed by direct attitudes (ß = .242, p < .001), and indirect attitudes (ß = .174, p < .007). Indirect perceived behavioral control was very close to significance (ß = .125, p = .053). These 3 of the 6 independent

variables contributed significantly to the prediction of the intention to engage in physical activity.

Table 15: Multiple Linear Regression for Testing the Theory of Planned Behavior with the Intention Index for Active Male Members

| Variable | B | S.E. | Standardized B | t | Sig. |
|---|---|---|---|---|---|
| Intention | .842 | .322 | | 2.532 | .012* |
| Direct Attitude | .271 | .069 | .262 | 3.949 | .000* |
| Indirect Attitude | 3.034E-03 | .001 | .174 | 2.741 | .007* |
| Direct Subjective Norm | 3.854E-02 | .069 | .039 | .562 | .575 |
| Indirect Subjective Norm | -8.508E-04 | .002 | -.038 | -.523 | .602 |
| Direct PBC | .342 | .078 | .314 | 4.397 | .000* |
| Indirect PBC | 3.057E-03 | .002 | .125 | 1.944 | .053 |

* Significant at a .05 level (2-tailed)

Table 16 illustrates the multiple linear regression for testing the Theory of Planned Behavior with the intention index for retired male members. The multiple linear regression indicated a statistically significant model (F (6,73) = 28.20, p< .001, $R^2$ = .699) indicating 69.9% of the total variance was explained in the model. Direct attitude (ß = .561, p < .001) was the highest multivariate correlation followed by indirect subjective norms (ß = -.262, p = .005), direct subjective norms (ß = .249, p = .009), and direct perceived behavioral control (ß = .199, p = .032). These 4 of the 6 independent variables contributed significantly to the prediction of intention to engage in physical activity.

Table 16: Multiple Linear Regression for Testing the Theory of Planned Behavior with the Physical Activity Index for Retired Male Members

| Variable | B | S.E. | Standardized B | t | Sig. |
|---|---|---|---|---|---|
| Intention | -.324 | .548 | | -.592 | .556 |
| Direct Attitude | .648 | .108 | .561 | 5.998 | .000* |
| Indirect Attitude | 1.682E-03 | .002 | .116 | 1.072 | .287 |
| Direct Subjective Norm | .234 | .087 | .249 | 2.695 | .009* |
| Indirect Subjective Norm | -5.362E-03 | .002 | -.262 | -2.919 | .005* |
| Direct PBC | .209 | .096 | .199 | 2.189 | .032* |
| Indirect PBC | 4.069E-04 | .002 | .023 | .242 | .810 |

* Significant at a .05 level (2-tailed)

Path Analysis

Figure 3 indicates the standardized beta coefficients for the path of the constructs of the Theory of Planned Behavior and the physical activity index for active male longshoremen. The equation included the effects of the 7 exogenous or independent variables (intention, direct attitudes, indirect attitudes, direct subjective norm, indirect subjective norm, direct perceived behavioral control, and indirect perceived behavioral control) and one endogenous variable (physical activity). The results, for active male members, of this structural equation yielded a significant $R^2$ of .114, $F(7, 228) = 4.18$, p<.001. The path from direct perceived behavioral control (t = 2.89, p = .004) and intention (t = 3.06, p = .002) achieved a significant relationship with physical activity, suggesting that these have a direct effect on physical activity with active members.

# Figure 3: Path Coefficients and Physical Activity for Active Males
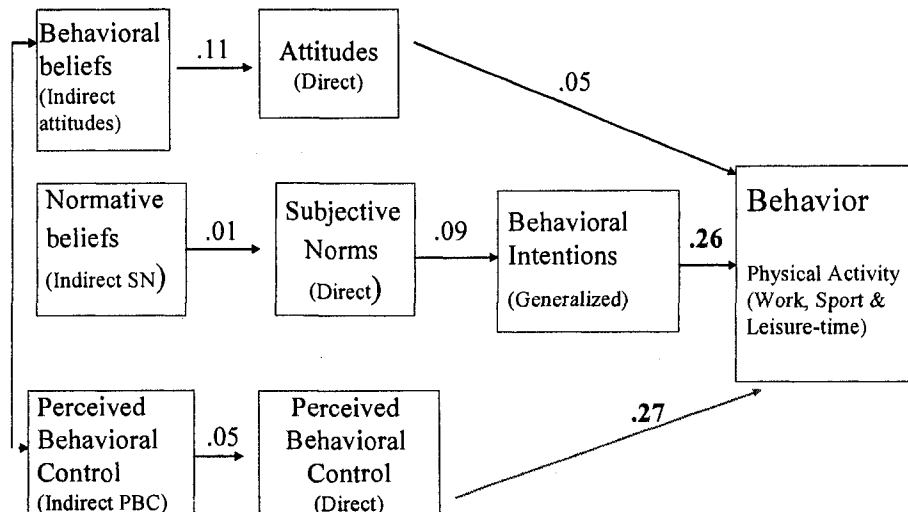


Figure 4 indicates the standardized beta coefficients for the path of the constructs in the model of the Theory of Planned Behavior for retired male longshoremen. The equation included the effects of the 7 exogenous or independent variables (intention, direct attitudes, indirect attitudes, direct subjective norm, indirect subjective norm, direct perceived behavioral control, and indirect perceived behavioral control) and one endogenous variable (physical activity). The results for retired male members yielded a significant $R^2$ of .277, F (7, 58) = 3.18, p<.006. Only the path from direct subjective norm (t = -2.30, p = .025) achieved a significant relationship with physical activity, suggesting these have a direct effect on physical activity with retired members.

## Figure 4: Path Coefficients for Physical Activity
## With Retired Males
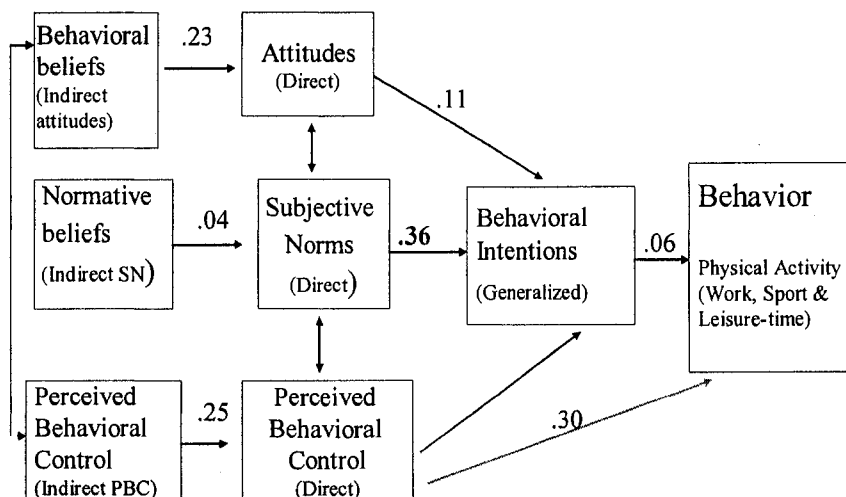


Figure 5 shows the path coefficients for active members and the intention index.

This structural equation assessed the effects of direct attitudes, indirect attitudes, direct

subjective norm, indirect subjective norm, direct perceived behavioral control, and

indirect perceived behavioral control on intention to engage in physical activity. For

active male members, the squared multiple correlation of this equation was .465, a

significant finding, $F (6,240) = 34.80$, $p< .001$). A comparison of the standardized

coefficients revealed that direct attitudes ($t = .273$, $p = .007$), indirect attitudes ($t = .254$,

$p = .012$), direct perceived behavioral control ($t = 4.92$, $p < .001$), indirect perceived

behavioral control ($t = 1.99$, $p = .048$) were statistically significant, suggesting these have

a direct effect on intention for active members.

## Figure 5: Path Coefficients for Intention Index with Active Males
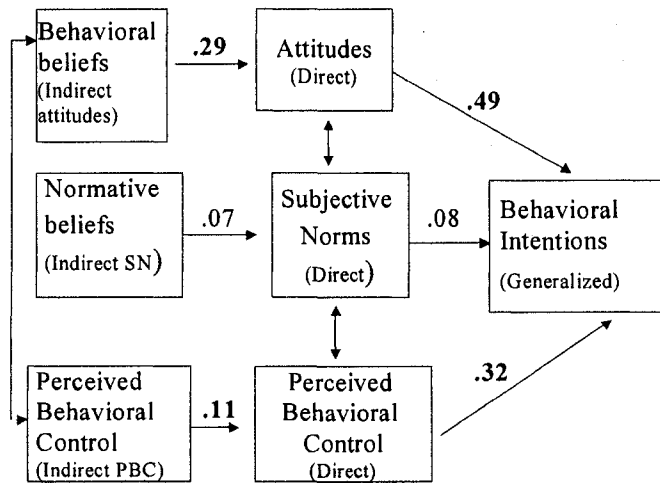


Figure 6 shows the path coefficients for retired members and the intention index. For retired male members, the squared multiple correlation of this equation was .575, a significant finding, $F\ (6, 77) = 17.33$, $p<.001$. A comparison of the standardized coefficients revealed that direct attitudes ($t = 4.60$, $p < .001$), indirect subjective norm ($t= 2.65$, $p = .010$), and direct perceived behavioral control ($t = 4.92$, $p < .001$) were statistically significant, suggesting a direct effect on intention for retired members.

Figure 6: Path Coefficients for Intention With
Retired Males
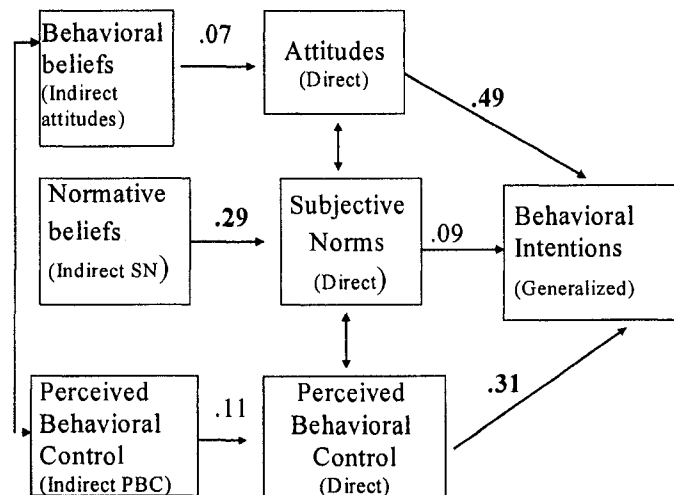


*Research Question 3*

Research Question 3, How are the demographic variables related to intention to

engage in physical activity and the behavior of physical activity? Table 17 shows the

means, standard deviations and correlations in the physical activity and intention indices

with age. The physical activity index when correlation with age was not significant for

both active (p = .391) and retired members (p = .412). However, age and intention to

engage in physical activity was statistically significant for active members   (p = .010) yet

not statistically significant for retirees (p = .906).

Table 17: Means, Standard Deviations and Correlations of Age with the Physical Activity and Intention Indices for Active and Retired Members

| Variable | Active | Retired |
|---|---|---|
| **Physical Activity Index** | | |
| Age | | |
|    Mean(SD) | 46.13 (9.76) | 67.83(9.60) |
|    Correlation | -.057 | -.109 |
|    Significance level | .391 | .412 |
| **Intention Index** | | |
| Age | | |
|    Mean(SD) | 46.13 (9.76) | 67.83(9.60) |
|    Correlation | -.167 | .013 |
|    Significance level | .010* | .906 |

* Significant at a .05 level (2-tailed)

Table 18 shows the means and standard deviations of ethnicity with the physical activity and intention indices for active and retired members. The means with physical activity of active White (M = 8.58, SD = 1.74) and African-American (M = 8.69, SD = 1.71) participants were not significantly different. In addition, means with physical activity of retired White (M = 8.61, SD = 1.41) and African-American (M = 8.83, SD = 1.29) participants were not significantly different.

An independent *t* test was calculated comparing the mean scores of active White and African-Americans with the physical activity index. No significant differences were found (t(239) = -.374, p = .709). An independent *t* test was calculated comparing the mean scores of retired White and African-American participants with the physical activity index. No significant differences were found (t(65) = .553, p = .553). An independent *t* test was calculated comparing the mean scores of active White and African-Americans participants with the intention index. No significant differences were found (t (252) = .228, p = .820). An independent *t* test was calculated comparing the

mean scores of retired White and African-Americans with the intention index. No

significant differences were found (t(85) = -1.63, p = .107).

Table 18: Means and Standard Deviations of Ethnicity with the Physical Activity and
Intention Indices for Active and Retired Members

| Variable | N | Active Mean(SD) | N | Retired Mean(SD) |
|---|---|---|---|---|
| **Physical Activity Index** | | | | |
| Ethnicity | | | | |
| White | 44 | 8.58 (1.74) | 17 | 8.61 (1.41) |
| African-American | 197 | 8.69 (1.71) | 50 | 8.83 (1.29) |
| **Intention Index** | | | | |
| Ethnicity | | | | |
| White | 46 | 5.58 (1.41) | 24 | 5.44 (1.26) |
| African-American | 208 | 5.53 (1.33) | 63 | 5.88 (1.09) |

Table 19 shows the means and standard deviations of marital status with the

physical activity and intention indices for active and retired members. The means of

physical activity with marital status for active members (M = 8.67, SD = 1.71) and retired

members (M = 8.76, SD = 1.31) participants were not significantly different. In addition,

the means of intention with marital status for active members (M = 5.53, SD = 1.34) and

retired members (M = 5.74, SD = 1.91) participants were not significantly different.

Table 19: Means and Standard Deviations of Marital Status with the Physical Activity and Intention Indices for Active and Retired Members

| Variable | N | Active Mean(SD) | N | Retired Mean(SD) |
|---|---|---|---|---|
| **Physical Activity Index** | | | | |
| Marital Status | 242 | 8.67 (1.71) | 68 | 8.76 (1.31) |
|     Married | 152 | 8.54 (1.60) | 52 | 8.76 (1.36) |
|     Divorced | 37 | 9.03 (2.16) | 7 | 8.63 (1.06) |
|     Widowed | 6 | 8.19 (1.99) | 5 | 8.53 (1.25) |
|     Never Married | 47 | 8.69 (1.71) | 4 | 8.83 (1.29) |
| **Intention Index** | | | | |
| Marital Status | 255 | 5.53 (1.34) | 89 | 5.74 (1.91) |
|     Married | 160 | 5.52 (1.32) | 65 | 5.76 (1.18) |
|     Divorced | 40 | 5.72 (1.14) | 12 | 5.51 (1.20) |
|     Widowed | 7 | 6.05 (1.22) | 8 | 5.63 (1.57) |
|     Never Married | 48 | 5.36 (1.38) | 4 | 6.25 (.631) |

One-way ANOVA test were performed on the independent variable marital status and the dependent variables of the physical activity and intention indices. For active members, ANOVA tests revealed no significant differences between marital status and physical activity ($F(3,238) = 1.265$, $p = .287$) or intention ($F (3,251) = .861$, $p = .462$). Tukey HSD ($p = .454$). Tukey HSD ($p = .362$) with intention found no significant differences. For retired members, ANOVA tests revealed no significant differences for physical activity ($F (3,64) = .399$, $p = .754$) or intention ($F (3,85) = .413$, $p = .744$) for marital status. Tukey HSD with marital status and intention showed no significant differences.

Table 20 shows the means and standard deviations of educational level with the physical activity and intention indices for active and retired members. Means for active

members and physical activity ranged from a high of 9.01 to a low of 8.10. Means for retired members and physical activity ranged from a high of 8.91 to a low of 8.49. Means for active members and intention ranged from a high of 5.70 to a low of 4.85. Means for retired members and intention ranged from a high of 6.19 to a low of 5.51.

One-way ANOVA tests were performed on the independent variable educational level and the dependent variables of the physical activity and the intention indices. For active members, a non-significant Levene statistic for physical activity (p = .886) and intention (p = .133) showed homogeneity of variance. ANOVA tests revealed significant differences between educational level and physical activity $(F(3,237) = 3.935, p = .009)$ and intention $(F (3,250) = 2.968, p = .033)$. Tukey HSD with physical activity showed only a significant difference with those who had a high school diploma and those with some high school training (p = .003). Tukey HSD with intention showing a significant difference with those who did not have a high school diploma and those that had a high school diploma (p = .026) and those who were college graduates (p = .035). For retired members, a nonsignificant Levene's statistic for physical activity (p = .424) and intention (p = .760) showed homogeneity of variance. ANOVA tests revealed no significant differences for physical activity $(F (3,64) = .22, p = .881)$ or intention $(F (3,85) = 1.337, p = .268)$. Tukey HSD with physical activity and intention showed no significant differences within the different educational levels.

Table 20: Means and Standard Deviations of Educational Level with the Physical Activity and Intention Indices for Active and Retired Members

| Variable | N | Active Mean(SD) | N | Retired Mean(SD) |
|---|---|---|---|---|
| **Physical Activity Index** | | | | |
| Educational level | 241 | 8.67 (1.71) | 68 | 8.77 (1.31) |
| Less than HS | 24 | 8.70 (1.79) | 24 | 8.84 (1.23) |
| HS or GED | 103 | 9.01 (1.66) | 27 | 8.81 (1.48) |
| Post HS training | 67 | 8.10 (1.73) | 12 | 8.49 (1.18) |
| College Graduate | 47 | 8.69 (1.60) | 5 | 8.91 (1.22) |
| **Intention Index** | | | | |
| Educational level | 254 | 5.53 (1.34) | 89 | 5.74 (1.31) |
| Less than HS | 28 | 4.85 (1.55) | 32 | 5.71 (1.24) |
| HS or GED | 106 | 5.63 (1.26) | 35 | 5.51 (1.18) |
| Post HS training | 72 | 5.54 (1.45) | 15 | 6.13 (1.15) |
| College Graduate | 48 | 5.70 (1.13) | 7 | 6.19 (.960) |

Table 21 provides the means and standard deviations of the yearly income with the physical activity and intention indices for active and retired members. Pearson product moment correlation was performed on the independent variable annual income and the dependent variables, physical activity and the intention indices. For active members, tests revealed no significant differences (r = .465, p > .05) between annual income (M = 8.67, SD = 1.71) and physical activity (M = 4.07, SD = 1.36). In addition, no significant differences were found with and intention (M = 4.07, SD = 1.36, r = .683) and annual income (M = 5.59, SD = 1.34). For retired members, tests revealed no

significant differences (r = .879) between annual income (M= 8.67, SD = 1.71) and

physical activity (M = 4.07, SD = 1.36) and no significant differences with intention (r =

.173, M = 5.75, SD = 1.19) and annual income (M = 2.675, SD = 1.62).

