1. Taj Haider, hereby submit this original work as part of the requirements for the degree of Master of Public Health in Public Health - Health Education/Health Promotion.

It is entitled:
Using Social Cognitive Theory to Predict Exercise Behavior among College Students of South Asian Descent at Two Large Midwestern Universities

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Committee member: Amy Bernard, PhD
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by

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Abstract

AN ABSTRACT OF THE THESIS FOR THE MASTERS OF PUBLIC HEALTH DEGREE IN
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UNIVERSITY OF CINCINNATI

TITLE: Using social cognitive theory to predict exercise behavior among college students of
South Asian descent at two large Midwestern universities

MASTERS COMMITTEE MEMBERS: Dr. Manoj Sharma, Chair
Dr. Amy Bernard

The purpose of this study was to determine the role of expectations, self-efficacy, self-efficacy to overcome barriers, self-control, and social support as predictors of exercise among South Asian college students enrolled in two large public universities in Ohio. A sample of 58 students of South Asian descent enrolled at two Midwestern universities in Ohio completed a 55 item valid and reliable web-based survey assessing their level of exercise, expectations, self-efficacy to participate in exercise, self-efficacy to overcome barriers, self-control, and social support. Regression analyses were done to test for variance in exercise behavior attributable to each of the five independent variables. The results of this regression model showed that only self-efficacy was predictive of exercise behavior ($R^2=0.082$). Recommendations for future research into the predictors of exercise among this population have been offered.
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Chapter 1

Introduction

In the United States it has become increasingly apparent that many Americans do not participate in exercise on a regular basis. Approximately sixteen percent of Americans have reported no moderate or vigorous activity in a usual week, while forty-five percent stated that they do participate in some physical activity in a usual week. Unfortunately, vigorous-intensity levels of physical activity, the kind that provides cardiovascular benefits, are participated in by only fifteen percent of U.S. adults (Macera et al., 2005). The estimates of exercise may even be high as the information was self-reported rather than measured illustrating the need for exercise among U.S. populations, especially those at high-risk for obesity related diseases (i.e. cancer, diabetes, heart disease).

The U.S. has a prodigious immigrant population, estimated to be 102.5 million, subsequently certain minority groups have been designated as high-risk due to the higher rate of obesity among these groups compared to the general “white” population (U.S. Census Bureau, 2008). Non-Hispanic black women reported the highest levels of obesity among all populations as more than half of these women, over the age of forty, were obese and more than eighty percent were overweight (Flegal, Carroll, & Ogden, 2002). Another study in the U.S. reported that thirteen percent of non-Hispanic white men were physically inactive, while twenty point eight percent and twenty one point eight percent of non-Hispanic black men and Hispanic men were physically inactive, respectively. For women there was an even larger discrepancy as twenty eight point four percent of non-Hispanic black women and twenty seven point one percent of Hispanic women were reported as
physically inactive, compared to only thirteen point two percent of non-Hispanic white women (Macera et al., 2005).

Although, there is a lack of studies comparing South Asian immigrants to their American counterparts studies in the United Kingdom have shown that only twenty-one of Bangladeshi women reported physical activity, while fifty-six of their English counterparts were physically active (Fischbacher, Hunt, & Alexander, 2004). In a study performed in New Zealand it was found seventy-one percent of Indian immigrants and eighty seven percent of Pakistani immigrants did not meet the guidelines of 30 minutes of moderate physical activity five days a week (Kolt, Schofield, Rush, Oliver, & Chadha, 2007). This data suggests that there is a need for exercise education among minority populations residing in the U.S. as the benefits of exercise can decrease the prevalence of many chronic diseases.

Physical inactivity is one risk factor associated with chronic disease that can be modified, unlike genetic predisposition, age, or ethnicity (Warburton, Nicol, & Bredin, 2006). Studies have shown that regular moderate physical activity is associated with a thirty to fifty percent reduction in the risk of coronary heart disease, as well as a reduction in obesity, diabetes, and stroke (Fischbacher, Hunt, & Alexander, 2004). According to the CDC, adults that participate in regular physical activity reduce the risk of being diagnosed with hypertension, depression, anxiety, many types of cancer, and osteoporosis. Moreover, the CDC reported that an estimated twelve percent of the deaths each year in the United States are derived from a lack of physical activity (Pate et al., 2009). Considering many factors associated with chronic diseases are non-modifiable it is important to promote physical activity to decrease preventable deaths in the U.S (Warburton, Nicol, & Bredin, 2006).
Statement of the Problem

Asian Indian immigrants in the U.S. have far worse risk factor profiles than their native counterparts. Research suggests that among South Asian populations in the United Kingdom the prevalence of diabetes is nineteen percent as opposed to four percent in the general population (McKeigue, Shah, & Marmot, 1991). Many studies have examined the high rates of coronary heart disease and diabetes in this population, identifying their lack of physical activity and sedentary pursuits as key contributing factors (Kolt, Schofield, Rush, Oliver, & Chadha, 2007). Furthermore, studies have shown that South Asian populations, specifically those of Indian, Pakistani, and Bangladeshi ethnic origin, have the lowest levels of physical activity compared to any other ethnic group studied (Fischbacher, Hunt, & Alexander, 2004). It has also been suggested that the longer South Asian immigrants live in the United States their risk for chronic disease increases (Kandula & Lauderdale, 2005). It is imperative that researchers begin to understand the trends of physical inactivity among South Asians.