Table 21: Means and Standard Deviations of Yearly Income with the Physical Activity
and Intention Indices for Active and Retired Members

| Variable | N | Active Mean(SD) | N | Retired Mean(SD) |
|---|---|---|---|---|
| **Physical Activity Index** | | | | |
| Yearly Income Total | 233 | 8.70 (1.71) | 64 | 8.74 (1.33) |
| 25,000 – 34,999 | 24 | 8.83 (1.68) | 26 | 9.03 (1.09) |
| 35,000 – 44,999 | 16 | 7.87 (1.51) | 12 | 8.17 (1.08) |
| 45,000 – 54,999 | 20 | 8.70 (1.85) | 8 | 8.36 (1.71) |
| 55,000 – 64,999 | 47 | 8.73 (1.52) | 5 | 8.45 (1.37) |
| Above 65,000 | 137 | 8.76 (1.77) | 13 | 9.02 (1.65) |
| **Intention Index** | | | | |
| Yearly Income Total | 245 | 5.51 (1.35) | 83 | 5.70 (1.20) |
| 25,000 – 34,999 | 25 | 5.43 (1.30) | 31 | 5.54 (1.09) |
| 35,000 – 44,999 | 16 | 5.60 (1.45) | 13 | 5.51 (1.23) |
| 45,000 – 54,999 | 21 | 5.52 (1.35) | 11 | 6.00 (1.26) |
| 55,000 – 64,999 | 39 | 5.31 (1.40) | 8 | 5.31 (1.31) |
| Above 65,000 | 144 | 5.57 (1.35) | 20 | 6.06 (1.25) |

Table 22 shows the bivariate relationship of the independent variable: years in the

HRSA-ILA, and the dependent variables: physical activity and intention indices. Means

and standard deviations for both the physical activity and the intention indices were 14.35

(10.09)for active members and 31.42(10.82) for retired members. Correlation of the intention index and years in the HRSA-ILA was statistically significant for active members only.

Table 22: Means, Standard Deviations and Correlations of Years in the HRSA-ILA with the Physical Activity and Intention Indices for Active and Retired Members

| Variable | Active | Retired |
|---|---|---|
| **Physical Activity Index** | | |
| Years in the HRSA-ILA | | |
| N | 242 | 68 |
| Mean(SD) | 14.35 (10.09) | 31.42(10.82) |
| Correlation | -.076 | -.036 |
| Significance level | .249 | .804 |
| **Intention Index** | | |
| Years in the HRSA-ILA | | |
| N | 255 | 68 |
| Mean(SD) | 14.35 (10.09) | 31.42(10.82) |
| Correlation | -.161 | -.071 |
| Significance level | .012* | .566 |

\* Significant at a .05 level (2-tailed)

*Research Question 4*

Research question 4, To what extent do the demographic factors moderate the performance of the Theory of Planned Behavior model in explaining intention to engage in regular physical activity and to engage in the behavior of regular physical activity among longshoremen? Age, ethnicity, education levels, marital status, and annual income were added to the multiple linear regression models for physical activity and intention.

Table 23 indicates the relationship of the demographic variables (age, ethnicity, educational level, marital status, and annual income) with the physical activity index. Pearson's correlation indicated only marital status $(r = .118, p = .049)$ was statistically

significant for active members. None of the demographic variables were statistically

significant for retired members.

Table 23: Relationship of the Demographic Variables to the Physical Activity Index of
Active and Retired Male Members

| Independent Variable | Active Members N=196 | Retired Members N=52 |
|---|---|---|
| Age | -.018 .403 | -.068 .315 |
| Ethnicity | -.012 .434 | .082 .281 |
| Educational Level | -.108 .067 | -.107 .225 |
| Marital Status | .118 .049* | -.064 .327 |
| Annual Income | .074 .153 | .074 .300 |

* Significant at a .05 level (2-tailed)

Table 24 indicates the relationship of the demographic variables (age, ethnicity,

educational level, marital status, and annual income) to the physical activity index.

Pearson's correlation indicated only age (r = -.174, p = .007) was statistically significant

for active members. Only ethnicity (r = -.253, p = .020) was statistically significant for

retired members.

Table 24: Relationship of the Demographic Variables to the Intention Index of Active and Retired Male Members

| Independent Variable | Active Members N=196 | Retired Members N=52 |
|---|---|---|
| Age | -.174 .007* | .108 .194 |
| Ethnicity | .079 .130 | .253* .020 |
| Educational Level | .063 .184 | .022 .430 |
| Marital Status | -.008 .453 | -.096 .222 |
| Annual Income | -.018 .402 | .093 .229 |

* Significant at a .05 level (2-tailed)

Table 25 explains the multiple linear regression for testing the Theory of Planned Behavior in the physical activity index, with the demographic variables for active members. Multiple linear regression, for active members, indicated a statistically significant model (F(12, 183) = 2.864, p <.001, $R^2$ = .158). The $R^2$ indicated that the model accounted for 15.8% of the total variance. In this model, only marital status (p = .038) was statistically significant for predicting physical activity.

Table 25: Multiple Linear Regression for Testing the Theory of Planned Behavior with the Physical Activity Index and Demographic Variables for Active Male Members

| Variable | B | S.E. | Standardized B | t | Sig. |
|---|---|---|---|---|---|
| Physical Activity (constant) | 6.668 | 1.252 | .150 | 5.324 | .000 |
| Intention | .409 | .140 | .297 | 2.917 | .004* |
| Direct Attitude | -2.774E-02 | .143 | -.020 | -.194 | .846 |
| Indirect Attitude | -3.194E-03 | .002 | -.131 | -1.323 | .187 |
| Direct Subjective Norm | -.363 | .147 | -.259 | -2.468 | .014* |
| Indirect Subjective Norm | 9.821E-04 | .003 | .031 | .291 | .771 |
| Direct PBC | .420 | .168 | .279 | 2.499 | .013 |
| Indirect PBC | -2.906E-04 | .003 | -.008 | -.084 | .933 |
| Age | 3.821E-02 | .012 | .022 | .309 | .758 |
| Ethnicity | -.195 | .268 | -.053 | -.725 | .469 |
| Educational level | -.234 | .129 | -.126 | -1.808 | .072 |
| Marital Status | .217 | .104 | .150 | 2.091 | .038* |
| Annual Income | .163 | .092 | .133 | 1.758 | .080 |

* Significant at a .05 level (2-tailed)

Table 26 explains the multiple linear regression for testing the Theory of Planned Behavior in the physical activity index, with the demographic variables for retired members. For retirees, multiple regression indicated a statistically significant model $(F(12, 39) = 1.763, p = .090, R^2 = .352)$ with the $R^2$ indicating that the model accounted for over 35% of the total variance. Although none of the variables were statistically

significant for predicting physical activity, direct subjective norm and direct perceived

behavioral control came close.

Table 26: Multiple Linear Regression for Testing the Theory of Planned Behavior with Physical Activity and the Demographic Variables for Retired Male Members

| Variable | B | S.E. | Standardized B | t | Sig. |
|---|---|---|---|---|---|
| Physical Activity (constant) | 7.882 | 2.207 | - | 3.571 | .001 |
| Intention | -6.960E-02 | .502 | -.051 | -.139 | .890 |
| Direct Attitude | -.153 | .503 | -.107 | -.304 | .763 |
| Indirect Attitude | 6.704E-03 | .005 | -.354 | 1.438 | .158 |
| Direct Subjective Norm | -.516 | .285 | -.368 | -1.811 | .078 |
| Indirect Subjective Norm | -3.724E-03 | .006 | -.124 | -.608 | .547 |
| Direct PBC | .579 | .311 | .411 | 1.863 | .070 |
| Indirect PBC | 6.024E-03 | .005 | .268 | 1.234 | .225 |
| Age | 3.847E-03 | .023 | .027 | .171 | .865 |
| Ethnicity | 3.913E-02 | .446 | .013 | .088 | .931 |
| Educational level | -8.590E-02 | .227 | -.054 | -.378 | .708 |
| Marital Status | -.210 | .229 | -.130 | -.916 | .366 |
| Annual Income | 5.287E-02 | .133 | .063 | .397 | .694 |

* Significant at a .05 level (2-tailed)

Table 27 explains the multiple linear regression model for testing the theory

constructs in the intention to engage in physical activity index with the demographic

variables for active members. For active members the multiple linear regression

indicated a statistically significant model (F(11,192) = 22.477, p<.001, $R^2$ = .563) with

the $R^2$ indicating 56.3% of the total variance was explained by the model. Direct attitude, indirect attitude, direct perceived behavioral control, and age achieved statistical significance.

Table 27: Multiple Linear Regression for Testing the Theory of Planned Behavior with Intention and the Demographic Variables for Active Male Members

| Variable | B | S.E. | Standardized B | t | Sig. |
|---|---|---|---|---|---|
| Intention | 1.20 | .643 | - | 1.865 | .064 |
| Direct Attitude | .273 | .071 | .266 | 3.823 | .001* |
| Indirect Attitude | 2.576E-03 | .001 | .145 | 2.115 | .036* |
| Direct Subjective Norm | 7.378E-02 | .075 | .073 | .978 | .329 |
| Indirect Subjective Norm | -4.349E-04 | .002 | -.019 | -.251 | .602 |
| Direct PBC | .307 | .084 | .281 | 3.653 | .000* |
| Indirect PBC | 2.967E-03 | .002 | .121 | 1.712 | .089 |
| Age | -1.623E-02 | .006 | -.130 | -2.629 | .009* |
| Ethnicity | .235 | .135 | .088 | 1.741 | .083 |
| Educational level | 7.318E-03 | .066 | .005 | .111 | .911 |
| Marital Status | -2.733E-02 | .053 | -.026 | -.515 | .607 |
| Annual Income | 7.533E-02 | .047 | .009 | .161 | .872 |

* Significant at a .05 level (2-tailed)

Table 28 explains the multiple linear regression model for testing the theory constructs in the intention to engage in physical activity index with the demographic variables for retired members. For retired members, the multiple linear regression model was statistically significant ((F (11,54) = 15.081, p<.001, $R^2$ = .754) indicating 75.4% of

the total variance was explained in the model. Direct attitude, direct subjective norm, and indirect subjective norm achieved statistical significance.

Table 28: Multiple Linear Regression for Testing the Theory of Planned Behavior with Intention and the Demographic Variables for Retired Male Members

| Variable | B | S.E. | Standardized B | t | Sig. |
|---|---|---|---|---|---|
| Intention | -.608 | .863 | - | -.713 | .479 |
| Direct Attitude | .714 | .130 | .620 | 5.500 | .001* |
| Indirect Attitude | 2.853E-03 | .002 | .205 | 1.616 | .112 |
| Direct Subjective Norm | .260 | .105 | .263 | 2.478 | .016* |
| Indirect Subjective Norm | -6.524E-03 | .002 | -.293 | -2.878 | .006* |
| Direct PBC | 5.622E-02 | .114 | .054 | .492 | .625 |
| Indirect PBC | 2.407E-04 | .002 | .014 | .119 | .906 |
| Age | 4.555E-03 | .009 | .040 | .500 | .619 |
| Ethnicity | .131 | .182 | .056 | .723 | .473 |
| Educational level | 8.335E-02 | .094 | .063 | .889 | .378 |
| Marital Status | -3.091E-02 | .098 | -.023 | -.317 | .753 |
| Annual Income | -1.868E-02 | .051 | -.028 | -.363 | .718 |

* Significant at a .05 level (2-tailed)

CHAPTER V

CONCLUSIONS

*Conclusions*

The following discussion provides some theoretical and practical implications from this research. Essentially all persons can benefit from physical activity, and those who are physically active tend to live longer than those who are sedentary. Thus, it is important to examine the beliefs that can promote or inhibit physical activity. This is the first known study that examined the constructs of the Theory of Planned Behavior within a maritime union population.

This study hypothesized that longshoremen with higher scores on attitude, subjective norms, and perceived behavioral control will be more likely to intend to engage and actually engage in physical activity. The results partially support these hypotheses. The findings do support that the Theory of Planned Behavior is a useful framework for determining the important beliefs related to the intention to engage in physical activity but less so for actually engaging in physical activity. This is similar to other studies that concluded the Theory of Planned Behavior variables better predict intentions than behavior (Armitage & Conner, 2000).

Overall, the single physical activity question did not provide a statistically significant model. However, the composite physical activity index provided a better measure for physical activity. For active and retired members, the multiple linear regression model of the constructs and physical activity index provided a statistically significant model. For active members the model accounted for 9.7% of the total variance and intention and direct perceived behavioral control were statistically

significant. For retired members, 27.3% of the total variance was accounted for in the model. Direct subjective norm came close to being statistically significant.

The results of the multiple linear regression model of the constructs using the intention index with active members, also provided a statistically significant model with 54.4% of the variance accounted for by the model and direct perceived behavioral control, direct attitude, and indirect attitude achieved statistical significance and indirect perceived behavioral control came very close to significance. The multiple linear regression model of the constructs and intention index with retired members, also provided a statistically significant model with 69.9% of the variance accounted for by the model and direct attitude, direct subjective norm, indirect subjective norm, and direct perceived behavioral control attaining statistical significance.

When the demographic variables of age, gender, ethnicity, educational level, marital status, income, and years in the HRSA-ILA were added to the physical activity model for active members, the model improved accounting for 15.8% of the total variance. The constructs intention, direct subjective norm and marital status achieved statistical significance. For retired members, the model also improved accounting for 35.2% of the total variance with none of the predictors achieving statistical significance. When the demographic variables of age, gender, ethnicity, educational level, marital status, income, and years in the HRSA-ILA were added to the intention model for active members, the model improved providing 56.3% of the total variance accounted for with direct attitude, indirect attitude, direct perceived behavioral control, and age achieving statistical significance. For retired members, the model improved providing 75.4% of the total variance with direct attitude, direct subjective norm, and indirect norm achieving

statistical significance. The increase in the variance suggests that even though demographic variables are not part of the theory, they provide important information for this group.

*Physical Activity Index*

Considering the single physical activity question first, more than quarter of the active (30.2%) and retired (29.7%) members did not participate in any additional physical activity other than their regular work activity. This is consistent with the reported leisure-time activities from the National Health Survey reported in Chapter I (USDHHS, 2006). The highest means for both active and retired members was for direct and indirect attitude. Although the logistic regression model did not provide a statistically significant model for either active or retired members, analysis demonstrated that several of the constructs were influential. For active members, intention and direct perceived behavioral control exerted the most influence on members' engaging in physical activity, yet only indirect perceived behavioral control predicted physical activity. For retired members, direct subjective norms and indirect perceived behavioral control were important factors for predicting physical activity.

When the physical activity index was used to measure physical activity, the means were similar. Only small differences were found between active and retired members. Active members' means were highest on the sport index (2.99, SD = .81) and the retired member's means were highest on the work index (3.04, SD = .50). The active members means were lowest on the leisure-time index (2.99, SD = .81), while retired member's means were highest on the work index (3.04, SD = .50). These means were fairly consistent with another study of male workers, which reported, a mean of 2.6 on

the work index, 2.8 on the sport index and 2.8 on the leisure-time index (Baeche, Burrma & Frijters, 1982). Overall, the 3 indexes highly correlated with physical activity, which suggests that the physical activity index was a good measure of physical activity for this group.

The path analysis for active members was statistically significant for physical activity but only intention and direct perceived behavioral control achieved a significant relationship. Other studies found this relationship with physical activity (Chatzisarantis, Frederick, Biddle, Hagger, & Smith, 2007; Armitage, 2005). This implies that active members may have greater intentions and believe they have more control over their ability to engage in physical activity than retired members. For retired members, the path was also statistically significant but only direct subjective norm achieved a significant relationship. This implies that for the retired members, other's opinions about their participation in physical activity were more important than for active members.

*Intention*

Although this study measured intention by different questions, strong positive correlations of intention were found with physical activity and all theoretical variables, which was consistent with several other studies (Blue, 2007; Chatzisarantis, Frederick, Biddle, Hagger, & Smith, 2007; Gretebeck, Black, Blue, Glickman, Huston, and Gretebeck, 2007; Latimer, Ginis & Arbour, 2006; and Armitage, 2005). In addition, the models for active and retired members were statistically significant for the intention index. The first model used the intention index as the dependent variable and direct and indirect attitudes, subjective norms, and perceived behavioral control as the independent variables. The $R^2$ indicated that 54.4% of the variance for active members and 69.9% of

the variance for retired members with intention to engage in physical activity could be predicted by the independent variables. The $R^2$ for the second model improved with the addition of age, ethnicity, educational level, marital status and annual income as independent variables. In the second model, 56.3% of the variance for active members and 75.4% of the variance for retired members, in intention to engage in physical activity could be predicted by the addition of the demographic variables to the other independent variables. Caution must be used in interpreting this data; the high $R^2$ for retired members may be an artifact of the small sample size and the increase in the number of independent variables. However, this model does suggest that addition of the demographic variables provides a better model for predicting intention to engage in physical activity.

The path analysis for active members was statistically significant for intention to engage in physical activity. Direct attitudes, indirect attitudes, direct perceived behavioral control, and indirect perceived behavioral control achieved a statistically significant relationship. This suggests that attitudes and perceived behavioral control were more important to active members than subjective norms. For retired members, the path was also statistically significant and direct attitudes, indirect subjective norm, and direct perceived behavioral control achieved significant relationships. Again, subjective norms played a more important role in predicting intention to engage in physical activity for retired members than for active members.

*Attitudes*

This study found statistically significant correlations of attitudes with physical activity and intention, which was consistent with other studies (Chatzisarantis, Frederick, Biddle, Hagger, & Smith, 2007; Gretebeck, Black, Blue, Glickman, Huston, and

Gretebeck, 2007; and Armitage, 2005). The means for the direct and indirect measures of attitude were the highest for both active and retired members. For both groups, correlations for direct attitude were significant for both the physical activity and intention indices. For active members, only correlations with intention and indirect attitude were significant. Retired members showed statistical significance with physical activity and intention with both indices. The indirect attitude score means revealed the participants believed that physical activity was good for their health, improved stress, helped maintain or control weight, and made them feel better. The negative belief statement question scores were much lower, indicating that these items had less impact on indirect attitudes regarding physical activity.

*Subjective Norm*

Direct (active members) and indirect subjective norms ( active and retired members) were not significantly correlated with physical activity. This finding is consistent with other studies (Chatzisarantis & Hagger, 2005; Prapavessis, Maddison, Ruygrok, Bassett, Harper, & Gillanders, 2005; Blue, 1995). However, studies have shown statistically significant correlations of subjective norms and intention to engage in physical activity (Chatzisarantis, Frederick, Biddle, Hagger, & Smith, 2007; and Tolma, Reininger, Evans, & Ureda, 2006; Armitage, 2005), which are also consistent with findings from this study.

For both active and retired members, the direct subject norms item means were highest for the question *that most people think I should participate in physical activity* and lowest for the question on the *expectation to participate in physical activity*. This may indicate that although they know others think they should engage in physical

activity, they do not have a strong self-expectation to engage in physical activity. For both active and retired members, the mean for indirect subjective norm items indicated that participants were highly influenced by their doctors and/or wives. Other family members, friends or ILA coworkers had less of an influence on their decision to engage in physical activity. The path from direct subjective norm, for retirees, showed a significant relationship with physical activity.

*Perceived Behavioral Control*

Direct and indirect perceived behavioral control are important variables in this study. Similar to the findings of this study, one study found perceived behavioral control to be the strongest predictor of intention to engage in physical activity (Tolma, Reininger, Evans, & Ureda, 2006). In this study as in other studies statistically significant correlations were found with perceived behavioral control and intention to exercise (Guinn, Vincent, Jorgensen, Dugas, & Semper, 2007; Armitage, 2005; Chatzisarantis & Hagger, 2005; and Latimer & Ginis, 2005). Active and retired members showed significant correlations for both direct and indirect perceived behavioral control with physical activity behavior and intention to engage in physical activity.

For active members, the path analysis from direct perceived behavioral control to physical activity achieved a significant relationship. For both active and retired members, the path analysis from direct perceived behavioral control to intention to engage in physical activity achieved a significant relationship. In both regression models, direct perceived behavioral control (active members) was statistically significant for physical activity and for intention to engage in physical activity. In the second regression

model, direct perceived behavioral control contributed significantly to predicting physical activity for active members.

<div align="center">Implications for Health Promotion</div>

<div align="center">*Health*</div>

Regular activity helps to increase quality of life by preserving independence and functional ability. The Surgeon General's Report on Physical Activity and Health recognized the importance of a physically active lifestyle in preventing chronic disease and promoting health and well being (USDHHS, 1996). The report linked sedentary behavior to osteoporosis, obesity, depression, and high death rates from coronary heart disease, Type 2 diabetes, and colon cancer. One study, noted that the healthy choice is not always easy to enact, even if you know it, believe in it, and want to do it (Ritchie, Herscovitch, and Norfor, 1994). Participation and maintenance of a physically active lifestyle are the most important health behaviors in preventing the onset or reducing the severity of many chronic diseases.

<div align="center">*Environment*</div>

Opportunities, both at home and at work, need to be provided that support physical activity. Although the Theory of Planned Behavior does not address environmental concerns, physical space is another important consideration when developing interventions to encourage physical activity. Environments that are safe and have convenient resources for physical activity make it easier for people to exercise. Areas for physical activity need to be readily available so that the choice to engage in physical activity is the easier choice and supports the decision to create an active, healthier lifestyle.

*Recommendations*

Further research is needed to study strategies to assist members in moving from behavioral intentions to targeted actions that improve the likelihood of engaging in physical activity. One of the current challenges for research is translating intentions into action (Sniehotta, Scholz, & Schwarzer, 2004). This gap is referred to as the "intention-behavior gap" which was found in this study and by other researchers (Sniehotta, Scholz, & Schwarzer, 2004; Armitage & Conner, 2000).

Another model, the Health Action Process Approach (HAPA), may provide additional insight into what creates intention and, consequently, what actually propels one to engage in a behavior. Although not part of the Theory of Planned Behavior, HAPA provides a distinction between the pre-intentional motivational processes that lead to the behavioral intention and the post-intentional volitional processes that lead to the actual behavior (Schwarzer, 2008). In the motivational phase, the person needs to believe in his or her ability to perform a behavior; otherwise, he or she will fail to initiate an action. However, in the subsequent volitional phase the intention has to be transformed into specific pathways to perform the behavior.

Self-efficacy is involved in the post-intentional volitional phase in the HAPA model (Sniehotta, Scholz, and Schwarzer, 2005). Self-efficacy defined as "beliefs about one's own capability to accomplish a certain task by one's own actions and resources even in the face of obstacles or barriers." Self-efficacious beliefs influence planning, taking initiative, managing relapses, and maintaining a behavior change. For example, adding an exercise log to a weekly planning calendar or planning what one would do when a relapse occurs may increase the likelihood of actually engaging in a behavior.

Future research may find that adding variables such as, planning and self-efficacy may be useful in identifying other determinants of engaging in physical activity.

*Conclusions*

The Theory of Planned Behavior is useful in identifying important beliefs related to the intention to engage in physical activity and for actually engaging in physical activity. Knowledge about physical activity behaviors could be advanced if programs were designed with interventions that targeted specific behavioral beliefs to a population (Blue, 1995). This study has identified some of the determinants of intention to engage in and actually engaging in physical activity, which can be used to plan more effective interventions for members of the HRSA-ILA.

Developing programs and motivating people to increase their physical activity is a challenge. These data suggest that heightening positive attitudes toward engaging in physical activity, incorporating social influence from wives and doctors, and strengthening the perception of personal behavioral control are important factors that promote the intention to engage and, possibly, actual engagement in physical activity. Therefore, including this knowledge in the development of interventional content and programs consistent with the significant beliefs expressed in this study is crucial.

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# APPENDIXES

## Appendix A: IRB Approvals – Focus

**OLD DOMINION UNIVERSITY**

COLLEGE OF HEALTH SCIENCES
SCHOOL OF PHYSICAL THERAPY
Norfolk, Virginia 23529-0288
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April 26, 2005
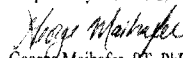
Dear Susan Tweed;

The Human Subjects Committee of the College of Health Sciences has met to consider your research proposal entitled, *"Identifying Health Behaviors in Maritime Union Members – Focus Groups"* RPI: Clare Houseman , Co-investigator: Susan A Tweed

The Committee has approved the proposal as an exempt study. Because of the exempt nature of the study, you will not have to submit a yearly progress report or a close-out report when the study has been completed.

Please feel free to contact me if you have any additional questions.

Respectfully submitted,

George Maihafer, PT, PhD
Chairperson, Human Subjects Committee
College of Health Sciences

# Appendix: A-2 – IRB Approval - Survey

**OLD DOMINION UNIVERSITY**

COLLEGE OF HEALTH SCIENCES
SCHOOL OF PHYSICAL THERAPY
Norfolk, Virginia 23529-0288
www.odu.edu/dpt
Phone: (757) 683-4519 • Fax: (757) 683-4410

August 6, 2007

Dear Susan Tweed:

The Human Subjects Committee of the College of Health Sciences has met to consider your research proposal entitled, *"Identifying Health Behaviors in Maritime Union Members"* RPI: Stacey B. Plichta, Co-investigator: Susan A Tweed.

The Committee has approved the proposal as an exempt study. Because of the exempt nature of the study, you will not have to submit a yearly progress report or a close-out report when the study has been completed.

Please feel free to contact me if you have any additional questions.

Respectfully submitted,

George Maihafer, PT, PhD
Chairperson, Human Subjects Committee
College of Health Sciences

Old Dominion University is an equal opportunity, affirmative action institution

**Appendix B: Moderator's Guide**

<div align="center">

**HRSA-ILA's Focus Group Moderator's Guide**
*Warm Up and Explanation*

</div>

1. *Introduction*
   a. Thank you for coming
   b. Your presence is important
   c. Today you are here to participate in a focus group. A focus group is like an interview to get your attitudes and perceptions regarding behaviors that can enhance your health. During this focus group I will ask general broad questions.

2. *Purpose*
   a. We will be exploring your attitudes and perceptions regarding nutritional behaviors, physical activity, change and the union's role in health promotion. We are interested in all of your statements.
   b. There are no right or wrong answers
   d. All comments both positive and negative are welcome
   e. Please feel free to disagree with one another. We would like to have many points of view.
   f. Due to our limited time together, we will need to stay focused on the topics of nutritional behaviors, physical activity, change and the union's role in health promotion.
   g. If by mistake someone begins to talk about anything that is illegal or immoral we will need to stop the tape, erase the information, and then proceed with our topic. These are not areas we will be discussing.
   h. To maintain the confidentiality of all participants, we ask you not to discuss what other say in this focus group outside this group. In other words – what is said in the room stays in the room.

3. *Procedure*
   a. Because we value all of your opinions, we will be using a tape recorder in order to record all your responses. Tapes will be erased and destroyed after the transcripts are verified. All comments are confidential and will be used to improve the services of Healthy Edge, the HRSA-ILA wellness program.
   b. I want this to be a group discussion, so you do not have to wait for me to call on you. Please speak one at a time, so that the tape recorder can pick up all of your comments.
   c. We have a lot of ground to cover, so I may change the subject or move ahead. Please stop me if you want to add something.

4. *Self-introductions*
   a. You will not be referred to by your real names, so please write a name you would like to be referred to on the card in front of you. Do not use your real name.

## Part Two: Focus Group Questions

1. Opening question
   a. Tell us how you want to addressed and what you most enjoy doing when you are not at work.
2. Introductory Questions
   a. What is the first thing that comes to mind when you hear the phrase healthy lifestyle?
3. Key Questions – Nutritional behaviors and physical activity
   a. What do you believe you need to maintain or create eating habits that promote a healthy weight?
   b. What do you believe you need to maintain or create physical activity habits that promote a strong healthy body?
   c. What would you need to do to create better eating habits and more physical activity in your life?
   d. What prevents you from creating better eating habits and more physical activity in your life?
   e. What does your family and friends do to help you participate in maintaining a healthy lifestyle?
   f. How do other members of the HRSA-ILA help you maintain a healthy lifestyle?
4. Let's talk a bit about change and what it takes to change a habit?
   a. Think of a behavior you would like to change, can you identify the good and the bad points to making a change?
   b. Do you have confidence that you could adopt a new behavior or cease and unhealthy one if you needed to? Do you have an example you would like to share?
   c. If you knew you should make a behavior change, but you did not really want to - what would it take to tip the scale towards change?
   d. Once you decided to make a change, what do you think you would need to sustain the change?
5. Now I want to focus on being an HRSA-ILA member.
   a. What are some of the benefits of being an HRSA-ILA member related to creating a healthy lifestyle?
   b. What programs and events does the HRSA-ILA have that let you know maintaining your good health is a priority to them? Can you give me an example?
6. Suppose you had one minute to talk to the president of the ILA on promoting a healthy lifestyle. What would you say?


Thank you for your time and comments.

**Appendix C: Literature Review Using Theory of Planned Behavior and Physical Activity**

| Author | Article | Brief Description | Attitude Predicts Exercise | SN Predicts Exercise | PBC Predicts Exercise | Intention Predicts Exercise |
|---|---|---|---|---|---|---|
| Armitage (2005) | Can TPB Predict the Maintenance of Physical Activity? | Tested the ability of the TPB to predict participation in PA and the development of activity habits in a 12-week longitudinal study. 94 participants.<br><br>Used descriptive, correlation and survival analysis.<br><br>Self reported behavior measured by one question. | Cronbach's alpha .90 at baseline, .81 at follow-up<br><br>Strong positive correlations of attitudes and intention (r = .37, p< .01)<br><br>Strong positive correlations of attitudes and PA behavior (r = .36, p< .01) | Cronbach's alpha .85 at baseline, .96 at follow-up<br><br>Strong positive correlations of SN and intention (r = .35, p< .01)<br><br>Correlations of SN and PA behavior (r = .14, p< .05) | Cronbach's alpha .85 at baseline, .95 at follow-up<br><br>Strong positive correlations of PBC and intention (r = .65, p< .01)<br><br>Strong positive correlations of PBC and PA behavior (r = .51, p< .01) | Cronbach's alpha .72 at baseline, .76 at follow-up<br><br>Strong positive correlations of intention and actual behavior (r = .42, p< .01) |
| Blanchard, Courneya, Rodgers, Fraser, Murray, Daub, & Black (2003) | Is the TPB a useful framework for Understanding Exercise Adherence During Phase II Cardiac Rehabilitation? | Evaluated the TPB for understanding exercise adherence. 215 patients.<br><br>Measured past exercise behavior. | Internal consistency scale α= .83 Behavioral beliefs were significantly related to attitude (r=.49, p<.001 Attitude determined intention to exercise. | Internal consistency scale α= .92 Normative beliefs were significantly related to SN (r=.49, p<.001. SN had a significant influence on intention. | Internal consistency scale α= .85 Control beliefs were significantly related to PBC (r=.49, p<.001. PBC determined intention to exercise | Hierarchical regression of exercise intention with the constructs R² = .30 Normative beliefs were significantly related to intention (r= .28, p<.001 |

| Author | Article | Brief Description | Attitude Predicts Exercise | SN Predicts Exercise | PBC Predicts Exercise | Intention Predicts Exercise |
|---|---|---|---|---|---|---|
| Blue, (2007) | Does the Theory of Planned Behavior identify diabetes – related cognitions for intention to be physically active and eat a healthy diet? | Pilot study examined the relationship among attitude, social norm, perceived behavioral control, and intentions to be physically active in persons at risk for diabetes. Purposive sample of 106 adults recruited from the community. Did not measure physical activity behavior. Used structural equation modeling | Attitude was not related to intention to be physically active | Greek lambda coefficients for intention and SN (.35) significant. Participants who perceived greater influence from important referents reported stronger intention to be physically active. | Greek lambda coefficients for intention and PBC were (.43) significant. Participants who perceived greater control over PA reported stronger intention to be physically active | Amount of variance explained with intention was 63%. Greek lambda coefficients for intention from (.39 behavioral belief to (.96 intention) significant meaning that the measures a good indicator of underlying constructs. |
| Chatzisarantis, Frederick, Biddle, Hagger, & Smith, 2007 | Influences of volitional and forced intentions on physical activity and effort within the Theory of Planned Behavior | 444 participants (185 males & 260 females) extended the theory to include volitional and forced intentions, effort & past behavior. Prospective design measured at 2 points in time. Used measures of past behavior – Godin and Shephard's Leisure-Time Exercise Questionnaire. Descriptive statistics, internal consistency, factor analysis, model fit analysis and hierarchical regression analysis | Correlation between attitudes and intention statistically sig. 0.539  Correlation between attitudes and PA statistically sig. 0.355  Alpha coefficient 0.79 | Correlation between SN and intention statistically sig. 0.012  Correlation between SN and PA not statistically sig.  Alpha coefficient 0.65 | Correlation between PBC and intention statistically sig. 0.424  Correlation between PBC and PA statistically sig. 0.263  Alpha coefficient 0.76 | Correlation between intention and PA statistically sig. 0.557  Alpha coefficient 0.92 |

| Author | Article | Brief Description | Attitude Predicts Exercise | SN Predicts Exercise | PBC Predicts Exercise | Intention Predicts Exercise |
|---|---|---|---|---|---|---|
| Chatzisarantis & Hagger (2005) | Effects of a brief intervention based on the Theory of Planned Behavior on leisure-time physical activity participation | Two persuasive communications were developed to assess the utility of an intervention based on TPB in promoting PA attitudes, intentions, and behavior. Messages targeted model salient behavioral beliefs and important behavioral beliefs. 83 students – 2 groups Used Godin and Shephard's Leisure-Time Exercise Questionnaire for behavior measurement. Evaluated the utility of a persuasive message that targeted model salient behavioral beliefs in changing attitudes, intentions, and physical activity control. Focused on attitude alone. 83 students (41 male 42 female) | Correlation of attitude and intention statistically significant .665 p>.05<br><br>Correlation of attitude and physical activity statistically significant .639 p>.05<br><br>ANOVA showed that persuasive communication influenced attitudes not SN or PBC | Correlation of SN and intention not statistically significant<br><br>Correlation of SN and physical activity not statistically significant | Correlation of PBC and intention statistically significant .538 p>.05<br><br>Correlation of attitude and physical activity statistically significant .398 p>.05 | |

| Author | Article | Brief Description | Attitude Predicts Exercise | SN Predicts Exercise | PBC Predicts Exercise | Intention Predicts Exercise |
|---|---|---|---|---|---|---|
| Conn, Tripp-Reimer, & Maas (2003) | Older Women and Exercise: Theory of Planned Behavior Beliefs | Examined the relationships between theory of planned behavior constructs and exercise behavior and exercise intention in older women. 225 women 65 years and older. Used the Baecke Physical Activity Scale to measure PA. Cronbach's alpha used to test internal consistency of tool. Descriptive Multiple regression, logistic regression | Multiple regression significant behavioral beliefs p = 0.006 predicts exercise<br><br>Predicts exercise intention behavioral beliefs p= 0.001 | Multiple regression not significant normative beliefs p = 0.34 predicts exercise<br><br>Predicts exercise intention normative beliefs p= 0.005 | Multiple regression significant Perceived control beliefs p = 0.0001 PBC predicts exercise<br><br>Predicts exercise intention perceived control beliefs p= 0.001 | |
| Courneya, Vallance, Jones, & Reiman (2005) | Correlates of exercise intentions in non-hodgkin's lymphoma survivors: an application of the Theory of Planned Behavior | Subjects were 399 (205 men and 194 women) non-Hodgkin's lymphoma survivors – mailed survey. Used the leisure score idex from the Godin Leisure Time Exercise Questionnaire to measure behavior. Used descriptive analysis, associations, and multiple regression analysis. Added demographic and medical moderators to the analysis. | Correlation of attitude and intention significant p<.001 (.56)<br><br>Second strongest independent correlate ($\beta$=.23) | Correlation of SN and intention significant p<.001 (.49)<br><br>Independent correlate ($\beta$=.15) | Correlation of PBC and intention significant p<.001 (.68)<br><br>Strongest independent correlate($\beta$=.47) | |

| Author | Article | Brief Description | Attitude Predicts Exercise | SN Predicts Exercise | PBC Predicts Exercise | Intention Predicts Exercise |
|---|---|---|---|---|---|---|
| French, Sutton, Hennings Mitchell, Wareham - Griffin, Hardeman, and Kinmonth (2005) | The importance of affective beliefs and attitudes in the Theory of Planned Behavior: Predicting intention to increase physical activity | 213 adults (95 male and 115 female) 35-75 years old. Survey examined the relationship between affective and instrumental beliefs and integrated into the context of being more physically active over the next 12 months. No measure of PA. | Correlations of instrumental attitude significant $p < .01$, $r = .55$. affective attitude $p < .01$ $r = .58$ | Correlations of instrumental attitude and SN significant $p < .01$, $r = .61$. | Correlations of instrumental attitude and PBC significant $p < .01$, $r = .51$. | Instrumental attitude, SN, and PBC predictive of intention in hierarchical regression analyses adjusted $R^2.48$ |
| Gretebeck, Black, Blue, Glickman, Huston, and Gretebeck (2007) | Physical activity and function in older adults: Theory of Planned Behavior | To assess the TPB and explain intention and self-reported physical activity. Cross-sectional design, mailed survey. 2056 retirees 53.8% females, aged 65-98 from Midwestern university. Univariate statistics, factor analyses of scales and Cronbach's alpha on scales. Structural equation modeling to model constructs. Physical activity was measured by the Physical Activity Scale for the Elderly. | Pearson's correlation significantly related to PA ($r = .70$) PBC and intention had the highest significant total standardized effect in attitude ($\beta=.36$). For PA behavior and attitude had great influence ($\beta= .09$). | Pearson's correlation significantly related to PA ($r = .19$) SN and intention not significant in total standardized effect of intention ($\beta= .1482$). For PA behavior and SN not significant ($\beta=-.04$). | Pearson's correlation significantly related to PA ($r = .38$) PBC and intention had the highest significant total standardized effect in intention ($\beta= .82$). For PA behavior and PBC not significant ($\beta=.08$). | Pearson's correlation significantly related to PA ($r = .57$) For PA behavior and intention had great influence ($\beta= .26$). |
| Guinn, Vincent, Jorgensen, Dugas, & Semper (2007) | Predicting physical activity among low-income Mexican-American women: application of the TPB | Used the TPB to explain the prediction of PA intention. Cross-sectional design – 201 subjects. Measured physical activity with one question. Structural equation modeling used for analyses. | Direct measures alpha coefficient .87 Small associations with intention. | Direct measures alpha coefficient .78 | One measure of PBC. PBC was the strongest predictor of intention to engage in PA | Did not measure exercise. |