In a survey study Misra and colleagues (2000) demonstrated that among a population of Asian Indian immigrants in the U.S. forty percent were overweight or obese. The study further reported that Asian Indian populations 25 years or younger exercised only “sometimes” and were not routinely physical active as recommended by the Surgeon General (Misra, Patel, Davies, & Russo, 2000). Considering that many health behaviors are established during young adulthood it is imperative that routine physical activity must become part of the lives of South Asian college students (Buckworth & Nigg, 2004). This Chapter will explore the multi-faceted determinants of exercise among South Asians and college students.
A study done by Seo and colleagues (2009) illustrated the physical activity differences among male college students cross-culturally. Among Indian males the prevalence of physical activity was significantly lower than their United States, Korean, and Costa Rican counterparts. The study went onto show that among all countries Indians showed the lowest proportion of students who met the moderate physical activity guidelines in both female and male students. This study concluded that, although Indian immigrants in the United States may be exposed to physical activity more often than in their country of origin, the benefits of physical activity may not transcend cultures (Seo, Torabi, Jiang, Fernando-Rojas, & Park, 2009).

Not only are South Asians a unique population of study for exercise determinants, but college students' also present unique barriers to following the guidelines for exercise. The 2000 National College Assessment Survey reported that fifty seven percent of male and sixty one percent of female college students surveyed stated that they performed no vigorous or moderate activity on at least three days of the past week (Buckworth & Nigg, 2004). Another study reported that fifty two point two percent of college students in 29 California colleges reported little or no physical activity. The period of transition from high-school student to young adult plays a significant role in the lack of physical activity participated in by college students (Brown, 2005). Furthermore, one study has demonstrated that the steepest decline in physical activity occurs between the ages of 18 and 24. This suggests that it is important for health educators to intervene as adolescent's transition to young adulthood so that physical activity can be maintained throughout their life (Petosa, Suminski, & Hertz, 2003).
In a study by Buckworth and Nigg (2004) many college students reported that reading, computer work, studying and homework interfered with time allotted for exercise. Two factors were identified as determinants of college student participation in regular physical activity, accessibility and motivation. Although, many college students reported time constraints, they also reported a considerable amount of discretionary time. The choice to participate in exercise or sedentary activities was surveyed. The results showed that television watching (females) and computer use (males) was negatively correlated with exercise (Buckworth & Nigg, 2004).

Another significant study, Project GRAD, tested the potential mediators that may affect university student’s participation in exercise (Sallis, Calfas, Alcaraz, Gehrman, & Johnson, 1999). Derived from the social cognitive theory, this study attempted to change the student’s self-efficacy to perform exercise, social support, outcome expectations, and enjoyment of exercise. Interestingly, they found that for “ethnic” minority women only enjoyment of exercise caused a significant change in their exercise. Overall results suggested that social support was the most important determinant of exercise among women, while the benefits of exercise determined exercise for men. This study suggests that although there are many mediators that determine exercise in men and women, over time, through reciprocal determinism, the factors can vary in importance and necessity (Sallis, Calfas, Alcaraz, Gehrman, & Johnson, 1999).

Researchers Petosa, Suminski, and Hertz (2003) performed a study testing the social cognitive constructs as predictors of vigorous exercise among college students. The constructs tested were social support for exercise from friends and family, self-regulation, self-efficacy, expectations, exercise role identity, and positive exercise experience. The
study reported that forty five percent of the college student sample averaged zero days per week of vigorous exercise. The study did conclude that the SCT constructs were predictors of exercise among college students, but that many of the constructs were not being met on college campuses. Many students surveyed reported low scores for expectations of exercising as well as low scores associated with a positive outlook on vigorous exercise and self-control. This study suggests that university life may support a physically active lifestyle, but it does not appear to support the development of skills for maintenance of physical activity (Petosa, Suminski, & Hertz, 2003). Many South Asian entering college do not have the skill set to begin physical activity so without campus life emphasizing the importance of exercise development it is unlikely that they will exercise regularly, if at all. Furthermore, little information is available about the constructs that determine exercise among South Asian college students.

Need for the Study

The South Asian population in the United States is under represented in the health literature. Cardiovascular disease prevalence as well as diabetes prevalence in South Asian Americans is among the highest in the world, but few health promotion programs have been implemented to educate this high-risk population (Misra, Patel, Davies, & Russo, 2000). Furthermore, South Asian immigrants have been shown to have the lowest levels of physical activity compared to the general population in the United Kingdom, but no such study has been implemented in the U.S. (Fischbacher, Hunt, & Alexander, 2004). Considering that Asian Americans are the fastest growing minority population in the United States it is imperative that health educators begin to understand the health-risks for this particular population.
Presently, many studies tend to lump Asian Americans together, suggesting that they have better health and lower mortality rates than their white counterparts. When Asian Americans are separated by subgroup it is apparent that South Asians are at a higher risk for cardiovascular disease than Southeast and East Asian ethnic groups (Kandula & Lauderdale, 2005). To date much of the literature on exercise has concentrated on Japanese, Chinese, and Filipino immigrants in the U.S., but this cannot be considered a representation of South Asian Americans. Health knowledge, beliefs, behaviors, and lifestyle choices differ between each ethnic group suggesting that these factors must be assessed to implement effective health education programs targeted to South Asians (Misra, Patel, Davies, & Russo, 2000).

The decline in exercise among college students and young adults is an alarming trend apparent in the United States (Buckworth & Nigg, 2004). In addition, there are few studies concerned with exercise determinants among South Asian college students. Considering college exposes students, for the first time, to an independent lifestyle that can be modified by their own behavior and choices it can be assumed that physical activity varies based on cultural, behavioral, and personal factors (Seo, Torabi, Jiang, Fernando-Rojas, & Park, 2009).

There are numerous studies pertaining to exercise and college students, but none address cultural differences as a determinant of exercise. Fruit and vegetable consumption, smoking, weight perception, and gender have all been targeted as factors, but for immigrants or the children of immigrants this may not be the entire story. For example, one study demonstrated that gender could predict physical activity among Caucasian-American, South Korean, and Puerto Rican college students, but in the Indian students
surveyed gender did not predict physical activity, suggesting that there are cultural
differences associated with this disparity (Seo, Torabi, Jiang, Fernando-Rojas, & Park,
2009).

Most physical activity research among college students addresses exercise behavior
and beliefs as stationary conditions (Wallace, Buckworth, Kirby, & Sherman, 2000). The
social cognitive theory utilizes the concept of reciprocal determinism allowing for changes
in social, cultural, and psychological mediators that people experience over time (Sallis,
Calfas, Alcaraz, Gehrman, & Johnson, 1999). In addition, the social cognitive theory
assumes that people are capable of self-control and can actively change their environment
(Maddux, 1993). Factors of the social cognitive theory that relate to exercise behavior are
social support, self-efficacy, self-control, outcome expectancies, and outcome expectations.
Studies have shown that by improving the self-efficacy and social support of college
students has lead to an increase in physical activity (Suminski & Petosa, 2006). Although
this data is promising for the general U.S. population studies must be done to assess the
social cognitive variables associated with exercise behavior among South Asian college
students. Due to the emphasis on personal health behaviors as predictors of exercise the
social cognitive theory would be applicable in determining the attitudes South Asian
college students have about exercise.

Purpose of the Study

Presently, there is a gap in the literature pertaining to South Asian populations. The
function of this study is to fill in the gap with information pertaining to South Asian college
students and exercise. There is a large amount of literature focusing on college students
and exercise behavior, but no studies have yet to concentrate on South Asian college
students. This study will use social cognitive theory to predict exercise behavior among South Asian college students (Figure 1.1).

Figure 1.1

*Diagram of the Key Constructs used as Determinants of Exercise Behavior among South Asian College Students.*

*Research Questions & Hypotheses*

The following research questions were explored in this study.

1. To what extent did expectations (outcome expectations multiplied by outcome expectancies) of exercise predict exercise behavior among South Asian college students?
2. To what extent did self-efficacy to participate in exercise predict exercise behavior among South Asian college students?

3. To what extent did self-efficacy to overcome barriers of exercise predict exercise behavior among South Asian college students?

4. To what extent did self-control toward exercise predict exercise behavior among South Asian college students?

5. To what extent did social support for exercise predict exercise behavior among South Asian college students?

6. To what extent did generation immigration to the United States (first or second) predict exercise behavior among South Asian college students?

7. To what extent did gender predict exercise behavior among South Asian college students?

**Hypothesis 1**

*Predictive hypothesis (H₀) 1.* South Asian college students who place a higher value on expectations for exercise will exhibit exercise behavior more often than South Asian college students who place a lower value on expectations.

*Alternative hypothesis (Hₐ) 1.* South Asian college students who place a higher value on expectations for exercise will exhibit exercise behavior less often than South Asian college students who place a lower value on expectations.

*Null hypothesis (H₀) 1.* There will be no significant difference between South Asian college students who place a higher value on expectations for exercise and South Asian college students who place a lower value on expectations for exercise in regard to how often they exhibit exercise behavior.
Hypothesis 2

Predictive Hypothesis \((H_0)\) 2. South Asian college students who have higher levels of self-efficacy to perform exercise will exhibit exercise behavior more often than South Asian college students who have lower levels of self-efficacy to perform exercise.

Alternative Hypothesis \((H_A)\) 2. South Asian college students who have higher levels of self-efficacy to perform exercise will exhibit exercise behavior less often than South Asian college students who have lower levels of self-efficacy to perform exercise.

Null Hypothesis \((H_0)\) 2. There will be no significant difference between South Asian college students who have higher levels of self-efficacy to perform exercise and South Asian college students who have lower levels of self-efficacy to perform exercise in regard to how often they exhibit exercise behavior.

Hypothesis 3

Predictive Hypothesis \((H_0)\) 3. South Asian college students who have higher levels of self-efficacy to overcome barriers to exercise will exhibit exercise behavior more often than South Asian college students who have lower levels of self-efficacy to overcome barriers to exercise.

Alternative Hypothesis \((H_A)\) 3. South Asian college students who have higher levels of self-efficacy to overcome barriers to exercise will exhibit exercise behavior less often than South Asian college students who have lower levels of self-efficacy to overcome barriers to exercise.

Null Hypothesis \((H_0)\) 3. There will be no significant difference between South Asian college students who have higher levels of self-efficacy to overcome barrier to exercise and
South Asian college students who have lower levels of self-efficacy to overcome barriers to exercise in regard to exercise behavior.

_Hypothesis 4_

_Predictive Hypothesis (Hₚ) 4._ South Asian college students who have higher levels of self-control toward exercise will exhibit exercise behavior more often than South Asian college students who have lower levels of self-control towards exercise.

_Alternative Hypothesis (Hₐ) 4._ South Asian college students who have higher levels of self-control toward exercise will exhibit exercise behavior less often than South Asian college students who have lower levels of self-control towards exercise.

_Null Hypothesis (H₀) 4._ There will be no significant difference between South Asian college students who have higher levels of self-control toward exercise and South Asian college students who have lower levels of self-control towards exercise in regard to exercise behavior.

_Hypothesis 5._

_Predictive Hypothesis (Hₚ) 5._ South Asian college students with higher levels of social support for exercise will exhibit exercise behavior more often than South Asian college students with lower levels of social support for exercise.