| Author | Article | Brief Description | Attitude Predicts Exercise | SN Predicts Exercise | PBC Predicts Exercise | Intention Predicts Exercise |
|--------|---------|-------------------|----------------------------|----------------------|-----------------------|-----------------------------|
| Jones, Courneya, Vallance, Ladha, Mant, Belch, & Reiman (2006) | Understanding the Determinants of Exercise Intentions in Multiple Myeloma Cancer Survivors An Application of the TPB | Cross-sectional survey – 70 multiple myeloma CA survivors completed & usable survey. 56% response rate SPSS – Descriptive stat, Pearson correlations, multiple regression. Physical activity measured by the Godin Leisure-Time Exercise Questionnaire. | Instrumental attitude ($\beta$= .42: P<.001) a significant independent predictor of intention | | PBC ($\beta$= .23: P<.059) a significant independent predictor of intention | TPB explained 43% of the variance in exercise intentions |
| Latimer & Ginis (2005) | TPB in Prediction of Leisure Time Physical Activity (LYPA) Among Individuals With Spinal Cord Injury | Prospective correlational design – 104 participants (75 men – 29 women. Convenience sampling. Physical Activity measured by the Physical Activity Recall Assessment for People with Spinal Cord Injury. Correlations Multiple regression | Internal consistency $\alpha$=.84 Correlations significant p<.01 Of attitude and SN r = .31, attitude and PBC r = .44, and attitude and intentions r = .58 | Correlations significant intentions and SN r = .48, p< .001 | Internal consistency $\alpha$=.85 Correlations significant intentions and PBC r = .66, p< .001 PBC did not directly predict LTPA | Leisure time physical activity behavior correlated with intentions (r =.42), p<.001, attitudes (r =.34, p<.001), SN (r = .25, p < .01) and PBC (r = .26, p<.01) |
| Latimer, Ginis & Arbour (2006) | The efficacy of an implementation intention intervention for promoting physical activity among individuals with spinal cord injury: a randomized control trial. | Randomized clinical trial – 37 subjects n=19 intervention group n=18 control group Physical Activity measured by the Physical Activity Recall Assessment for People with Spinal Cord Injury. | | | PBC did not add any unique variance to the prediction of behavior | Intentions explained more variance in physical activity duration and frequency for the intervention group than for the control group |

| Author | Article | Brief Description | Attitude Predicts Exercise | SN Predicts Exercise | PBC Predicts Exercise | Intention Predicts Exercise |
|---|---|---|---|---|---|---|
| Mummery, Spence, & Hudec (2000) | Understanding Physical Activity Intention in Canadian School Children and Youth: An Application of the TPB | Randomly stratified sample design. Questionnaire done in class. 746 students from 30 schools. Chronbach's alpha used to test internal consistency of tool. No measure of PA Descriptive statistics Multiple regression | Correlation coefficients of intention to attitudes .53 significant p<.01  Standardized regression coefficients p<.01 (.32) | Correlation coefficients of intention to SN .50 significant p<.01 Standardized regression coefficients p<.01 (.23) | Correlation coefficients of intention to PBC .55 significant p<.01 Standardized regression coefficients p<.01 (.34) | 3 direct measures accounted for 47% of the variance in PA intention. |
| Norman & Conner (2005) | The Theory of Planned Behavior and exercise: Evidence for the mediating and moderating roles of planning on intention-behavior relationships | Two studies Added roles of planning to the TPB model.  Study 1: Convenience sample of undergraduates – questionnaire completed at two points in time separated by 2 weeks. 125 (61 males and 65 females) completed Time 1 – 58 completed Time 2 by email. Correlations and hierarchical regression analysis. PA past behavior measured by one question.  Study 2: Convenience sample of undergraduates – questionnaire completed at two points in time separated by 2 weeks. 102 respondents (20 males and 82 females) Time 1 | Intercorrelation between Attitude and intention significantly positive p<.001 (.44).  Intercorrelation between Attitude and intention significantly positive p<.001 (.70) | Intercorrelation between Attitude and SN not statistically significant  Intercorrelation between Attitude and SN statistically significant p<.01 (.34) | Intercorrelation between PBC and intention statistically significant p<.001 (.56)  Intercorrelation between PBC and future exercise statistically significant $R^2$ p<.01 (.43).  Intercorrelation between PBC and intention statistically significant p< .001 (.77)  Intention strongest predictor. | Intention and PBC explained 43% of the variance in exercise behavior at Time 2, F(2,55)=20.86, p<.001  Attitude, SN and PBC explained 62% of the variance in exercise behavior at Time 2, F(3,98)=53.43, p<.001 |

| Author | Article | Brief Description | Attitude Predicts Exercise | SN Predicts Exercise | PBC Predicts Exercise | Intention Predicts Exercise |
|---|---|---|---|---|---|---|
| | | and 76 completed Time 2. PA past behavior measured by one question. Added to the theory future exercise behavior, planning, and past behavior. | | | | |
| Prapavessis, Maddison, Ruygrok, Bassett, Harper, & Gillanders, (2005) | Using Theory of Planned Behavior to understand exercise motivation in patients with congenital heart disease | Cross-sectional design - 64 participants (30 males, 34 females) with diagnosis of CHD and 48 (16 males, 32 females) were matched control group. Used the Godin Leisure Time Exercise Questionnaire for measure of PA.. Chi square and t-tests on demographic variables. No significant differences found between the two groups. Mean, SD, and range reported Path analysis | Correlations for CHD subjects attitudes and PA statistically significant at p<.01 (.27)

Correlations for CHD subjects attitudes and intention statistically significant at p<.01 (.56) Cronbach's alpha .89 | Correlations for CHD subjects SN and PA not statistically significant

Correlations for CHD subjects SN and intention statistically significant at p<.01 (.72)

Cronbach's alpha .82 | Correlations for CHD subjects PBC and PA statistically significant p< .05 (.33)

Correlations for CHD subjects PBC and intention statistically significant at p<.01 (.72) PCB found to be main determinant of PA. Cronbach's alpha .91 | Correlations for CHD subjects intentions and PA statistically significant p<.05 (.26)

Cronbach's alpha .92 |
| Rhodes, Jones, & Courneya (2002) | Extending the Theory of Planned Behavior in the exercise domain: a comparison of social support and subjective norm | 192 undergraduates – convenience sample. Compares the utility of subjective norm verses social support for predicting exercise using a prospective design and structural equation modeling. Used the Godin Leisure Time Exercise Questionnaire for measure of PA. Measured at 2 points in time self-reported questions | Attitude had significant structural effects on intention p<.05 (.10) | SN not significant on structural effects on intention. | PBC had significant structural effects on intention p<.05(.50) | |

| Author | Article | Brief Description | Attitude Predicts Exercise | SN Predicts Exercise | PBC Predicts Exercise | Intention Predicts Exercise |
|---|---|---|---|---|---|---|
| | | of TPB concepts then 2 weeks later a measure of exercise behavior.<br><br>Exercise behavior measured by Godin leisure Time Exercise Questionnaire | | | | |
| Sniehotta, Scholz, Schwarzer (2005) | Bridging the intention-behavior gap: Planning, self-efficacy, and action control in the adoption and maintenance of physical exercise. | Longitudinal sample of 307 cardiac rehab patients. Measured at 3 points in time. Added planning, maintenance self-efficacy, and action control to the model to bridge the intention-behavior gap.<br>Measured PA by two questions. | | | | Intentions predicted exercise behavior at Time 3 sig. $\beta=0.33, p<0.01$, and explained 11% of the variance in behavior. |
| Stofan, DiPietro,Davis, Kohl & Blair (1998) | Physical Activity Patterns Associated with cardio respiratory fitness and reduced mortality: the aerobics center longitudinal study | Cross-sectional design. Studied the PA patterns associated with low, moderate or high levels of cardio respiratory fitness.<br>Measured PA with 10 questions.<br>Survey in a clinic population 13,444 men and 3972 women 20-87 years old.<br><br>No use of TPB. | | | | Modest levels of PA are associated with the moderate level of relative cardio respiratory fitness that has been shown to reduce mortality risk. |
| Tolma, Reininger, Evans, & Ureda (2006) | Examining the TPB and the construct of Self-Efficacy to Predict Mammography | Cross-sectional design, convenience sampling of 293 women 40-65 years old asymptomatic of breast cancer. 88% response rate. | Pearson correlation r=.33 Attitudes and intention<br><br>Attitude second | Pearson correlation r=.39 SN and Intention SN (F=31.73, p=.0001 were the | Pearson correlation r=.33 PBC third strongest predictor F=16.28, p=.0001 of intention | Cronbach's alpha of the constructs ranged from .70 to .86 Regression model was significant |

| Author | Article | Brief Description | Attitude Predicts Exercise | SN Predicts Exercise | PBC Predicts Exercise | Intention Predicts Exercise |
|---|---|---|---|---|---|---|
| | Intention | Questionnaire developed from an elicitation study. Self-efficacy added to the model and tested. No measure of PA. Instrument tested by internal consistency measures, descriptive, Pearson correlation, ANOVA, multiple regression. | strongest predictor F=23.67, p= .0001 of intention | strongest predictor of intention | | for prediction of Intention explaining 26.7% of the variability. |
| Tsorbatzou dis (2005) | Evaluation of a school based interventio n programm e to promote physical activity: An application of the TPB | Tested the effectiveness of an intervention on manipulating the variables of the TPB and exercise behaviors. 366 high school students. Used the Baecke Questionnaire of Habitual Activity. Descriptive, Pearson correlations, ANCOVA Control group had higher scores on variables on the first measurement. | Correlation of attitudes and intention significant at p<.001 (.50) Correlation of attitudes and PA not significant at p<.001 (.08) | Correlation of SN and intention significant at p<.001 (.15) Correlation of SN and PA not significant at p<.001 .11 | Correlation of PBC and intention significant at p<.001 .63 Correlation of PBC and PA significant at p<.001 .25 | |
| Watts, Vernon, Myers, & Tilley (2003) | Intention to be screened over time for colorectal cancer in male automotive workers | Did not use TPB but did use the concept of intention. 5042 eligible autoworkers in 28 sites. Data collected at 3 points in time - Cross-sectional and prospective design. | Some beliefs were not significantl y associated with intention. | Multivariate analysis identified family member support positively associated with intention. | | |

Appendix D: Research Questions and Main Hypotheses

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|---|
| Research Question 1: What is the current level of regular physical activity of longshoremen? |
| |
| Research Question 2: To what extent does the Theory of Planned Behavior provide a good model to predict intention to engage in regular physical activity and also the behavior of regular physical activity in longshoremen? In particular, when considered in one model how are attitudes, subjective norms, perceived behavioral control, and intentions related to longshoremen engaging in regular physical activity? |
| 2.1 When considered in one model, longshoremen with higher scores on attitude, subjective norms, and perceived behavioral control will be more likely to have higher scores on intention to engage in physical activity than those with lower scores on attitude, subjective norms, and perceived behavioral control. |
| 2.2 When considered in one model, longshoremen with higher scores on attitude, subjective norms, and perceived behavioral control will be more likely to engage physical activity than those with lower scores on attitude, subjective norms, and perceived behavioral control. |
| 2.3 Longshoremen with higher scores on direct and indirect measures of perceived behavioral control will be more likely to engage in physical activity than those with lower scores on direct and indirect measures of perceived behavioral control. |
| Hypotheses |
| a. Longshoremen with a more positive direct attitude towards regular physical activity will be more likely to have greater intentions of engaging in regular physical activity than those with a more negative direct attitude towards regular physical activity. |
| b. Longshoremen with a more positive indirect attitude towards regular physical activity will have greater intentions of engaging in regular physical activity than those with a less positive indirect attitude towards regular physical activity. |
| c. Longshoremen with a higher level of direct subjective norms will have greater intentions of engaging in regular physical activity than those with lower level of direct subjective norms. |
| d. Longshoremen with a higher level of indirect subjective norms will have greater intentions of engaging in regular physical activity than those with lower level of indirect subjective norms. |
| e. Longshoremen with a higher level of direct perceived behavioral control will have greater intentions of engaging in regular physical activity than those with a lower level of direct perceived behavioral control. |
| f. Longshoremen with a higher level of indirect perceived behavioral control will have greater intentions of engaging in regular physical activity than those with a lower level of indirect perceived behavioral control. |
| g. Longshoremen with higher scores on perceived behavioral control will have higher scores on regular physical activity than those with lower scores on perceived behavioral control. |
| h. Longshoremen with a more positive direct attitude towards regular physical activity will be more likely to engage in regular physical activity than those with a negative direct attitude towards regular physical activity. |

| |
|---|
| i. Longshoremen with a more positive indirect attitude towards regular physical activity will be more likely to engage in regular physical activity than those with a less positive indirect attitude towards regular physical activity. |
| j. Longshoremen with a higher level of direct subjective norms will be more likely to engage in regular physical activity than those with lower level of direct subjective norms. |
| k. Longshoremen with a higher level of indirect subjective norms will be more likely to engage in regular physical activity than those with lower level of indirect subjective norms. |
| l. Longshoremen with a higher level of direct perceived behavioral control will be more likely to engage in regular physical activity than those with a lower level of direct perceived behavioral control. |
| m. Longshoremen with a higher level of indirect perceived behavioral control will be more likely to engage in regular physical activity than those with a lower level of indirect perceived behavioral control. |
| n. Longshoremen with greater intentions to engage in regular physical activity will be more likely to engage in regular physical activity than those with lesser intentions to engage in regular physical activity. |
| |
| Research Question 3: How are demographic variables (e.g. age, gender, ethnicity, educational level, marital status, income, years in the HRSA-ILA, and employment status) related to intention to engage in regular physical activity and the behavior of regular physical activity among longshoremen? |
| 3.1 When attitude, subjective norm, and perceived behavioral control are considered in one model, intention to engage in regular physical activity will be predictive of regular physical activity, when controlling for relevant demographic variables. |
| Main Hypotheses for Question 3 |
| a. Younger longshoremen will have a stronger intention to engage in regular physical activity than older longshoremen. |
| b. Male longshoremen will have a stronger intention to engage in regular physical activity than female longshoremen. |
| c. Longshoremen with higher educational levels will have a stronger intention to engage in regular physical activity than those with less education. |
| d. Unmarried longshoremen will have a stronger intention to engage in regular physical activity than married longshoremen. |
| e. Longshoremen with a higher income will have a stronger intention to engage in regular physical activity than those with lesser incomes. |
| f. Longshoremen with fewer years in the union will have a stronger intention to engage in regular physical activity than those with more years in the union. |
| g. Actively working longshoremen will have a stronger intention to engage in regular physical activity than retired longshoremen. |
| h. Younger longshoremen will engage in regular physical activity more than older longshoremen. |
| i. Male longshoremen will engage in regular physical activity more than female longshoremen. |
| j. Longshoremen with higher educational levels will engage in regular physical activity more than those with less education. |

| |
|---|
| k. Unmarried longshoremen will engage in regular physical activity more than married longshoremen. |
| l. Longshoremen with a higher income will engage in regular physical activity than those with lesser incomes. |
| m. Longshoremen with fewer years in the union will engage in regular physical activity more than those with more years in the union. |
| n. Actively working longshoremen will engage in regular physical activity more than retired longshoremen. |

**Appendix E: Physical Activity Survey Packet**

Physical Activity Survey

Physical activity among HRSA-ILA members varies widely. Some of you participate in sports or work out; some of you have physically demanding jobs, while others may lead a more sedentary lifestyle.

This survey asks questions about how HRSA-ILA members, like you, feel about physical activity and exercise. We are very interested in your personal opinions. The Centers for Disease Control and Prevention say physical activity is activity that you do most days of the week, preferably daily; or 5 or more days of the week if moderate-intensity activities, in bouts of at least 10 minutes for a total of at least 30 minutes per day; or 3 or more days of the week if vigorous-intensity activities for at least 20-60 minutes per session.

Please read each question carefully and mark the answer that is true for you. There is no right or wrong answers. We are merely interested in your personal point of view. We will not share your individual answers with anyone. We will only report the average responses of the group that completes the survey. Please do not put your name on the survey, as this will help us to keep all answers confidential.

The HRSA-ILA has **nothing** to do with this study and will **not** see your individual responses. No identifying information will be collected from this questionnaire and answers will not be able to be linked back to you. We will destroy the paper questionnaires at the end of the study.

***Thank you for your participation in this study.***

# PHYSICAL ACTIVITY SURVEY

## INSTRUCTIONS ON HOW TO COMPLETE THE SURVEY:

Many questions in this survey make use of rating scales with 7 places. You will be asked to circle the ONE number that best describes your opinion.

For example, if you were asked to rate "The Weather in Hampton Roads" on such a scale, the 7 places should be interpreted as follows:

The weather in Hampton Roads is:

bad :___1___:___2___:___3___:___4___:___5___:___6___:___7___: good
     extremely  quite  slightly    neither   slightly   quite  extremely

If you think the weather in Hampton Roads is extremely good, then you would circle the *number 1*, as follows:

The weather in Hampton Roads is:

bad :___1___:___2___:___3___:___4___:___5___:___6___:___7___: good

If you think the weather in Hampton Roads is quite bad, then you would circle the *number 6*, as follows.

The weather in Hampton Roads is:

bad :___1___:___2___:___3___:___4___:___5___:___6___:___7___: good

If you think the weather in Hampton Roads is slightly good, then you would circle the *number 3*.

The weather in Hampton Roads is:

bad :___1___:___2___:___3___:___4___:___5___:___6___:___7___: good

If you think the weather in is neither good nor bad, then you would circle the *number 4*. The weather in Hampton Roads is:

bad :___1___:___2___:___3___:___4___:___5___:___6___:___7___: good

**When making your ratings, please remember the following points:**
**\* Be sure to answer all items – do not omit any.**
**\* Only circle _one_ number on each scale.**

Physical Activity Survey

Please answer each of the following questions by circling the number that best describes your opinion. Some of the questions may appear to be similar, but they do address somewhat different issues. Please read each question carefully.