_Alternative Hypothesis (Hₐ) 5._ South Asian college students with higher levels of social support for exercise will exhibit exercise behavior less often than South Asian college students with lower levels of social support for exercise.

_Null Hypothesis (H₀) 5._ There will be no significant difference between South Asian college students with higher levels of social support for exercise and South Asian college students with lower levels of social support for exercise in regard to exercise behavior.
Hypothesis 6.

*Predictive Hypothesis (H₁)*: South Asian college students who are first generation immigrants to the United States will exhibit exercise behavior more often than South Asian college students who are second generation immigrants to the United States.

*Alternative Hypothesis (Hₐ)*: South Asian college students who are first generation immigrants to the United States will exhibit exercise behavior less often than South Asian college students who are second generation immigrants to the United States.

*Null Hypothesis (H₀)*: There will be no significant differences between South Asian college students who are first generation immigrants to the United States and South Asian college students who are second generation immigrants to the United States in regard to exercise behavior.

Hypothesis 7.

*Predictive Hypothesis (H₁)*: South Asian college students who are women will exhibit exercise behavior more often than South Asian college students who are men.

*Alternative Hypothesis (Hₐ)*: South Asian college student who are women will exhibit exercise behavior less often than South Asian college students who are men.

*Null Hypothesis (H₀)*: There will be no significant differences between South Asian college students who are women and South Asian college students who are men in regard to exercise behavior.

**Delimitations**

This study was delimited to South Asian college students attending classes at two large public universities in the state of Ohio. To be included in the study the college students must be of either Pakistani, Indian, Bangladeshi, Nepali, Bhutanese or Sri Lankan
descent. Descent implying that either one of their parents is South Asian or the participant themselves have been born in South Asia. Time is a delimitation in this study as participants in the pilot study will be asked about their exercise habits during the winter when exercise could be less in general. In the main phase of the study students will be asked about their exercise habits during spring months, which could be different from winter months. It is important to note that the construct of environment was not measured during this study, meaning the context in which the environment plays a role in exercise behavior is not being addressed. It has been acknowledged that the gym “environment” may be a determinant of exercise for South Asians given they are not accustomed to this environment in their native land. Another delimitation is that the students must be enrolled as either part-time or full-time students between the dates 03/26/2011 and 06/26/2011 considering the responses were collected during this period. The data was collected for the pilot study during Winter Quarter 2011 and during Spring Quarter 2011 for the main phase of the study. The study was extended for two weeks into Summer Quarter 2011. The survey administered in the study was available for a period of three months.

Limitations

In the interpretation of the results of this study, the following limitations were considered:

1. The results were based on self-reported responses and could have included both participant bias and dishonesty.
2. Being a survey based study recall was a potential problem.
3. Participants may have misunderstood or misinterpreted some questions, thereby misrepresenting their responses. It was expected that pilot testing would help remove any ambiguities in the survey wording and responses.

4. Participants were not selected at random from a large population pool, but were limited to college students at two large public universities in Ohio.

5. The South Asian population represents smaller ethnic subgroups with differing beliefs and attitudes towards exercise behavior. One subgroup could have been overrepresented in this study leading to skewed results for the South Asian population as a whole.

6. Although demographic information was collected during this study the actual ethnicity of the participant (Bhutanese, Nepali, Sri Lankan, Pakistani, or Indian) was not being used as a covariate. It was expected that the difference in generation, first or second, would play a larger role for comparison in this study.

Assumptions

It was assumed that each participant in this study was able to read, understand, and interpret the questions included in the questionnaire. It was also assumed that the number of students repeating the questionnaire more than once would be minimal. It was also assumed that the recall questions included in the survey were concerned with mainly current life events rather than past life events enabling participants to respond with increased accuracy. It is assumed that since the exercise recall pertains only to the last seven days and not long in the past that the responses would not be flawed. Considering the majority of the questions did not ask about the past, but asked the participants to take into account certain statements and choose a response that best fits them, recall bias was
not assumed to be a problem. For example with the self-efficacy to perform exercise item
the participants were given a series of exercise activities and asked, “How confident are you
that you could perform the following behavior for at least 30 minutes continuously?” Very few
questions utilized retrospective recall.

The assumptions underlying multiple regression analysis were as follows (Daniels, 1995):

1. The predictor variables were nonrandom (fixed) variables. This assumption
   indicated that any inferences that were drawn from a sample data applied only
to the set of values observed and not to some larger collection of the predictor
   variables.

2. For each set of values for the predictor variables, there was a subpopulation of
   the dependent variable’s values. It had to be assumed that the subpopulations of
   the values for the dependent variable were normally distributed.

3. The variances of the subpopulation of values for the predictor variables were all
equal.

4. The values for the dependent variable were independent. It assumed, that the
   values of the dependent variable selected for one set of the values for the
   predictor variables did not depend on the values of the dependent variable
   selected at another set of the values for the predictor variables.

Definition of Terms

Exercise Recall. For the purpose of this study the item exercise recall has been
defined as the minutes a college student has performed exercise behavior in his or her free
time that uses large muscle groups and makes their heart move faster for the past seven
days.
**Outcome expectancies.** For the purpose of this study outcome expectancies were defined as the value a person places on the probable outcomes that result from performing exercise behavior. Each statement was scored on a numerical scale from 0-4.

**Outcome expectations.** For the purpose of this study outcome expectations were defined as the anticipation of the probable outcomes that would ensue as a result of engaging in the exercise behavior. Each statement was scored on a numerical scale 0-4.

**Expectations.** For the purpose of this study expectations were defined as the product of the outcome expectations (0-4) multiplied by the outcome expectancies (0-4).

**Reciprocal determinism.** For the purpose of this study reciprocal determinism was defined as the triadic reciprocity of causation among personal factors, environment, and behavior.

**Self-control.** For the purpose of this study, self-control to perform exercise has been defined as the ability of the college student to set exercise goals, keep track of their progress towards their exercise goals, and understand the personal rewards from performing exercise behavior. Each statement was scored on a numerical scale 0-4.

**Self-efficacy to perform exercise.** For the purpose of this study, self-efficacy to perform exercise has been defined as the confidence a person has, presently, to participate in exercise. In this study the college students are asked to rate their confidence to perform different types of exercise for at least 30 minutes. Each statement was scored on a numerical scale 0-4.

**Self-efficacy to overcome impediments.** For the purpose of this study self-efficacy to overcome impediments was defined as the confidence that a person has in overcoming
barriers while performing a given behavior. Each statement was scored on a numerical scale 0-4.

*Social Support.* For the purpose of this study social support was defined as the help obtained through social relationships and interpersonal exchanges. Each statement was scored on a numerical scale 0-4.

*South Asian origin.* For the purpose of this study South Asian origin was defined by being of either Pakistani, Asian Indian, Bangladeshi, Nepali, Bhutanese or Sri Lankan descent. One or both parents could be of South Asian origin. This means the participant could be born in the United States or in South Asia, but then migrated to the United States.

*Summary*

This chapter explored the prevalence of exercise in college students and South Asians while examining the benefits and potential dangers of not participating in regular exercise. A justification for this study was also stated in this chapter, addressing the gap in the literature pertaining to predictors of exercise behavior for South Asian college students. The research questions, hypotheses, delimitations, and limitations of the proposed study were explicitly addressed in this chapter. The next chapter will focus on a review of the current literature pertaining to South Asians, college students, exercise, and the constructs of the social cognitive theory applied to exercise behavior. Chapter two will also describe interventions applied to South Asians and college students with regard to exercise behavior, as well as discuss the broad application of social cognitive theory in health education.
Chapter 2

Review of the Literature

Introduction

This literature review is intended to outline the existing information pertaining to exercise, college students, persons of South Asian descent, and social cognitive theory. There are insufficient resources predicting exercise among South Asian college students thereby not permitting an extensive literature review of that topic. In replacement, resources concentrating on exercise and college students, exercise and South Asians, and the application of the social cognitive theory are further explored.

Before performing the study a preliminary investigation of resources was necessary to compile present data regarding the topic. The databases were accessed through the University of Cincinnati’s Health Sciences Library. CINAHL, ERIC, Medline, and HaPI (Health and Psychosocial Instruments) were the databases used for this inquiry. Key search terms used were exercise prevalence, college students and exercise, South Asians and exercise, Asian Indians and exercise, social cognitive theory and exercise, exercise interventions, and South Asian exercise interventions. Approximately forty-two articles related to exercise prevalence in all populations, South Asians, exercise interventions and the social cognitive theory were analyzed for this literature review. The remainder of this chapter will be dedicated to an in-depth exploration of the information gathered from this investigation.

Prevalence of Exercise

Misconceptions concerning the time spent and intensity level of physical activity recommended for health benefits is a difficulty associated with the lack of physical activity in the U.S. According to Healthy People 2020 the recommended amount of physical activity
is either 75 minutes a week of vigorous physical activity or 150 minutes a week of moderate physical activity. Jogging, swimming, and aerobic dance are considered vigorous activity, while housework and walking are considered moderate physical activity (Healthy People 2020, 2010). Considering many Americans are unaware of the recommendations they either do not participate in physical activity enough or at all.

Numerous studies have been done attempting to explore the prevalence of exercise in the United States. A study in California attempted to establish the prevalence of physical activity in a large population of adults born between 1902 and 1982. The results of the questionnaire showed that only twenty-two point three percent and thirty-seven point four percent of Californian adults meet the recommended guidelines of moderate and vigorous activity per week, respectively. Note that the guidelines for recommended levels differed in this study, defining recommended moderate physical activity to be done 30 minutes per day five days a week, while recommended levels of vigorous physical activity should be participated in 30 minutes at least two days a week. This study further explains that the results presented here are uncharacteristically high, explaining that many national surveys have estimated that twenty five percent of U.S. adults meet the guidelines for physical activity, while only six percent of adults participate in vigorous physical activity each week (Hawkins, Cockburn, Hamilton, & Mack, 2004). Although, the estimates may differ from study to study each suggest that the majority of the U.S. population fails to reach recommended levels of exercise.

One study by Macera (2005) and colleagues used data collected from the 2001 Behavioral Risk Factor Surveillance System, a random-digit dial telephone survey that questioned adults 18 years and older in regard to health conditions and risk behaviors.
Physical activity whether moderate or vigorous and the time spent each day engaged in these activities was assessed. The researchers concluded that the prevalence of the recommended amounts of physical activity for men of healthy weight and overweight (established by BMI) was fifty percent. For women of healthy weight the prevalence was fifty percent while only thirty percent of overweight women were getting the recommended amounts of physical activity. The study went on to show that among the three ethnicities compared (African American, Caucasian, and Hispanic) Hispanics had the highest prevalence of recommended physical activity while African American, and even more so African American women, had the lowest (Macera et al., 2005). Additional studies have shown even lower levels of exercise prevalence among distinct U.S. populations.