## My Attitudes About Physical Activity

1. In the next month, I expect to engage in physical activity on a regular basis
   strongly disagree :___1__:___2__:___3__:___4__:___5__:___6__:___7__:strongly agree

2. For me to engage in physical activity regularly is
   harmful :___1__:___2__:___3__:___4__:___5__:___6__:___7__: beneficial

3. For me to engage in physical activity regularly is
   bad :___1__:___2__:___3__:___4__:___5__:___6__:___7__: good

4. For me to engage in physical activity regularly is
   unpleasant :___1__:___2__:___3__:___4__:___5__:___6__:___7__: pleasant

5. For me to engage in physical activity regularly is
   worthless :___1__:___2__:___3__:___4__:___5__:___6__:___7__: useful

6. For me to engage in physical activity regularly is
   boring :___1__:___2__:___3__:___4__:___5__:___6__:___7__: fun

7. In the next month, I want to engage in physical activity on a regular basis
   strongly disagree :___1__:___2__:___3__:___4__:___5__:___6__:___7__:strongly agree

8. Physical activity is good for my health
   strongly disagree :___1__:___2__:___3__:___4__:___5__:___6__:___7__:strongly agree

9. Physical activity helps to reduce my stress
   strongly disagree :___1__:___2__:___3__:___4__:___5__:___6__:___7__:strongly agree

10. Physical activity helps me control my weight
    strongly disagree :___1__:___2__:___3__:___4__:___5__:___6__:___7__:strongly agree

11. Physical activity helps me feel better
    strongly disagree :___1__:___2__:___3__:___4__:___5__:___6__:___7__:strongly agree

12. Physical activity is difficult because I am too tired
    strongly disagree :___1__:___2__:___3__:___4__:___5__:___6__:___7__:strongly agree

13. Physical activity is difficult because I don't have time
    strongly disagree :___1__:___2__:___3__:___4__:___5__:___6__:___7__:strongly agree

14. Physical activity is difficult because it is inconvenient
strongly disagree :__1__:__2__:__3__:__4__:__5__:__6__:__7__:strongly agree

15. Physical activity helps prevent heart disease
strongly disagree :__1__:__2__:__3__:__4__:__5__:__6__:__7__:strongly agree

16. Improving my health with physical activity is
extremely undesirable :__1__:__2__:__3__:__4__:__5__:__6__:__7__: extremely desirable

17. Controlling my stress level through physical activity is
extremely undesirable :__1__:__2__:__3__:__4__:__5__:__6__:__7__: extremely desirable

18. Controlling my weight through physical activity is
extremely undesirable :__1__:__2__:__3__:__4__:__5__:__6__:__7__: extremely desirable

19. Feeling better by engaging in physical activity is
extremely undesirable :__1__:__2__:__3__:__4__:__5__:__6__:__7__: extremely desirable

20. Being tired makes physical activity
extremely undesirable :__1__:__2__:__3__:__4__:__5__:__6__:__7__: extremely desirable

21. Not having enough time makes physical activity
extremely undesirable :__1__:__2__:__3__:__4__:__5__:__6__:__7__: extremely desirable

22. Being inconvenient makes physical activity
extremely undesirable :__1__:__2__:__3__:__4__:__5__:__6__:__7__: extremely desirable

23. Preventing heart disease by engaging in physical activity is
extremely undesirable :__1__:__2__:__3__:__4__:__5__:__6__:__7__: extremely desirable

24. In the next month, I intend to engage in physical activity on a regular basis
extremely undesirable :__1__:__2__:__3__:__4__:__5__:__6__:__7__: extremely desirable

## What Others Think About My Physical Activity

25. Most people who are important to me think that I
should not:__1__:__2__:__3__:__4__:__5__:__6__:__7__: I should
participate in physical activity on a regular basis.

26. It is expected of me to participate in physical activity on a regular basis
strongly disagree:__1__:__2__:__3__:__4__:__5__:__6__:__7__: strongly agree

27. I feel under social pressure to participate in physical activity on a regular basis
strongly disagree:__1__:__2__:__3__:__4__:__5__:__6__:__7__: strongly agree

28. People who are important to me think that I should participate in physical activity on a regular basis
    strongly disagree:___1__:___2__:___3__:___4__:___5__:___6__:___7__: strongly agree

29. My wife or significant other thinks that I
    should not:___1__:___2__:___3__:___4__:___5__:___6__:___7__: should
    participate in physical activity on a regular basis.

30. My family members
    disapprove :___1__:___2__:___3__:___4__:___5__:___6__:___7__: approve
    of my participation in physical activity on a regular basis.

31. My friends
    do not:___1__:___2__:___3__:___4__:___5__:___6__:___7__: do
    participate in physical activity on a regular basis.

32. My ILA coworkers
    do not:___1__:___2__:___3__:___4__:___5__:___6__:___7__: do
    participate in physical activity on a regular basis.

33. My doctor thinks that I
    should not:___1__:___2__:___3__:___4__:___5__:___6__:___7__: should
    participate in physical activity on a regular basis.

34. My wife or significant other's approval of my participation in physical activity is important to me.
    Not at all:___1__:___2__:___3__:___4__:___5__:___6__:___7__: very much

35. What my family members think I should do matters to me.
    Not at all:___1__:___2__:___3__:___4__:___5__:___6__:___7__: very much

36. What my friends think I should do matters to me .
    Not at all:___1__:___2__:___3__:___4__:___5__:___6__:___7__: very much

37. What my ILA brothers think I should do matters to me.
    Not at all:___1__:___2__:___3__:___4__:___5__:___6__:___7__: very much

38. Doing what my doctor wants me to do is important to me.
    Not at all:___1__:___2__:___3__:___4__:___5__:___6__:___7__: very much

## My Ideas About Regular Physical Activity

39. I am confident that if I wanted to, I could engage in physical activity on a regular basis.
    strongly disagree:___1__:___2__:___3__:___4__:___5__:___6__:___7__: strongly agree

40. For me to engage in physical activity on a regular basis is
    difficult :___1__:___2__:___3__:___4__:___5__:___6__:___7__: easy

41. The decision to engage in regular physical activity is beyond my control.
    strongly disagree:___1__:___2__:___3__:___4__:___5__:___6__:___7__: strongly agree

42. Whether or not I engage in regular physical activity is entirely up to me.
    strongly disagree:___1__:___2__:___3__:___4__:___5__:___6__:___7__: strongly agree

43. I would use places to participate in physical activity if they were available at
    work.
    unlikely :___1__:___2__:___3__:___4__:___5__:___6__:___7__: likely

44. With more free time I would engage in regular physical activity
    unlikely :___1__:___2__:___3__:___4__:___5__:___6__:___7__: likely

45. If I would plan, I would engage in regular physical activity
    unlikely :___1__:___2__:___3__:___4__:___5__:___6__:___7__: likely

46. If I didn't have so many other obligations, I would engage in regular physical
    activity
    unlikely :___1__:___2__:___3__:___4__:___5__:___6__:___7__: likely

47. If I didn't work so many hours, I would engage in regular physical activity
    unlikely :___1__:___2__:___3__:___4__:___5__:___6__:___7__: likely

48. If there were more places to exercise at work, it would be
    Much more difficult:___1__:___2__:___3__:___4__:___5__:___6__:___7__: much easier
        to engage in regular physical activity.

49. Having more free time would make it
    Much more difficult:___1__:___2__:___3__:___4__:___5__:___6__:___7__: much easier
        to engage in regular physical activity.

50. If I planned to engage in regular physical activity it would be
    Much more difficult:___1__:___2__:___3__:___4__:___5__:___6__:___7__: much easier

51. Having many other obligations makes it
    Much more difficult:___1__:___2__:___3__:___4__:___5__:___6__:___7__: much easier
        to engage in regular physical activity.

52. Working long hours makes it
    Much more difficult:___1__:___2__:___3__:___4__:___5__:___6__:___7__: much easier
        to engage in regular physical activity.

## Tell Us About Yourself

53. What is your age?_____

    53a.  Are you
        ☐ Male
        ☐ Female

54. Check the group(s) that best describe your race or ethnic identity?
        ☐ White
        ☐ Black or African American
        ☐ Asian
        ☐ Hispanic or Latino
        ☐ Other

55. What is your educational level?
        ☐ Did not complete high school
        ☐ High school diploma or GED
        ☐ Some post-high school training
        ☐ College graduate

56. What is your marital status?
        ☐ Married or a member of an unmarried couple
        ☐ Divorced/Separated
        ☐ Widowed
        ☐ Never Married

57. What is your annual income from all sources?
        ☐ $25,000 - $34,999
        ☐ $35,000 – $44,999
        ☐ $45,000 - $54,999
        ☐ $55,000 – $64,999
        ☐ above $65,000

58. How many years have you been in the HRSA-ILA? _____

59. Are you:
        ☐ Actively working
        ☐ Retired
        ☐ On permanent disability
        ☐ On temporary disability and not working right now

60. Do you belong to a gym?
        ☐ Yes
        ☐ No

6

## Tell Us About Your Physical Activity At Work

During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise?

- ☐ Yes
- ☐ No
- ☐ Don't know

62. What is your main occupation? _____

63. At work I sit
- ☐ Always
- ☐ Often
- ☐ Sometimes
- ☐ Seldom
- ☐ Never

64. At work I stand
- ☐ Never
- ☐ Seldom
- ☐ Sometimes
- ☐ Often
- ☐ Always

65. At work I walk
- ☐ Never
- ☐ Seldom
- ☐ Sometimes
- ☐ Often
- ☐ Always

66. At work I lift heavy loads
- ☐ Never
- ☐ Seldom
- ☐ Sometimes
- ☐ Often
- ☐ Very Often

67. After work I am tired
- ☐ Very often
- ☐ Often
- ☐ Sometimes
- ☐ Seldom
- ☐ Never

68. At work I sweat
   ☐ Very often
   ☐ Often
   ☐ Sometimes
   ☐ Seldom
   ☐ Never
69. In comparison with others of my own age I think my work is physically
   ☐ Much heavier
   ☐ Heavier
   ☐ As heavy
   ☐ Lighter
   ☐ Much lighter

## Tell Us About Your Sports Physical Activity

70. Do you play sports?
   ☐ Yes
   ☐ No
70a. If yes, what sport do you play most frequently?
   ☐ Basketball       ☐ Football
   ☐ Baseball         ☐ Soccer
   ☐ Table Tennis     ☐ Running
   ☐ Shoot Pool       ☐ Hunting or Fishing
   ☐ Other  _____
   How many hours a week? _____
   How many months a year?_____


70b. If you play a second sport, which sport is it?
   ☐ Basketball       ☐ Football
   ☐ Baseball         ☐ Soccer
   ☐ Table Tennis     ☐ Running
   ☐ Shoot Pool       ☐ Hunting or Fishing
   ☐ Other  _____
   How many hours a week? _____
   How many months a year?_____

## Tell Us About Your Leisure Time Physical Activity

1
71. In comparison with others of my own age, I think my physical activity during leisure     time is
   ☐ Much more
   ☐ More
   ☐ Same
   ☐ Less
   ☐ Much Less

72. During leisure time I sweat
- ☐ Very often
- ☐ Often
- ☐ Sometimes
- ☐ Seldom
- ☐ Never

73. During leisure time I play sports
- ☐ Never
- ☐ Seldom
- ☐ Sometimes
- ☐ Often
- ☐ Very often

74. During leisure time I watch television
- ☐ Never
- ☐ Seldom
- ☐ Sometimes
- ☐ Often
- ☐ Very often

75. During leisure time I walk
- ☐ Never
- ☐ Seldom
- ☐ Sometimes
- ☐ Often
- ☐ Very often

76. During leisure time I cycle
- ☐ Never
- ☐ Seldom
- ☐ Sometimes
- ☐ Often
- ☐ Very often

77. How many minutes do you walk and/or cycle per day to and from work, school, and shopping?
- ☐ Less than 5 minutes
- ☐ 5-15 minutes
- ☐ 15-30 minutes
- ☐ 30-45 minutes
- ☐ More than 45 minutes

78. During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise?
- ☐ Yes
- ☐ No
- ☐ Don't know

**Thank you for your time and ideas!**

Appendix F: Statistical Tests for Hypotheses

| Research Question 2: To what extent does the Theory of Planned Behavior provide a good model of regular physical activity in longshoremen? In particular, when considered in one model how are attitudes, subjective norms, perceived behavioral control, and intentions related to longshoremen engaging in regular physical activity? | | | |
|---|---|---|---|
| Hypotheses # | Dependent Variable | Independent Variable | Test |
| 2.1 When considered in one model, longshoremen with higher scores on attitude, subjective norms, and perceived behavioral control will have higher scores on intention to engage in regular physical activity than those with lower scores on attitude, subjective norms, and perceived behavioral control. | Intention | Indirect and Direct Attitude score Indirect and Direct SN score Indirect and Direct PBC score | Multiple regression |
| 2.2 When considered in one model, longshoremen with higher scores on attitude, subjective norms, and perceived behavioral control will have higher scores on the behavior of regular physical activity than those with lower scores on attitude, subjective norms, and perceived behavioral control. | PA | Indirect and Direct Attitude score Indirect and Direct SN score Indirect and Direct PBC score | Multiple regression |
| 2.3 Longshoremen with higher scores on direct and indirect measures of perceived behavioral control will have higher scores on regular physical activity than those with lower scores on direct and indirect measures of perceived behavioral control. | PA | Indirect and Direct PBC score | Pearson's r |
| a. Longshoremen with a more positive direct attitude towards regular physical activity will have greater intentions of engaging in regular physical activity than those with a more negative attitude. | Intention PA | Direct attitude | Pearson's r |
| i. Longshoremen with the direct attitude that regular physical activity is beneficial will have greater intentions to engage in regular physical activity than those with harmful belief. | Intention | Beneficial | Spearman rho |
| ii. Longshoremen with the direct attitude that regular physical activity is good will have greater intentions to engage in regular physical activity than those with a belief that | Intention | Good | Spearman rho |

| regular physical activity is bad. | | | |
|---|---|---|---|
| iii. Longshoremen with the direct attitude that regular physical activity is pleasant will have greater intentions to engage in regular physical activity than those with a belief that regular physical activity is unpleasant. | Intention | Pleasant | Spearman rho |
| iv. Longshoremen with the direct attitude that regular physical activity is useful will have greater intentions to engage in regular physical activity than those with a belief that regular physical activity is worthless. | Intention | Useful | Spearman rho |
| v. Longshoremen with the direct attitude that regular physical activity is fun will have greater intentions to engage in regular physical activity than those with a belief that regular physical activity is boring. | Intention | Fun | Spearman rho |
| | | | |
| b. Longshoremen with a more positive indirect attitude towards regular physical activity will have greater intentions of engaging in regular physical activity than those with a less positive indirect attitude. | Intention<br><br>PA | Indirect Attitude | Pearson's r |
| i. Longshoremen with the indirect attitude that regular physical activity is good for their health will have greater intentions to engage in regular physical activity than those with a belief that regular physical activity is not good for their health. | Intention | Health beliefs | Spearman rho |
| ii. Longshoremen with the indirect attitude that regular physical activity will improve their levels of stress will have greater intentions to engage in regular physical activity than those without the beliefs that regular physical activity improves their stress levels. | Intention | Stress beliefs | Spearman rho |
| iii. Longshoremen with the indirect attitude that regular physical activity and weight control beliefs will have greater intentions to engage in regular physical activity than those without the beliefs that regular physical activity improves weight control. | Intention | Weight control | Spearman rho |
| iv. Longshoremen with the indirect attitude that regular physical activity increases feeling good will have greater intentions to engage in regular physical | Intention | Feeling good | Spearman rho |

| | | | |
|---|---|---|---|
| activity than those without the beliefs that regular physical activity increases feeling good. | | | |
| v. Longshoremen with the indirect attitude that regular physical activity is difficult due to tiredness will have less intention to engage in regular physical activity than those without the beliefs that regular physical activity is difficult due to being tired. | Intention | Tiredness | Spearman rho |
| vi. Longshoremen with the indirect attitude that regular physical activity and enough time will have greater intentions to engage in regular physical activity than those that lack time to engage in regular physical activity. | Intention | Lack of time | Spearman rho |
| vii. Longshoremen with the indirect attitude that regular physical activity is inconvenient will have less intentions to engage in regular physical activity than those who believe regular physical activity is convenient. | Intention | Inconvenience | Spearman rho |
| viii. Longshoremen with the indirect attitude that regular physical activity helps prevent heart disease will have greater intentions to engage in regular physical activity than those who don't. | Intention | Prevents heart disease | Spearman rho |
| | | | |
| c. Longshoremen with a higher level of direct subjective norms will have greater intentions of engaging in regular physical activity than those with a lower level of direct subjective norms. | Intention PA | Direct subjective norms | Pearson's r |
| i. Longshoremen with the direct subjective norms that most people think I should participate in regular physical activity will have greater intentions to engage in regular physical activity. | Intention | Most people think I should participate | Spearman rho |
| ii. Longshoremen with the direct subjective norms that they are expected to participate in regular physical activity will have greater intentions to engage in regular physical activity. | Intention | Expected to participate | Spearman rho |
| iii. Longshoremen with the direct subjective norms that they are under social pressure to participate in regular physical | Intention | Under social pressure | Spearman rho |

| | | | |
|---|---|---|---|
| activity will have greater intentions to engage in regular physical activity. | | | |
| iv. Longshoremen with the direct subjective norms that important people to them think they should participate in regular physical activity will have greater intentions to engage in regular physical activity. | Intention | Important people to them think they should participate | Spearman rho |
| | | | |
| d. Longshoremen with a higher level of indirect subjective norms will have greater intentions of engaging in regular physical activity than those with a lower level of indirect subjective norms. | Intention PA | Indirect subjective norms | Pearson's r |
| i. Longshoremen with the indirect subjective norms that their wife or significant other believes they should participate in regular physical activity will have greater intentions to engage in regular physical activity. | Intention | Wife or significant other | Spearman rho |
| ii. Longshoremen with the indirect subjective norms that their family members believe they should participate in regular physical activity will have greater intentions to engage in regular physical activity. | Intention | Family members | Spearman rho |
| iii. Longshoremen with the indirect subjective norms that their friends believe they should participate in regular physical activity will have greater intentions to engage in regular physical activity. | Intention | Friends | Spearman rho |
| iv. Longshoremen with the indirect subjective norms that their coworkers believe they should participate in regular physical activity will have greater intentions to engage in regular physical activity. | Intention | Coworkers | Spearman rho |
| v. Longshoremen with the indirect subjective norms that their doctor believes they should participate in regular physical activity will have greater intentions to engage in regular physical activity. | Intention | Doctor | Spearman rho |
| | | | |
| e. Longshoremen with a higher level of direct perceived behavioral control will have greater intentions of engaging in regular physical activity than those with a lower level of direct perceived behavioral control. | Intention PA | Direct perceived behavioral control | Pearson's r |
| i. Longshoremen with the direct perceived | Intention | Confident | Spearman |

| | | | |
|---|---|---|---|
| behavioral control belief that they are confident they can engage in regular physical activity will have greater intentions to engage in regular physical activity. | | | rho |
| ii. Longshoremen with the direct perceived behavioral control belief that engaging in physical activity is easy will have greater intentions to engage in regular physical activity. | Intention | Easy | Spearman rho |
| iii. Longshoremen with the direct perceived behavioral control belief that engaging in physical activity is beyond their control will have greater intentions to engage in regular physical activity. | Intention | Beyond their control | Spearman rho |
| iv. Longshoremen with the direct perceived behavioral control belief that engaging in physical activity is entirely up to me will have greater intentions to engage in regular physical activity. | Intention | Entirely up to me | Spearman rho |
| | | | |
| f. Longshoremen with a higher level of indirect perceived behavioral control will have greater intentions of engaging in regular physical activity than those with a lower level of indirect perceived behavioral control. | Intention<br><br>PA | Indirect perceived behavioral control | Pearson's r |
| i. Longshoremen with the indirect perceived behavioral control belief that there are places at work to engage in regular physical activity will have greater intentions to engage in regular physical activity. | Intention | Places at work | Spearman rho |
| ii. Longshoremen with the indirect perceived behavioral control belief that if they had more free time they would engage in regular physical activity will have greater intentions to engage in regular physical activity. | Intention | More free time | Spearman rho |
| iii. Longshoremen with the indirect perceived behavioral control belief that if they plan to engage in regular physical activity will have greater intentions to engage in regular physical activity. | Intention | Plan | Spearman rho |
| iv. Longshoremen with the indirect perceived behavioral control belief that without other obligations they would engage in regular physical activity will have greater | Intention | Without other obligations | Spearman rho |

| intentions to engage in regular physical activity. | | | |
|---|---|---|---|
| v. Longshoremen with the indirect perceived behavioral control belief that if they didn't work so many hours they would engage in regular physical activity will have greater intentions to engage in regular physical activity. | Intention | Work so many hours | Spearman rho |