The South Asian population is an ethnic group unaccounted for in many exercise assessments. The prevalence of physical activity in a survey study of Asian Indian immigrants in the United States reported that fifty percent of the respondents followed a physical activity routine (Misra, Patel, Davies, & Russo, 2000). Although, fifty percent of the population being physical active is high relative to previous populations mentioned it is important to note that fifty percent of population was not necessarily getting recommended levels of physical activity as it was not reported. It is also important to note that forty eight percent of those respondents stated difficulty in maintaining a physical activity regimen (Misra, Patel, Davies, & Russo, 2000). There is a lack of accurate physical activity reporting and a lack of data concerning exercise prevalence in South Asian populations in the literature. What could be found in the literature was a need for the development of exercise behavior in young adulthood for all populations, including South Asians.
Concerns with the prevalence of exercise levels among college students has led to research about this population. A national study of 4,728 college students reported that, among this population, fifty two point two percent participated in very low levels or no physical activity (Brown, 2005). Another study indicated that the obesity trend in adults is due to gradual weight gain in young adults. The study also addressed the decline in physical activity prevalence during the transition from high school to college from sixty five percent to thirty percent (Strong, Parks, Andersen, Winett, & Davy, 2008). This data suggests that college students need exercise interventions and that understanding the predictors of exercise in these populations could be crucial for the effectiveness of such programs.

Determination of Exercise among College Students

According to the U.S. Department of Health and Human Services the most dramatic decrease in physical activity is between the ages of 18 and 24, suggesting that college students account for this decline (Petosa, Suminski, & Hortz, 2003). Establishing the determinants of physical activity behavior among college students could be beneficial for the formation of effective physical activity interventions. Numerous studies have attempted to investigate the predictors of physical activity to gain insight into the lack of physical activity levels participated by college students. Here three of those studies will be discussed in detail, the determinants found in these studies are summarized in Table 2.1.

One such study explored the perceived barriers (obstacles) and perceived benefits (gains) of physical activity in college students. This study identified a number of variables that influence physical activity levels including demographics, cognition, social environment, and physical environment. This study utilized the Exercise Benefits/Barriers
Scale to differentiate between salient and minor predictors of physical activity. The results of this study determined that the most significant perceived benefits that mediated physical activity participation for college students were feeling better, task improvement (less tired/mental alertness), seeing physical activity as a pleasurable activity (meet new people/contact with friends), disease prevention, and ranked highest was improved physical performance. The most important perceived barriers to performing physical activity were either facility obstacles (facility too far away/inconvenient facility schedule) or fatigue. In addition this study stated that, although these variables ranked high as predictors of physical activity, there was little correlation between them (Brown, 2005). This suggests that there is a need for more in-depth research to identify the complex interactions of factors that determine exercise in college students.

Research testing the interactive relationship between sedentary behaviors and exercise behaviors was performed by Buckworth and Nigg (2004) to study mediators of physical activity in college students ages 18-24. Here emphasis was placed on access (work needed to obtain activity) and motivation (reinforcing value of activity) as decision-making factors for college students to perform physical activity behavior. A strong correlation between age and sedentary behavior was apparent; the older the student the more often they engaged in sedentary behavior (i.e. computer usage, studying). Social support was found to be a strong predictor of physical activity in male college students, while television watching competed with active behaviors in women (Buckworth & Nigg, 2004). These results indicate that physical activity programs that target not only physical activity behaviors, but sedentary behaviors as well could prove effective.
A variety of determinants may play a role in physical activity among college students as studied by Nelson and colleagues (2009). In this study focus groups and one-on-one interviews were used. A variety of factors were mentioned in the study as possible deterrents of physical activity; sleep deprivation, stress, and alcohol or drug use. The study separated the results into qualitative themes of factors influencing physical activity behavior that students mentioned most regularly. These determinants included lack of time for physical activity, negative experiences with the campus recreational center (i.e. overcrowding, intimidation, and unfamiliarity with proper exercise machine usage), lack of motivation to perform physical activity behavior, and insufficient social support to perform physical activity behavior (Nelson, Kocos, Lytle, & Perry, 2009). These determinants suggest that many college students lack the self-efficacy to perform exercise behavior, the knowledge to perform exercise behavior, and the social support. In each of the studies aforementioned there is a theme among determinants of exercise in college students, most notably the need for social support to perform exercise as well as impediments associated with facility barriers.

Table 2.1

*Summary of Salient Determinants of Exercise among College Students*

<table>
<thead>
<tr>
<th>Study</th>
<th>Determinants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown, 2005.</td>
<td>• Feeling better, task improvement, seeing physical activity as a pleasurable activity, disease prevention, and improved physical performance</td>
</tr>
<tr>
<td>Buckworth &amp; Nigg, 2004.</td>
<td>• Social support</td>
</tr>
<tr>
<td>Nelson, Kocos, Lytle, &amp; Perry, 2009</td>
<td>• Lack of time for physical activity, lack of motivation to perform physical activity behavior</td>
</tr>
</tbody>
</table>
Brown, 2005.


- Facility obstacles (facility too far away/inconvenient facility schedule)
- Negative experiences with the campus recreational center (i.e. overcrowding, intimidation, and unfamiliarity with proper exercise machine usage),

**Determinants of Exercise among South Asians**

Although the literature on exercise among South Asians is scarce, there are some studies dedicated to exploring the predictors of exercise in this population. These determinants are listed in Table 2.2.

Researchers attempted to determine the prevalence and determinants of physical activity among Pakistani, Indian, Sri Lankan, and Fiji immigrants (all referred to as Asian Indian in this study) in New Zealand. A lifestyle questionnaire was developed to test a number of variables including weight perception, demographics, nutritional habits, as well as the perceived negatives and positives associated with physical activity. Many older Asian Indian immigrants identified health and medical reasons as the most important motive for participating in physical activity. This group also identified fear of injury and illness due to physical activity as an obstacle to participating at greater levels (Kolt, Schofield, Rush, Oliver, & Chadha, 2007). It is important to note that similar results from older Asian Indians residing in the U.S. have been reported (Kalavar, Kolt, Giles, & Driver, 2005).