Research Question 3: How are demographic variables (e.g. age, gender, ethnicity, educational level, marital status, income, years in the HRSA-ILA, and employment status) related to engaging in regular physical activity among longshoremen?

| Hypothesis # | Dependent Variable | Independent Variable | Test |
|---|---|---|---|
| a. Younger longshoremen will have a stronger intention to engage in regular physical activity than older longshoremen. | Intention PA | Age | Spearman rho |
| b. Male longshoremen will have a stronger intention to engage in regular physical activity than female longshoremen. | Intention PA | Gender | M-W |
| c. Longshoremen with higher educational levels will have a stronger intention to engage in regular physical activity than those with less education. | Intention PA | Educational level | Anova |
| d. Unmarried longshoremen will have a stronger intention to engage in regular physical activity than married longshoremen. | Intention PA | Marital status | Anova |
| e. Longshoremen with a higher income will have a stronger intention to engage in regular physical activity than those with lesser incomes. | Intention PA | Income | Spearman rho |
| f. Longshoremen with fewer years in the union will have a stronger intention to engage in regular physical activity than those with more years in the union. | Intention PA | Years of employment | Spearman rho |
| g. Actively working longshoremen will have a stronger intention to engage in regular physical activity than retired longshoremen. | Intention PA | Employment status | M-W |

Research Question 4: How do the different constructs (e.g. attitudes, subjective norms, perceived behavioral control, and intention) of the Theory of Planned Behavior model relate to one another?

| Hypothesis # | Dependent Variable | Independent Variable | Test |
|---|---|---|---|
| 3.1 When attitude, subjective norm, and perceived behavioral control are considered | PA | Attitude , SN, PBC, and | Multiple Linear |

| | | | |
|---|---|---|---|
| in one model, intention to engage in regular physical activity will be predictive of regular physical activity, when controlling for relevant demographic variables. | | intention | Regression |
| a. Longshoremen with stronger direct attitudes will have greater intentions of engaging in regular physical activity. | Intention | Direct attitudes | Spearman rho |
| b. Longshoremen with stronger in direct attitudes will have greater intentions of engaging in regular physical activity. | Intention | Indirect attitudes | Spearman rho |
| c. Longshoremen with stronger direct subjective norms will have greater intentions of engaging in regular physical activity. | Intention | Direct subjective norm | Spearman rho |
| d. Longshoremen with stronger indirect subjective norms will have greater intentions of engaging in regular physical activity. | Intention | Indirect subjective norm | Spearman rho |
| e. Longshoremen with higher direct perceived behavioral control will have greater intentions of engaging in regular physical activity. | Intention | Direct perceived behavioral control | Spearman rho |
| f. Longshoremen with higher indirect perceived behavioral control will have greater intentions of engaging in regular physical activity. | Intention | Indirect perceived behavioral control | Spearman rho |
| g. Longshoremen with greater intentions to engage in regular physical activity will have higher levels of regular physical activity. | Regular physical activity | Intention | Spearman rho |

Appendix G: Frequencies, Measures of Central Tendency and Cronbach's Alpha of Active Members Only (without imputed values)

| Dependent Variables | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **PA Index** =(Work Index + Sport Index + Lesiure Time Index) N=259 | Mean (sd) 8.63(1.71) | | Median (IQR) 8.76 | | Range 10.24 Min=3.86 Max=14.10 | | Cronbach's Alpha .643 | Missing 25 |
| **Work Index** = (q63+q64 + q65 + q66 + q67 + q68 + q69)/7 N=274 | Mean (sd) 2.98(.62) | | Median (IQR) 3.0 | | Range 3.14 Min=1.29 Max=4.43 | | Cronbach's Alpha= .696 | Missing 10 |
| | 1 | 2 | 3 | 4 | 5 | Mis | | Mean(sd) |
| Q63 N=280 | 36 (12.9) | 78 (27.8) | 117 (41.8) | 41 (14.6) | 8 (2.9) | 4 | | 2.67(.96) |
| Q64 N=280 | 11 (3.9) | 35 (12.5) | 129 (46.1) | 84 (30) | 21 (7.5) | 4 | | 3.25(.91) |
| Q65 N=279 | 3 (1.1) | 35 (12.5) | 114 (40.9) | 90 (32.3) | 37 (13.3) | 5 | | 3.44(.91) |
| Q66 N=277 | 65 (23.5) | 59 (21.3) | 95 (34.3) | 34 (12.3) | 24 (8.7) | 7 | | 2.61(1.21) |
| Q67 N=279 | 24 (8.6) | 51 (18.3) | 150 (53.8) | 41 (14.7) | 13 (4.7) | 5 | | 2.89(.93) |
| Q68 N=278 | 41 (14.7) | 57 (20.5) | 118 (42.4) | 36 (12.9) | 26 (9.4) | 6 | | 3.17(1.12) |
| Q69 N=278 | 24 (8.6) | 53 (19.1) | 80 (28.8) | 91 (32.7) | 30 (10.8) | 6 | | 2.83(1.13) |
| **Sport IndexR** = (q71+q72+q73)/3 N=272 | Mean (sd) 2.99(.81) | | Median (IQR) 3.0 | | Range 4.0 Min=1 Max=5 | | Cronbach's Alpha= .601 | Missing 12 |
| | 1 | 2 | 3 | 4 | 5 | Mis | | Mean(sd) |
| Q71 N=272 | 43 (15.8) | 68 (25) | 103 (37.9) | 44 (16.2) | 14 (5.1) | 12 | | 3.30(1.07) |
| Q72 N=274 | 33 (12.0) | 50 (18.2) | 112 (40.9) | 57 (20.8) | 22 (8.0) | 10 | | 3.06(1.09) |
| Q73 N=274 | 55 (20.1) | 51 (18.6) | 126 (46.0) | 27 (9.9) | 15 (5.5) | 10 | | 2.62(1.08) |

| Lesiure time indexR= (q75+q76+q77)/3 N=270 | Mean (sd) 2.65(.79) | | Median (IQR) 2.67 | | Range 4.0 Min=1 Max=5 | | Cronbach's Alpha= .519 | Missing 14 |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | Mis | | |
| Q75 N=275 | 15 (5.5) | 58 (21.1) | 135 (49.1) | 50 (18.2) | 17 (6.2) | 9 | | 2.98(.93) |
| Q76 N=276 | 108 (39.1) | 63 (22.8) | 76 (27.5) | 19 (6.9) | 10 (3.6) | 8 | | 2.13(1.11) |
| Q77 N=272 | 49 (18.0) | 64 (23.5) | 78 (28.7) | 46 (16.9) | 35 (12.9) | 12 | | 2.84(1.27) |
| **Single PA question** | | | | | | | | |
| | Yes | No | Missing | | | | | |
| Q78 N=277 | 198 (69.7) | 79 (27.8) | 7 | | | | | |
| | | | | | | | | |
| **Intention index= (q01+q07+q24)/3 N=274** | Mean (sd) 16.71 (3.99) | | Median (IQR) 6.0 | | Range 6 Min=1 Max=5 | | Cronbach's Alpha= .775 | Missing 10 |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Missing | Mean(sd) |
| Q01 N=284 | 14 (4.9) | 11 (3.9) | 20 (7.0) | 44 (15.5) | 48 (16.9) | 46 (16.2) | 101 (35.6) | 0 | 5.26(1.76) |
| Q07 N=283 | 6 (2.1) | 9 (3.2) | 16 (5.7) | 28 (9.9) | 37 (13.1) | 63 (22.3) | 124 (43.8) | 1 | 5.71(1.56) |
| Q24 N=275 | 5 (1.8) | 6 (2.2) | 13 (4.7) | 33 (12.0) | 41 (14.9) | 55 (20.0) | 122 (44.4) | 9 | 5.73(1.5) |

| INDEPENDENT VARIABLES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Direct Attitude Index=274** | Mean (sd) 28.82(6.91) | | Median (IQR) 6.2 | | Range 6.0 Min=1 Max=7 | | Cronbach's Alpha= .881 | Missing 10 |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Missing | Mean(sd) |
| Q02 N=281 | 19 (6.8) | 7 (2.5) | 12 (4.3) | 14 (5.0) | 24 (8.5) | 49 (17.4) | 156 (55.5) | 3 | 5.81(1.81) |
| Q03 N=283 | 14 (4.9) | 3 (1.1) | 9 (3.2) | 20 (7.1) | 26 (9.2) | 47 (16.6) | 164 (58.0) | 1 | 5.99(1.62) |
| Q04 N=281 | 10 (3.6) | 12 (4.3) | 16 (5.7) | 33 (11.7) | 48 (17.1) | 51 (18.1) | 111 (39.5) | 3 | 5.51(1.68) |
| Q05 N=280 | 10 (3.6) | 5 (1.8) | 16 (5.7) | 11 (3.9) | 21 (7.5) | 62 (22.1) | 155 (55.4) | 4 | 6.0(1.57) |
| Q06 N=282 | 13 (4.6) | 9 (3.2) | 22 (7.8) | 23 (8.2) | 40 (14.2) | 62 (22.0) | 113 (40.1) | 2 | 5.52(1.74) |

| **Indirect Attitude Index=263** | Mean (sd) 238.04(69.40) | Median (IQR) 251 | Range 374 Min=18 Max=392 | Cronbach's Alpha= .811 | Missing 21 |
|---|---|---|---|---|---|
| | | | | Missing | |
| Q0816 N=263 | 38.07(13.52) | 42.0 | 48.0 | 21 | Min=1 Max=49 |
| Q0917 N=263 | 38.06(13.52) | 42.0 | 48.0 | 21 | Min=1 Max=49 |
| Q1018 N=263 | 37.44(13.83) | 42.0 | 48.0 | 21 | Min=1 Max=49 |
| Q1119 N=263 | 37.39(13.70) | 42.0 | 48.0 | 21 | Min=1 Max=49 |
| Q1220 N=263 | 15.86(12.08) | 12.0 | 48.0 | 21 | Min=1 Max=49 |
| Q1321 N=263 | 17.13(12.59) | 15.50 | 48.0 | 21 | Min=1 Max=49 |
| Q1422 N=263 | 15.30(11.92) | 15.0 | 48.0 | 21 | Min=1 Max=49 |
| Q1523 N=263 | 38.78(13.18) | 42.0 | 48.0 | 21 | Min=1 Max=49 |

| **Direct Subjective Norm IndexR=276** (q25+q26+q28)/3 | Mean (sd) 17.24(3.80) | | Median (IQR) 5.5 | | Range 6.0 Min=1 Max=5 | | Cronbach's Alpha= .743 | Missing 8 |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| Q25 N=277 | 6 (2.2) | 8 (2.9) | 13 (4.7) | 19 (6.9) | 32 (11.6) | 45 (15.9) | 154 (55.6) | 7 | 5.93(1.54) |
| Q26 | 9 | 4 | 16 | 40 | 48 | 55 | 105 | 7 | 5.53(1.57) |

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
|---|---|---|---|---|---|---|---|---|---|
| N=277 | (3.2) | (1.4) | (5.8) | (14.4) | (17.3) | (19.9) | (37.9) | | |
| Q28 N=278 | 10 (3.6) | 8 (2.9) | 7 (2.5) | 26 (9.4) | 40 (14.4) | 59 (21.2) | 128 (46.0) | 6 | 5.77(1.56) |
| **Indirect Subjective Norm Index=269** | Mean (sd) 159.32(54.66) | | Median (IQR) 161 | | | Range 224 Min=1 Max=49 | | Cronbach's Alpha= .807 | Missing 15 |
| | | | | | | | | Missing | |
| Q2934 N=274 | 34.96(15.31) | | 36.0 | | | 48.0 | | 10 | Min=1 Max=49 |
| Q3035 N=282 | 34.64(14.50) | | 36.0 | | | 48.0 | | 2 | Min=1 Max=49 |
| Q3136 N=279 | 27.73(15.14) | | 28.0 | | | 48.0 | | 5 | Min=1 Max=49 |
| Q3237 N=280 | 22.92(15.0) | | 20.0 | | | 48.0 | | 4 | Min=1 Max=49 |
| Q3338 N=283 | 39.07(12.75) | | 49.0 | | | 48.0 | | 1 | Min=1 Max=49 |
| **Direct Perceived Behavioral Control IndexR=279** | Mean (sd) 17.12(3.5) | | Median (IQR 6 | | | Range 6 Min=1 Max=5 | | Cronbach's Alpha= .694 | Missing 5 |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| Q39 N=283 | 4 (1.4) | 6 (2.1) | 12 (4.3) | 19 (6.7) | 34 (12.1) | 61 (21.6) | 147 (51.9) | 1 | 6.0(1.40) |
| Q40 N=282 | 8 (2.8) | 10 (3.5) | 24 (8.5) | 39 (13.7) | 72 (25.4) | 53 (19.0) | 75 (26.4) | 2 | 5.78(1.56) |
| Q42 N=281 | 5 (1.8) | 9 (3.2) | 13 (4.2) | 22 (7.7) | 34 (12.0) | 52 (18.7) | 146 (51.4) | 3 | 5.91(1.50) |
| **Indirect Perceived Behavioral Control Index=264** | Mean (sd) 144.45(49.0) | | Median (IQR) 147.50 | | | Range 224 Min=1 Max=49 | | Cronbach's Alpha= .780 | Missing 20 |
| | | | | | | | | Missing | |
| Q4348 N=276 | 34.69(14.38) | | 39.0 | | | 48.0 | | 8 | Min=1 Max=49 |
| Q4449 N=278 | 35.98(13.54) | | 36.0 | | | 47.0 | | 6 | Min=1 Max=49 |
| Q4550 N=276 | 33.58(13.45) | | 36.0 | | | 48.0 | | 8 | Min=1 Max=49 |
| Q4651 N=275 | 21.86(12.93) | | 21.0 | | | 48.0 | | 9 | Min=1 Max=49 |
| Q4752 N=278 | 18.37(12.67) | | 15.0 | | | 48.0 | | 6 | Min=1 Max=49 |

Appendix H: Frequencies, Measures of Central Tendency and Cronbach's Alpha of
Retired Members Only (without imputed values)

| Dependent Variables | | | | | |
| --- | --- | --- | --- | --- | --- |
| **PA Index** =(Work Index + Sport IndexR + Lesiure Time IndexR) N=66 | Mean (sd) 8.68(1.34) | Median (IQR) 8.48 | Range 5.48 Min=5.9 Max=11.38 | Cronbach's Alpha .434 | Missing 35 |
| **Work Index** = (q63+q64 + q65 + q66 + q67 + q68 + q69)/7 N=72 | Mean (sd) 3.04(.50) | Median (IQR) 3.0 | Range 2.43 Min=2 Max=4.43 | Cronbach's Alpha= .568 | Missing 29 |

| | 1 | 2 | 3 | 4 | 5 | Mis | | Mean(sd) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Q63 N=75 | 3 (4.0) | 10 (13.3) | 44 (58.7) | 17 (22.7) | 1 (1.3) | 26 | | 3.04(.76) |
| Q64 N=74 | 1 (1.4) | 7 (9.5) | 32 (43.2) | 31 (41.9) | 3 (4.1) | 27 | | 3.38(.77) |
| Q65 N=76 | 1 (1.3) | 5 (6.6) | 30 (39.5) | 30 (39.5) | 10 (13.2) | 25 | | 3.57(.85) |
| Q66 N=75 | 19 (25.3) | 23 (30.7) | 24 (32.0) | 5 (6.7) | 4 (5.3) | 26 | | 2.36(1.10) |
| Q67 N=76 | 4 (5.3) | 11 (14.5) | 31 (40.8) | 17 (22.4) | 13 (17.1) | 25 | | 3.32(1.09) |
| Q68 N=76 | 7 (9.2) | 17 (22.4) | 30 (39.5) | 13 (17.1) | 9 (11.8) | 25 | | 3.00(1.12) |
| Q69 N=78 | 3 (3.8) | 11 (14.1) | 21 (26.9) | 29 (37.2) | 14 (17.9) | 23 | | 3.51(1.07) |

| **Sport IndexR** = (q71+q72+q73)/3 N=95 | Mean (sd) 2.79(.67) | | Median (IQR) 2.67 | | Range 3.67 Min=1.33 Max=5.0 | | Cronbach's Alpha= .382 | Missing 6 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |

| | 1 | 2 | 3 | 4 | 5 | Mis | | Mean(sd) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Q71 N=95 | 19 (20.0) | 25 (26.3) | 41 (43.2) | 8 (8.4) | 2 (2.1) | 6 | | 2.46(.98) |
| Q72 N=95 | 7 (7.4) | 15 (15.8) | 44 (46.3) | 22 (23.2) | 7 (7.4) | 6 | | 3.07(.99) |
| Q73 N=95 | 47 (49.5) | 15 (15.8) | 28 (29.5) | 4 (4.2) | 1 (1.1) | 6 | | 1.92(1.03) |

| Lesiure time indexR= (q75+q76+q77)/3 N=95 | Mean (sd) 2.86(.76) | | Median (IQR) 3.0 | | Range 3.67 Min=1.33 Max=5.0 | | Cronbach's Alpha= .482 | Missing 6 |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | Mis | | |
| Q75 N=100 | 1 (1.0) | 14 (14.0) | 55 (55.0) | 24 (24.0) | 6 (6.0) | 1 | | 3.19(.79) |
| Q76 N=96 | 43 (44.8) | 11 (11.5) | 31 (32.3) | 8 (8.3) | 3 (3.1) | 5 | | 2.15(1.18) |
| Q77 N=99 | 10 (10.1) | 19 (19.2) | 31 (31.3) | 12 (21.1) | 27 (27.3) | 2 | | 3.25(1.32) |
| **Single PA question** | | | | | | | | |
| | Yes | No | Missing | | | | | |
| Q78 N=87 | 63 (62.4) | 24 (23.8) | 14 | | | | | |

| Intention index= (q01+q07+q24)/3 N=95 | Mean (sd) 17.41 (3.43) | | | Median (IQR) 6.0 | | Range 4.33 | | Cronbach's Alpha= .717 | Missing 6 |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Missing | Mean(sd) |
| Q01 N=100 | 7 (7.0) | 3 (3.0) | 10 (10.0) | 12 (12.0) | 11 (11.0) | 18 (18.0) | 39 (39.0) | 1 | 5.27(1.90) |
| Q07 N=99 | 1 (1.0) | 0 | 3 (3.0) | 10 (10.1) | 14 (14.1) | 23 (23.2) | 48 (48.5) | 2 | 6.0(1.25) |
| Q24 N=98 | 0 | 2 (2.0) | 1 (1.0) | 7 (7.1) | 15 (15.3) | 24 (24.5) | 49 (50.0) | 3 | 5.73(1.5) |

| INDEPENDENT VARIABLES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Direct Attitude Index=95** | Mean (sd) 30.20(4.69) | | Median (IQR) 6.2 | | Range 3.80 Min=3.2 Max=35 | | Cronbach's Alpha= .781 | Missing 6 |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Missing | Mean(sd) |
| Q02 N=95 | 2 (2.0) | 1 (1.0) | 3 (3.0) | 6 (6.0) | 12 (12.0) | 16 (16.0) | 60 (60.0) | 6 | 6.14(1.33) |
| Q03 N=95 | 0 | 0 | 2 (2.0) | 4 (4.1) | 12 (12.2) | 22 (22.4) | 58 (59.2) | 6 | 6.32(.99) |
| Q04 N=95 | 5 (5.0) | 4 (4.0) | 1 (1.0) | 11 (10.9) | 16 (15.8) | 19 (18.8) | 45 (44.6) | 6 | 5.67(1.63) |
| Q05 N=95 | 1 (1.0) | 0 | 1 (1.0) | 7 (7.1) | 12 (12.1) | 17 (17.2) | 61 (61.6) | 6 | 6.24(1.16) |
| Q06 N=95 | 1 (1.0) | 0 | 3 (3.0) | 13 (12.9) | 16 (15.8) | 23 (22.8) | 45 (44.6) | 6 | 5.83(1.29) |

Note: The headers "1 2 3 4 5 6 7 Missing Mean(sd)" apply to the Direct Attitude rows. Below follows the Indirect Attitude section.

| **Indirect Attitude Index=89** | Mean (sd) 249.11(80.15) | Median (IQR) 8.5 | Range 344 Min=4 Max=392 | Cronbach's Alpha= .847 | Missing 12 |
|---|---|---|---|---|---|
| | | | | Missing | |
| Q0816 N=98 | 38.02(14.55) | 49.0 | 45.0 | 12 | Min=1 Max=49 |
| Q0917 N=98 | 38.02(14.55) | 49.0 | 45.0 | 12 | Min=1 Max=49 |
| Q1018 N=94 | 39.43(12.80) | 49.0 | 44.0 | 12 | Min=1 Max=49 |
| Q1119 N=97 | 40.19(11.59) | 49.0 | 46.0 | 12 | Min=1 Max=49 |
| Q1220 N=99 | 17.84(15.70) | 10.0 | 48.0 | 12 | Min=1 Max=49 |
| Q1321 N=95 | 18.30(16.71) | 10.0 | 48.0 | 12 | Min=1 Max=49 |
| Q1422 N=97 | 17.92(16.02) | 12.0 | 48.0 | 12 | Min=1 Max=49 |
| Q1523 N=97 | 39.38(13.87) | 49.0 | 44.0 | 12 | Min=1 Max=49 |

| **Direct Subjective Norm IndexR=99** (q25+q26+q28)/3 | Mean (sd) 18.13(3.36) | | Median (IQR) 6.33 | | Range 5 | | Cronbach's Alpha= .719 | Missing 2 |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| Q25 N=99 | 2 (2.0) | 1 (1.0) | 2 (2.0) | 2 (2.0) | 10 (10.0) | 27 (27.0) | 56 (56.0) | 2 | 6.22(1.21) |
| Q26 | 2 | 4 | 3 | 9 | 6 | 25 | 51 | 2 | 5.96(1.49) |

| N=99 | (2.0) | (4.0) | (3.0) | (9.0) | (6.0) | (25.0) | (51.0) | | |
|---|---|---|---|---|---|---|---|---|---|
| Q28 N=99 | 2 (2.0) | 1 (1.0) | 5 (5.0) | 12 (12.0) | 8 (8.0) | 20 (20.0) | 52 (52.0) | 2 | 5.92(1.49) |
| **Indirect Subjective Norm Index=77** | Mean (sd) 168.66(53.49) | | Median (IQR) 170 | | Range 225 | | | Cronbach's Alpha= .827 | Missing 24 |
| | | | | | | | | Missing | |
| Q2934 N=77 | 38.55(13.06) | | 42.0 | | 45.0 | | | 24 | |
| Q3035 N=77 | 36.65(14.49) | | 42.0 | | 48.0 | | | 24 | |
| Q3136 N=77 | 26.21(15.44) | | 26.5 | | 48.0 | | | 24 | |
| Q3237 N=77 | 25.49(14.12) | | 28.0 | | 48.0 | | | 24 | |
| Q3338 N=77 | 41.82(12.37) | | 49.0 | | 45.0 | | | 24 | |
| **Direct Perceived Behavioral Control IndexR=95** | Mean (sd) 17.54(3.49) | | Median (IQR 6.33 | | Range 4.67 Min-2.33 Max=7 | | | Cronbach's Alpha= .654 | Missing 6 |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| Q39 N=95 | 2 (2.1) | 1 (1.0) | 2 (2.1) | 6 (6.2) | 13 (13.4) | 23 (23.7) | 50 (51.5) | 6 | 6.05(1.35) |
| Q40 N=95 | 6 (6.1) | 1 (1.0) | 5 (5.1) | 12 (12.2) | 19 (19.4) | 24 (24.5) | 31 (13.6) | 6 | 5.38(1.67) |
| Q42 N=95 | 3 (3.1) | 4 (4.1) | 1 (1.0) | 3 (3.1) | 8 (8.2) | 18 (18.6) | 60 (61.9) | 6 | 6.11(1.55) |
| **Indirect Perceived Behavioral Control Index=75** | Mean (sd) 143.21(62.94) | | Median (IQR) 143.0 | | Range 236 | | | Cronbach's Alpha= .780 | Missing 26 |
| | | | | | | | | Missing | |
| Q4348 N=75 | 29.71(16.78) | | 32.5 | | 48.0 | | | 26 | |
| Q4449 N=75 | 32.52(15.74) | | 36.0 | | 48.0 | | | 26 | |
| Q4550 N=75 | 34.48(14.13) | | 36.0 | | 47.0 | | | 26 | |
| Q4651 N=75 | 25.12(15.97) | | 20.0 | | 48.0 | | | 26 | |
| Q4752 N=75 | 21.39(15.92) | | 16.0 | | 48.0 | | | 26 | |

Appendix I: Frequencies, Measures of Central Tendency and Cronbach's Alpha of Active Members Only (with imputed values)*

| **Dependent Variables** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **PA Index** =(Work Index + Sport IndexR + Lesiure Time IndexR) N=269 | Mean (sd) 8.61(1.72) | | Median (IQR) 8.76 | | Range 10.24 Min=3.86 Max=14.10 | | Cronbach's Alpha .645 | Missing 15 |
| **Work Index** = (q63+q64 + q65 + q66 + q67 + q68 + q69)/7 N=278 | Mean (sd) 2.97(.62) | | Median (IQR) 3.0 | | Range 3.14 Min=1.29 Max=4.43 | | Cronbach's Alpha= .693 | Missing 6 |
| | 1 | 2 | 3 | 4 | 5 | Mis | | Mean(sd) |
| Q63 N=281 | 36 (12.8) | 78 (27.8) | 117 (41.6) | 42 (14.9) | 8 (2.8 ) | 3 | | 2.67(.97) |
| Q64 N=281 | 11 (3.9) | 35 (12.5) | 129 (45.9) | 85 (30.2) | 21 (7.5) | 3 | | 3.24(.91) |
| Q65 N=281 | 3 (1.1) | 35 (12.5) | 114 (40.6) | 91 (32.4) | 37 (13.2) | 3 | | 3.44(.91) |
| Q66 N=281 | 65 (23.1) | 59 (21.0) | 96 (34.2) | 35 (12.5) | 24 (8.5) | 3 | | 2.62(1.21) |
| Q67 N=281 | 24 (8.5) | 51 (18.1) | 150 (53.4) | 42 (14.9) | 13 (4.6) | 3 | | 2.89(.92) |
| Q68 N=279 | 41 (14.6) | 57 (20.3) | 118 (42.0) | 37 (13.2) | 26 (9.3) | 5 | | 3.18(1.13) |
| Q69 N=279 | 24 (8.5) | 54 (19.2) | 80 (28.5) | 91 (32.4) | 30 (10.7) | 5 | | 2.82(1.13) |
| **Sport IndexR** = (q71+q72+q73)/3 N=272 | Mean (sd) 2.99(.81) | | Median (IQR) 3.0 | | Range 4.0 Min=1 Max=5 | | Cronbach's Alpha= .601 | Missing 12 |
| | 1 | 2 | 3 | 4 | 5 | Mis | | Mean(sd) |
| Q71 N=274 | 43 (15.8) | 68 (25) | 103 (37.9) | 44 (16.2) | 14 (5.1) | 10 | | 2.70(1.08) |
| Q72 N=274 | 33 (12.0) | 50 (18.2) | 112 (40.9) | 57 (20.8) | 22 (8.0) | 10 | | 2.95(1.09) |
| Q73 N=274 | 55 (20.1) | 51 (18.6) | 126 (46.0) | 27 (9.9) | 15 (5.5) | 10 | | 2.62(1.08) |

| Lesiure time indexR= (q75+q76+q77)/3 N=277 | Mean (sd) 2.66(.81) | | Median (IQR) 2.67 | | Range 4.0 Min=1 Max=5 | | Cronbach's Alpha= .538 | Missing 7 |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | Mis | | |
| Q75 N=278 | 15 (5.5) | 59 (20.8) | 135 (47.5) | 51 (18.0) | 18 (6.3) | 6 | | 2.99(.93) |
| Q76 N=278 | 108 (39.1) | 63 (22.8) | 76 (27.5) | 19 (6.9) | 11 (3.9) | 6 | | 2.14(1.13) |
| Q77 N=277 | 49 (18.0) | 65 (22.9) | 79 (27.8) | 46 (16.2) | 36 (12.7) | 7 | | 2.83(1.27) |
| Single PA question | | | | | | | | |
| | Yes | No | Missing | | | | | |
| Q78 N=283 | 198 (69.8) | 85 (29.9) | 1 | | | | | |
| | | | | | | | | |
| Intention index= (q01+q07+q24)/3 N=284 | Mean (sd) 16.70 (4.01) | | Median (IQR) 5.83 | | Range 6.0 Min=1 Mx=7 | | Cronbach's Alpha= .780 | Missing 0 |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Missing | Mean(sd) |
| Q01 N=284 | 14 (4.9) | 11 (3.9) | 20 (7.0) | 44 (15.5) | 48 (16.9) | 46 (16.2) | 101 (35.6) | 0 | 5.26(1.76) |
| Q07 N=284 | 6 (2.1) | 9 (3.2) | 16 (5.7) | 28 (9.9) | 37 (13.1) | 63 (22.3) | 124 (43.8) | 0 | 5.70(1.56) |
| Q24 N=274 | 5 (1.8) | 7 (2.5) | 13 (4.6) | 33 (11.6) | 43 (15.1) | 55 (20.0) | 126 (44.4) | 0 | 5.73(1.5) |

| INDEPENDENT VARIABLES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Direct Attitude Index=284** | Mean (sd) 28.67(6.97) | | Median (IQR) 6.2 | | Range 6.0 Min=1 Max=7 | | Cronbach's Alpha= .884 | Missing 0 |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Missing | Mean(sd) |

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Missing | Mean(sd) |
|---|---|---|---|---|---|---|---|---|---|
| Q02 N=284 | 19 (6.7) | 7 (2.5) | 12 (4.2) | 15 (5.3) | 24 (8.5) | 49 (17.3) | 156 (54.9) | 0 | 5.78(1.82) |
| Q03 N=284 | 14 (4.9) | 3 (1.1) | 9 (3.2) | 21 (7.4) | 26 (9.2) | 47 (16.5) | 164 (57.7) | 0 | 5.95(1.63) |
| Q04 N=284 | 10 (3.6) | 12 (4.2) | 16 (5.6) | 33 (12.0) | 48 (16.9) | 51 (18.0) | 111 (39.4) | 0 | 5.47(1.69) |
| Q05 N=284 | 10 (3.5) | 5 (1.8) | 16 (5.6) | 11 (3.9) | 21 (7.4) | 62 (21.8) | 155 (54.6) | 0 | 5.96(1.58) |
| Q06 N=284 | 13 (4.6) | 9 (3.2) | 22 (7.7) | 24 (8.5) | 41 (14.4) | 62 (21.8) | 113 (39.81) | 0 | 5.50(1.73) |

| **Indirect Attitude Index=283** | Mean (sd) 236.61(72.12) | Median (IQR) 251 | Range 374 Min=18 Max=396 | Cronbach's Alpha= .826 | Missing 1 |
|---|---|---|---|---|---|
| | | | | Missing | |
| Q0816 N=284 | 37.49(13.85) | 42.0 | 48.0 | 0 | Min=1 Max=49 |
| Q0917 N=284 | 37.44(13.85) | 42.0 | 48.0 | 0 | Min=1 Max=49 |
| Q1018 N=284 | 37.07(13.93) | 42.0 | 48.0 | 0 | Min=1 Max=49 |
| Q1119 N=284 | 36.95(13.77) | 42.0 | 48.0 | 0 | Min=1 Max=49 |
| Q1220 N=284 | 16.21(12.30) | 12.0 | 48.0 | 0 | Min=1 Max=49 |
| Q1321 N=284 | 17.43(12.71) | 15.50 | 48.0 | 0 | Min=1 Max=49 |
| Q1422 N=284 | 15.84(12.25) | 15.0 | 48.0 | 0 | Min=1 Max=49 |
| Q1523 N=283 | 38.17(13.44) | 42.0 | 48.0 | 1 | Min=1 Max=49 |

| **Direct Subjective Norm IndexR=278 (q25+q26+q28)/3** | Mean (sd) 17.22(3.83) | | Median (IQR) 6.0 | | Range 6.0 Min=1 Max=7 | | Cronbach's Alpha= .747 | Missing 6 |
|---|---|---|---|---|---|---|---|---|

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
|---|---|---|---|---|---|---|---|---|---|
| Q25 N=278 | 6 (2.2) | 8 (2.8) | 13 (4.6) | 19 (6.7) | 32 (11.3) | 45 (15.8) | 154 (54.2) | 6 | 5.93(1.55) |
| Q26 N=278 | 9 (3.2) | 4 (1.4) | 16 (5.8) | 40 (14.4) | 48 (17.3) | 55 (19.8) | 106 (37.3) | 6 | 5.53(1.57) |

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
|---|---|---|---|---|---|---|---|---|---|
| Q28 N=278 | 10 (3.6) | 8 (2.8) | 7 (2.5) | 26 (9.7) | 40 (14.1) | 59 (20.8) | 128 (45.1) | 6 | 5.76(1.59) |
| **Indirect Subjective Norm Index N=283** | Mean (sd) 158.49(54.93) | | Median (IQR) 161 | | Range 224 Min=21 Max=245 | | | Cronbach's Alpha= .808 | Missing 1 |
| | | | | | | | | Missing | |
| Q2934 N=283 | 34.46(15.49) | | 36.0 | | 48.0 | | | 1 | |
| Q3035 N=283 | 34.36(14.61) | | 36.0 | | 48.0 | | | 1 | |
| Q3136 N=283 | 27.69(15.09) | | 28.0 | | 48.0 | | | 1 | |
| Q3237 N=283 | 22.99(14.90) | | 20.0 | | 48.0 | | | 1 | |
| Q3338 N=283 | 38.99(12.78) | | 49.0 | | 48.0 | | | 1 | |
| **Direct Perceived Behavioral Control IndexR=284** | Mean (sd) 17.05(3.56) | | Median (IQR 6.0 | | Range 6.0 Min=1 Max=7 | | | Cronbach's Alpha= .702 | Missing 0 |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| Q39 N=284 | 4 (1.4) | 6 (2.1) | 12 (4.2) | 19 (6.7) | 34 (12.0) | 61 (21.8) | 147 (51.8) | 0 | 5.98(1.41) |
| Q40 N=284 | 8 (2.8) | 10 (3.5) | 24 (8.5) | 39 (13.7) | 72 (25.4) | 54 (19.0) | 76 (26.8) | 0 | 5.19(1.58) |
| Q42 N=284 | 5 (1.8) | 9 (3.2) | 13 (4.6) | 22 (7.7) | 34 (12.0) | 53 (18.7) | 146 (51.4) | 0 | 5.88(1.52) |
| **Indirect Perceived Behavioral Control Index=281** | Mean (sd) 144.49(49.98) | | Median (IQR) 147 | | Range 224 Min=21 Max=245 | | | Cronbach's Alpha= .780 | Missing 3 |
| | | | | | | | | Missing | |
| Q4348 N=281 | 34.58(14.49) | | 36.0 | | 48.0 | | | 3 | |
| Q4449 N=281 | 35.70(13.68) | | 36.0 | | 47.0 | | | 3 | |
| Q4550 N=281 | 33.37(13.56) | | 36.0 | | 48.0 | | | 3 | |
| Q4651 N=281 | 22.14(13.18) | | 21.0 | | 48.0 | | | 3 | |
| Q4752 N=281 | 18.72(12.79) | | 15.0 | | 48.0 | | | 3 | |