A study in England concentrated on the barriers associated with physical inactivity in people of Pakistani and Indian descent diagnosed with Type II diabetes. Considering that diabetes is four times more common among South Asians living in the UK than the general population preventive measures need to be taken. Investigators explored the beliefs and
attitudes this population has regarding physical activity by utilizing in-depth personal interviews. Out of the 32 interviews all stated that they were aware of the health benefits of physical activity, but only seven reported making a concerted effort to make it part of their lifestyle. Many of the respondents stated that obligations to others and lack of time kept them from performing physical activity. This could be a result of the strong work ethic associate with both Pakistani and Indian cultures. Women participants stated that they were immigrants in the UK and were not acclimated to spending time outside, reporting that fear and shame mediated their lack of physical activity. Many respondents, both men and women, stated that the lack of culturally sensitive facilities inhibited them from following their physician’s advice (Lawton, Ahmed, Hanna, Douglas, & Hallowell, 2006). Considering many South Asians have different religious beliefs and values than the general American population could suggest that colleges do not have proper facilities to allow this groups to feel comfortable performing physical activity. This study gave substantial insight into the cultural barriers South Asians face to perform exercise.

Trends of physical inactivity are not isolated to the United States, but are becoming increasingly apparent in Indian school children. In Indian schools where the children come from higher income homes the prevalence of overweight can be as high as thirty three percent. One study has examined the determinants of sedentary lifestyle among Indian youth in an attempt to bring awareness to the problem. This study reported that changes in lifestyle, particularly urbanization, has led to physical inactivity among Indians. In addition, the study suggests that the increased desire for sedentary pursuits (i.e. TV watching, computer usage, and video games) as well as intense academic competition among school-aged children have led to physical inactivity. The study also suggests that the lack of
playgrounds at many schools as well as no physical education courses have prohibited Indian youth from developing the skills to perform physical activity behavior (Bhave, Bavdekar, & Otiv, 2004). Without the development of physical activity behavior as a child it is less likely that college-aged and adult South Asian populations will begin a physical activity routine. It is important to note that the intense academic competition determinant may be applicable to South Asian college students in the United States as they may believe exercise behavior may interfere with academic successes.

South Asians are a high-risk ethnic group for premature coronary heart disease (CHD) and diabetes. This study attempted to understand what factors influence physical activity in South Asian women (Indian, Pakistani, Bangladeshi, or Sri Lankan descent) for primary and secondary prevention purposes. South Asian women ages 26-70 years old diagnosed with CHD and/or non-insulin dependent diabetes were selected to participate in one on one interviews. Results indicated that many of these women perceived harmful effects from participating in physical activity behavior like fatigue, dizziness, or shortness of breath. Many of the women expressed fear of going beyond their “body limit,” further suggesting that they lacked the confidence to perform physical activity. Many of the women also felt they lacked knowledge about appropriate physical activity and were not receiving sufficient information from their physicians. They did, however, report that weight loss, socialization, and increased independence as a result of physical activity motivated them to perform the behavior. Also mentioned was the view that physical activity beyond housework chores was a selfish act or that performing physical activity in public was uncomfortable (Sriskantharajah & Kai, 2006). This data suggests that South Asian women
may not have the skills to perform exercise and if those could be developed their self-efficacy to perform exercise may increase.

Table 2.2

Summary of Salient Determinants of Exercise among South Asians

<table>
<thead>
<tr>
<th>Study</th>
<th>Determinants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kolt, Schofield, Rush, Oliver, &amp; Chadha, 2007</td>
<td>• Health and medical reasons</td>
</tr>
<tr>
<td>Lawton, Ahmed, Hanna, Douglas, &amp; Hallowell, 2006</td>
<td>• Obligations to others and lack of time</td>
</tr>
<tr>
<td></td>
<td>• Lack of culturally sensitive facilities</td>
</tr>
<tr>
<td></td>
<td>• Urbanization</td>
</tr>
<tr>
<td></td>
<td>• Increased desire for sedentary pursuits (i.e. TV watching, computer usage, and video games)</td>
</tr>
<tr>
<td></td>
<td>• Intense academic competition</td>
</tr>
<tr>
<td></td>
<td>• Perceived harmful effects from like fatigue, dizziness, or shortness of breath</td>
</tr>
<tr>
<td>Bhave, Bavdekar, &amp; Otiv, 2004.</td>
<td>• Lack of confidence or self-efficacy</td>
</tr>
<tr>
<td></td>
<td>• Fear</td>
</tr>
<tr>
<td></td>
<td>• Lacked knowledge about appropriate physical activity</td>
</tr>
<tr>
<td>Sriskantharajah &amp; Kai, 2006</td>
<td>• Weight loss, socialization, and increased independence</td>
</tr>
</tbody>
</table>

Applications of Social Cognitive Theory in Health Education

The social cognitive theory can be applied to various health education programs including prevention programs, predicting health behaviors, and interventions. It has been used in behavior research to predict condom use, fruit and vegetable consumption, heavy drinking, and physical activity among diverse populations. It has also been applied to interventions including smoking cessation programs and diabetes education programs (Table 2.3). The advantage of using such a theory is that it can be easily applied to many types of health education programs (Sharma & Romas, 2008). Here the discussion will
focus on a smoking cessation intervention, a mammography screening program, and a study targeting aggressive behavior resulting from community violence.