*Imputed values not shown on table

Appendix J: Frequencies, Measures of Central Tendency and Cronbach's Alpha of Retired Members Only (with imputed values)*

| **Dependent Variables** | | | | | |
|---|---|---|---|---|---|
| **PA Index** =(Work Index + Sport IndexR + Lesiure Time IndexR) N=77 | Mean (sd) 8.73(1.30) | Median (IQR) 8.50 | Range 5.48 Min=5.9 Max=11.38 | Cronbach's Alpha .590 | Missing 24 |
| **Work Index** = (q63+q64 + q65 + q66 + q67 + q68 + q69)/7 N=79 | Mean (sd) 3.04(.50) | Median (IQR) 3.0 | Range 2.43 Min=2 Max=4.43 | Cronbach's Alpha= .542 | Missing 22 |
| | 1 | 2 | 3 | 4 | 5 | Mis | | Mean(sd) |
| Q63 N=79 | 3 (3.8) | 10 (12.7) | 45 (57.0) | 17 (21.5) | 3 (3.8) | 22 | | 3.08(.81) |
| Q64 N=79 | 1 (1.4) | 7 (9.5) | 32 (43.2) | 31 (41.9) | 3 (4.1) | 22 | | 3.40(.80) |
| Q65 N=79 | 1 (1.3) | 5 (6.3) | 31 (39.2) | 30 (38.0) | 12 (15.2) | 22 | | 3.59(.85) |
| Q66 N=79 | 19 (24.1) | 23 (29.1) | 25 (31.6) | 5 (6.3) | 6 (7.6) | 22 | | 2.44(1.15) |
| Q67 N=79 | 4 (5.1) | 11 (13.9) | 32 (40.5) | 17 (21.5) | 15 (19.0) | 22 | | 3.35(1.10) |
| Q68 N=79 | 7 (8.9) | 17 (21.5) | 31 (39.2) | 13 (16.5) | 11 (13.9) | 22 | | 2.95(1.14) |
| Q69 N=80 | 3 (3.8) | 11 (13.8) | 23 (38.8) | 29 (36.3) | 14 (17.5) | 21 | | 23.50(1.06) |
| **Sport IndexR** = (q71+q72+q73)/3 N=93 | Mean (sd) 2.79(.67) | Median (IQR) 2.67 | Range 3.67 Min=1.33 Max=5.0 | Cronbach's Alpha= .386 | Missing 7 |
| | 1 | 2 | 3 | 4 | 5 | Mis | | Mean(sd) |
| Q71 N=94 | 19 (20.7) | 24 (25.5) | 41 (43.6) | 8 (8.4) | 2 (2.1) | 7 | | 2.46(.98) |
| Q72 N=94 | 7 (7.4) | 15 (16.0) | 44 (45.7) | 22 (23.4) | 7 (7.4) | 7 | | 3.07(.99) |
| Q73 N=94 | 47 (48.9) | 15 (16.0) | 28 (29.8) | 4 (4.3) | 1 (1.1) | 7 | | 1.92(1.03) |

| Lesiure time indexR= (q75+q76+q77)/3 N=100 | Mean (sd) 2.89(.79) | | Median (IQR) 3.0 | | Range 3.67 Min=1.33 Max=5.0 | | Cronbach's Alpha= .523 | Missing 1 |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | Mis | | |
| Q75 N=100 | 1 (1.0) | 14 (14.0) | 55 (55.0) | 24 (24.0) | 6 (6.0) | 1 | | 3.20(.79) |
| Q76 N=100 | 42 (42) | 12 (12.0) | 31 (31.0) | 9 (9.0) | 4 (4.0) | 1 | | 2.21(1.20) |
| Q77 N=100 | 10 (10.0) | 19 (19.0) | 31 (31.0) | 12 (12.0) | 27 (27.0) | 1 | | 3.26(1.33) |
| **Single PA question** | | | | | | | | |
| | Yes | No | Missing | | | | | |
| Q78 N=101 | 71 (70.3) | 30 (30.3) | 0 | | | | | |

| Intention index= (q01+q07+q24)/3 N=101 | Mean (sd) 17.33 (3.47) | | Median (IQR) 6.0 | | Range 4.33 Min=2.67 Max=7 | | Cronbach's Alpha= .731 | Missing 0 |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Missing | Mean(sd) |
| Q01 N=101 | 7 (6.9) | 3 (3.0) | 10 (9.9) | 12 (11.9) | 12 (11.9) | 18 (17.8) | 39 (38.6) | 0 | 5.27(1.89) |
| Q07 N=101 | 1 (1.0) | 0 | 3 (3.0) | 10 (9.9) | 14 (13.9) | 22 (21.8) | 50 (49.5) | 0 | 6.01(1.26) |
| Q24 N=101 | 0 | 2 (2.0) | 1 (1.0) | 9 (8.9) | 15 (14.9) | 23 (22.8) | 50 (49.5) | 0 | 6.05(1.9) |

| INDEPENDENT VARIABLES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Direct Attitude Index=101** | Mean (sd) 30.26(4.65) | | | Median (IQR) 6.2 | | Range 3.80 Min=3.2 Max=7.0 | | Cronbach's Alpha= .764 | Missing 0 |

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Missing | Mean(sd) |
|---|---|---|---|---|---|---|---|---|---|
| Q02 N=101 | 2 (2.0) | 1 (1.0) | 3 (3.0) | 6 (5.9) | 12 (11.9) | 16 (15.8) | 61 (60.4) | 0 | 5.80(1.81) |
| Q03 N=101 | 0 | 0 | 2 (2.0) | 4 (4.0) | 12 (11.9) | 22 (21.8) | 59 (58.4) | 0 | 6.33(.97) |
| Q04 N=101 | 5 (5.0) | 4 (4.0) | 1 (1.0) | 11 (10.9) | 16 (15.8) | 18 (17.8) | 46 (45.5) | 0 | 5.64(1.71) |
| Q05 N=101 | 1 (1.0) | 0 | 1 (1.0) | 7 (6.9) | 12 (11.9) | 17 (16.8) | 61 (60.4) | 0 | 6.26(1.14) |
| Q06 N=101 | 1 (1.0) | 0 | 3 (3.0) | 13 (12.9) | 16 (15.8) | 23 (22.8) | 45 (44.6) | 0 | 5.89(1.28) |

| **Indirect Attitude Index=101** | Mean (sd) 249.09(76.97) | Median (IQR) 255 | Range 344 Min=85 Max=392 | Cronbach's Alpha= .841 | Missing 0 |
|---|---|---|---|---|---|
| | | | | Missing | |
| Q0816 N=101 | 38.34(13.99) | 49.0 | 45.0 | 0 | Min=4 Max=49 |
| Q0917 N=101 | 38.34(14.0) | 49.0 | 45.0 | 0 | Min=4 Max=49 |
| Q1018 N=101 | 39.40(12.17) | 42.0 | 44.0 | 0 | Min=5 Max=49 |
| Q1119 N=101 | 39.80(11.93) | 49.0 | 46.0 | 0 | Min=3 Max=49 |
| Q1220 N=101 | 17.91(15.10) | 10.0 | 48.0 | 0 | Min=1 Max=49 |
| Q1321 N=101 | 18.03(16.06) | 12.0 | 48.0 | 0 | Min=1 Max=49 |
| Q1422 N=101 | 18.04(15.66) | 12.0 | 48.0 | 0 | Min=1 Max=49 |
| Q1523 N=101 | 39.23(13.66) | 49.0 | 44.0 | 0 | Min=5 Max=49 |

| **Direct Subjective Norm IndexR=101** (q25+q26+q28)/3 | Mean (sd) 17.96(3.57) | | | Median (IQR) 6.33 | | Range 5.0 Min=2.67 Max=7 | | Cronbach's Alpha= .753 | Missing 0 |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| Q25 N=101 | 2 (2.0) | 2 (2.0) | 2 (2.0) | 2 (2.0) | 10 (9.9) | 26 (25.7) | 57 (56.4) | 0 | 6.18(1.31) |
| Q26 | 2 | 4 | 3 | 9 | 6 | 25 | 50 | 0 | 5.89(1.53) |

| N=101 | (2.0) | (4.0) | (3.0) | (8.9) | (5.9) | (24.8) | (49.5) | | |
|---|---|---|---|---|---|---|---|---|---|
| Q28 N=101 | 2 (2.0) | 2 (2.0) | 5 (5.0) | 12 (11.9) | 8 (7.9) | 20 (19.8) | 52 (51.5) | 0 | 5.89(1.53) |
| **Indirect Subjective Norm Index=98** | Mean (sd) 168.42(54.18) | | Median (IQR) 171.67 | | Range 225 Min=67.01 Max=245 | | | Cronbach's Alpha= .835 | Missing 3 |
| | | | | | | | | Missing | |
| Q2934 N=98 | 37.89(13.25) | | 42.0 | | 45.0 | | | 3 | Min=4 Max=49 |
| Q3035 N=98 | 36.43(14.28) | | 42.0 | | 48.0 | | | 3 | Min=1 Max=49 |
| Q3136 N=98 | 26.31(15.41) | | 28.0 | | 48.0 | | | 3 | Min=1 Max=49 |
| Q3237 N=98 | 26.14(14.45) | | 28.0 | | 48.0 | | | 3 | Min=1 Max=49 |
| Q3338 N=98 | 41.65(12.28) | | 49.0 | | 45.0 | | | 3 | Min=4 Max=49 |
| **Direct Perceived Behavioral Control IndexR=99** | Mean (sd) 17.56(3.48) | | Median (IQR 6.33 | | Range 4.67 Min=2.67 Max=7 | | | Cronbach's Alpha= .658 | Missing 2 |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| Q39 N=99 | 2 (2.0) | 1 (1.0) | 2 (2.1) | 6 (6.1) | 14 (14.1) | 23 (23.2) | 51 (51.5) | 2 | 6.05(1.33) |
| Q40 N=99 | 6 (6.1) | 1 (1.0) | 5 (5.1) | 12 (12.1) | 18 (18.2) | 25 (25.3) | 32 (32.3) | 2 | 5.40(1.67) |
| Q42 N=99 | 3 (3.0) | 4 (4.0) | 1 (1.0) | 4 (4.0) | 8 (8.1) | 19 (19.2) | 60 (60.6) | 2 | 6.10(1.54) |
| **Indirect Perceived Behavioral Control Index=94** | Mean (sd) 143.04(62.23) | | Median (IQR) 143.50 | | Range 236 Min=9 Max=245 | | | Cronbach's Alpha= .866 | Missing 7 |
| | | | | | | | | Missing | |
| Q4348 N=94 | 29.78(16.05) | | 30.0 | | 48.0 | | | 7 | Min=1 Max=49 |
| Q4449 N=94 | 32.36(15.70) | | 36.0 | | 48.0 | | | 7 | Min=1 Max=49 |
| Q4550 N=94 | 34.42(13.96) | | 36.0 | | 47.0 | | | 7 | Min=2 Max=49 |
| Q4651 N=94 | 24.46(15.86) | | 22.5 | | 48.0 | | | 7 | Min=1 Max=49 |
| Q4752 N=94 | 22.03(15.93) | | 16.0 | | 48.0 | | | 7 | Min=1 Max=49 |

*Imputed values not shown on table

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## Present Status

Health Educator, Health and Preventive Services, OptimaHealth, Virginia Beach, Virginia.

## National Presentations

1. 32nd National Immunization Conference – Changes, Challenges, and Oppportunities. Atlanta, Georgia, July 21-24, 1998. Presented "Provider Toolkit for Childhood Immunizations."
2. 33rd National Immunization Conference – Immunization Leading the Way Our Work Has Just Begun. Dallas Texas, June 22-25, 1999. Presented "The Impact of Immunization on Parent Compliance With the Childhood Immunization Schedule."
3. 1999 American Holistic Nurses Association Annual Conference – Phoenix, Arizona, June 28 – July 2, 1999. Presented "Biological and Affective Responses to the Inhalation of the Essential Oil Lavender." Masters thesis research.
4. Banks C, Jenkins T, Kumar S, Ranne J, Rubino G, Tweed S, Vogel E, Zhang Y, Plichta S. "Factors predicting cost and length of stay of acute psychiatric inpatients" presented at Sentara Research Day 2002, Norfolk, VA, March, 2002
5. Banks C, Jenkins T, Kumar S, Ranne J, Rubino G, Tweed S, Vogel E, Zhang Y, Plichta S. "Factors predicting cost and length of stay of acute psychiatric inpatients" presented at APHA 130th Annual Meeting in Philadelphia, PA, November 2002
6. Tweed S, Zhang Y, Plichta S. "Unhealthy lifestyles: Who's at risk?" presented at APHA 130th Annual Meeting in Philadelphia, PA, November 2002
7. Tweed S, Zhang Y, Plichta S. "Unhealthy lifestyles: Who's at risk?" presented at American Association of Health Behavior 3rd Annual Conference in St. Augustine, FL, March, 2003 –Outstanding Poster – honorable mention.
8. Tweed S, Zhang Y, Plichta S. "Unhealthy lifestyles: Who's at risk?" presented at 43rd Navy Occupational Health and Preventive Medicine Conference, Chesapeake, VA – March 2003.
9. Tweed S. co –presented "Building Leaders, Building Members: A Coalition Training Tool Kit. Fifth National Conference on Immunization Coalitions, Westin Keirland Resort and Spa, Scottsdale AZ. May 28-30, 2003.
10. Tweed S, Zhang Y, Plichta SB. 'A Study of Tobacco Prevention, Exercise

And Healthy Eating Program for Young Girls,' 5th International Conference On the Scientific Basis of Health Services, Washington DC, September 2003.

11. Zhang Y, Tweed S, Plichta S "Maintaining and Improving Good Health Behaviors in High Risk Adolescent Girls", Poster presentation during the 132nd APHA Annual Meeting in Washington, DC, November 2004.

12. Zhang Y, Tweed S, Plichta S "Maintaining and Improving Good Health Behaviors in High Risk Adolescent Girls", Poster presentation during the Third International Conference on Urban Health in Boston MA, October 2004.

13. Zhang Y, Tweed S, Plichta S "Maintaining and Improving Good Health Behaviors in High Risk Adolescent Girls", poster presentation at the 5th Annual Meeting of the American Academy of Health Behavior in Charleston, SC, February 20-23, 2005.

14. Tweed S, Zhang Y, Plichta S. "Maintaining and Improving Good Health Behaviors in High Risk Adolescent Girls", AHIP's Building Bridges Conference, "Applying Evidence-Based Solutions to Health Care Priorities" Santa Fe, New Mexico, April 6-8, 2005.

15. Tweed S "Walk About With Healthy Edge" Presentation Stenens Point Wisconsin

16. Tweed S, Houseman C, Plichta S "Identifying Health Behaviors in Maritime Union Members", poster presentation Sentara Norfolk General Hospital "Evidence-Based Practice Transforming Care at the Bedside, May 14, 2007 Spring Hill Suites, Norfolk, Va.

17. Tweed S, Houseman C, Plichta S "Identifying Health Behaviors in Maritime Union Members", poster presentation ODU 2007 Research Expo: 400 Years of Discovery, Norfolk Virginia. April 5, 2007.

18. Tweed S presentation "Stay on Track – Daycare Initiative" Influenza Vaccine Expert Roundtable, Chicago, Il. April 2007.

19. Tweed S, Houseman C, Plichta S "Identifying Health Behaviors in Maritime Union Members", poster presentation AcademyHealth 2007 Annual Research Meeting, Walt Disney World Swan and Dolphin, Orlando June 3-5, 2007.

20. Tweed S, publication "Influenza Vaccination: Trends, Recommendations, and Best Practices" supplement to Managed Care - August 2007.

### Local Presentations

1. Sentara Woman's Health Source – Presented "Looking in the Mirror As You Age." February 2000.

2. Alternative Therapies – City of Virginia Beach, Department of Parks, Recreation, and Tourism – Presented "Aromatherapy: Healing With Scent." February 2000.

3. Celebrating Midlife Series – Sentara Women's Health Source - Presented "Becoming a Wise Woman." May 2000.

4. Celebrating Midlife Series – Sentara Women's Health Source - Presented "Aromatherapy: Healing With Scent." August 2000.

5. 11th Annual Diabetes Symposium – Current Directions in Diabetes Care – Presented "Stress Management." October 2000.
6. Education Council Cancer Institute – Presented "Aromatherapy: Healing With Scent." January 2001.
7. Celebrating Midlife Series – Sentara Women's Health Source - Presented "Overview of Healing Touch." June 2001.
8. Sentara Cardiac Rehabilitation – Presented "Guided Imagery." September 2001.
9. Tweed S, Zhang Y, Plichta S. "Unhealthy lifestyles: Who's at risk?" presented at National Public Health Day 2002, Norfolk, VA, April, 2002.
10. Banks C, Jenkins T, Kumar S, Ranne J, Rubino G, Tweed S, Vogel E, Zhang Y, Plichta S. "Factors predicting cost and length of stay of acute psychiatric inpatients" presented at National Public Health Day 2002, Norfolk, VA, April, 2002.
11. Zhang Y, Tweed S, Plichta S. "Unhealthy lifestyles: Who's at risk?" presented at Research Day of College of Health Science, Norfolk, VA, March, 2002.
12. Banks C, Jenkins T, Kumar S, Ranne J, Rubino G, Tweed S, Vogel E, Zhang Y, Plichta S. "Factors predicting cost and length of stay of acute psychiatric inpatients" presented at Sentara Research Day 2002, Norfolk, VA, March, 2002.
13. Tweed S, Zhang Y, Plichta S. "Unhealthy lifestyles: Who's at risk?" presented at Sentara Research Day 2002, Norfolk, VA, March, 2002.
14. Hampton Roads Health Coalition, Employer Summit 2002 - Presented "Small Businesses CAN Start a Wellness Program, June 2002.
15. Celebrating Midlife Series – Sentara Women's Health Source - Presented "Journaling: A Journey of Self Discovery" April 2004.
16. Zhang Y, Tweed S, Plichta S. "Unhealthy lifestyles: Who's at risk?" presented at 1st Annual Old Dominion University Research Day in Norfolk VA, March, 2004.
17. Tweed S, Zhang Y, Plichta SB. "A Study of Tobacco Prevention, Exercise and Healthy Eating Program for Young Girls," presented at Advancing Community Health: Meeting the Needs of the Underserved in Norfolk VA, May, 2004.
18. Sentara Woman's Health Source – Presented "Aromatherapy" February 2003.
19. Tweed S, Zhang Y, Plichta S. "Unhealthy lifestyles: Who's at risk?" presented at Advancing Community Health: Meeting the Needs of the Underserved in Norfolk VA, May, 2004.
20. Celebrating Midlife Series – Sentara Women's Health Source - Presented "Creating Your Own Sacred Beads" August 2005.
21. Celebrating Midlife Series – Sentara Women's Health Source - Presented "Blessed Stress" December 2005.
22. Sentara Woman's Health Source – Presented "Meditation – A Journey to Greater Health" August 2002, June 2004, August 2006.

## Awards

1. 1998 American Association of Health Plans, 2nd Place Award for development and implementation of "Provider Toolkit for Childhood Immunizations" for provider offices in Hampton Roads.
2. Jack McNamara Award – Given to employee that exemplifies the values of Sentara Health Management – 1st quarter 1997 and 4th quarter 1998.
3. Ambassador Award – 1999 - Given to recognize volunteerism within the community.
4. Sentara Healthcare's Nursing Excellence Award - May 2002.
5. 2002 Virginia Tobacco Settlement Foundation Grant award for $33,950 to present the "Healthy Me" program to at risk teens prior to sports activity.
6. Outstanding Poster – honorable mention for "Unhealthy lifestyles: Who's at risk?" poster presented at American Association of Health Behaviors 3rd Annual Conference in St. Augustine, FL, March, 2003
7. June 2003, American Association of Health Plans - $25,000 awarded for the Stay on Track Daycare initiative with Project Immunize Virginia
8. 2003 Virginia Tobacco Settlement Foundation Grant award for $26,600 to coordinate the "Healthy Me" program to at risk teens prior to sports activity.
9. 2004 Virginia Tobacco Settlement Foundation Grant award for $35,695 to coordinate the "All Stars" program to at risk teens prior to sports activity.
10. 2005 Virginia Tobacco Settlement Foundation Grant award for $32,500 to coordinate the "All Stars" program to at risk teens prior to sports activity.
11. 2006 Virginia Tobacco Settlement Foundation Grant award for $28,800 to coordinate the "All Stars" program to at risk teens prior to sports activity.
12. 2006 Health Information Resource Center Merit Award for the "Measuring Blood Pressure for the 21st Century" toolkit.
13. 2007 – 2008 – Awarded Dissertation Fellowship from Old Dominion University - $15,000.

## Creative Accomplishments

1. Produced DVD/video and Tool Kit on "Measuring Blood Pressure for the 21st Century" working in collaboration with Healthy Pathways, a VA statewide cardiovascular coalition.
2. Created, directed, and produced 3 audio CD's, 2004 "Meditation: A Journey To Greater Health" and 2006 "Meditation: A Journey Towards Health" and 2008, "Guided Rainbow Meditation."
3. Created, directed, and produced 2 DVD/video's - Healthy Heart Yoga and Healthy Heart Chair Yoga for distribution to community to reduce cardiovascular disease risks, 2006.
4. Created the Healthy Heart Yoga booklet for distribution to community to reduce cardiovascular disease risks, 2006.