Table 2.3

Examples of Applications of Social Cognitive Theory in Behavioral Research and Primary, Secondary and Tertiary Prevention

<table>
<thead>
<tr>
<th>Behavioral Research</th>
<th>Primary Prevention</th>
<th>Secondary &amp; Tertiary Prevention</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Predicting aggressive behavior among children exposed to community violence</td>
<td>• Smoking cessation intervention</td>
<td>• Self-management programs for diabetics</td>
</tr>
<tr>
<td>• Predicting obesity prevention behaviors among preadolescents in India</td>
<td>• Smoking prevention programs</td>
<td>• Mammography screening among Mexican immigrant women</td>
</tr>
<tr>
<td>• Predicting physical activity behavior</td>
<td>• Heavy alcohol use prevention among adolescents</td>
<td>• Coping with childbirth educational interventions for women</td>
</tr>
<tr>
<td>• Predicting risky behaviors related to HIV in African American women</td>
<td>• Internet physical activity intervention</td>
<td>• Predicting self-efficacy and self-care behaviors of recent kidney transplant recipient</td>
</tr>
<tr>
<td></td>
<td>• Injury prevention strategies for restaurant working teens</td>
<td>• Improving condom usage among people with HIV</td>
</tr>
</tbody>
</table>

Initially, smoking interventions directed toward youth focused on prevention, but with the increased prevalence of smoking among youth the focus is now on cessation. Here a review of a smoking cessation program for youth is described whereby the researchers used the constructs of the social cognitive theory to develop a three-year mass media campaign. The media markets in metropolitan areas of Texas, South Carolina, Florida, and Wisconsin were targeted. Educational objectives for the campaign were used including increasing confidence to resist smoking in high-risk situations (self-efficacy), increase expectations that good things will happen if you quit smoking completely (outcome expectations), increase perception of peer approval if you stop smoking (situational
perception), and increase knowledge about actual prevalence of smoking in youth (knowledge). Pre and post test surveys gathering information about smoking perceptions and usage were distributed at schools within the experimental cohort and a pre and post telephone survey was administered to youth not exposed to the mass media campaign.

Results showed that after the three-year period youth in the experimental cohort had significantly higher outcome expectations associated with smoking cessation than the comparison group, but there was no significant change in the other constructs. Moreover, the results did not show a significant decline in smoking among the experimental cohort when compared to the control group. Both groups reported the same average number of cigarettes smoked per week (Solomon et al., 2007). This data implies mixed results for the mass media campaign, but it does suggest that the constructs of social cognitive theory may play a role in perceived beliefs about particular behaviors.

Due to the ability of the social cognitive theory to explain health behaviors it was applied to an intervention investigating the decline in participation for the Mayo Mammography Health Study (MMHS). Women were mailed a recruitment packet with information regarding the study and a survey, but the response rate was low. 90-minute group interviews were used as focus groups for those who responded to the recruitment packet and those who did not. The basis for analyzing the data was done by application of the social cognitive theory. Respondents indicated that by observing breast cancer experiences of their friends and family motivated them to participate in the survey, an example of the construct outcome expectancies. Women recruited for the survey were cancer-free and healthy causing many of the non-respondents to indicate that the benefits of participating were not applicable to them, which could be an example of low outcome
expectations. Many non-respondents also said that procrastination and/or fear kept them from filling out the survey. Further analysis of this suggests that it may be an emotional coping mechanism as many people want to avoid thoughts of cancer. Another reason why many women did not participate in the survey was because they felt they could not answer the questions correctly, they did not have the confidence or the self-efficacy to fill it out. The researchers were able to take the responses of the women and modify the recruitment packet in hopes of increasing participation rates (Sinicrope, et al., 2009). In this example the social cognitive theory was useful for the analysis of data.

In this next example researchers used social cognitive mediators to examine the association between aggressive behavior and community violence in suburban adolescents. Reciprocal determinism of the adolescents cognition, their environment, and their behavior all interact to influence one another. This study assumed that when an adolescent witnesses violence (environment) it mediates their subsequent aggressive behavior (behavior) and causes them to ignore non-threatening environmental cues while being hypersensitive to any type of threat (cognition). A questionnaire was used to assess an adolescent’s lifetime exposure to violence. An aggressive behavior scale was distributed to the teachers to indicate aggressive students in the classroom. The results of the study imply that certain constructs of the social cognitive theory are distorted for many adolescents who have experienced community violence and act aggressively. Many adolescents situational perception are altered due to exposure to violence even at low levels in a suburban community. The results also indicate that the participants were unable to emotionally cope with violence and were not in an environment conducive to changing their aggressive behavior (Bradshaw, Rodgers, Ghandour, & Garbarino, 2009). Application
of the social cognitive theory allows researchers to dissect complex behaviors and explain the mediators that influence those behaviors.

*Applications of Social Cognitive Theory with Exercise Behavior*

According to the social cognitive theory, reciprocally influencing characteristics being the person, the environment, and the behavior all interact to determine behavior (Taymoori, Rhodes, & Berry, 2010). The constructs of outcome expectations, outcome expectancies, self-control, social support, self-efficacy, knowledge, and environment allow for explaining specific health behaviors. Here those constructs will be describe through health education programs targeting exercise behavior in several different populations.

Due to the increased levels in obesity, especially in youth and young adults, exercise interventions have come to the forefront in attempt to counteract the problem. Recent studies have shown that sixty-four of female Iranian adolescents do no participate in regular physical activity. A cross-sectional study targeting female youth distributed a questionnaire testing physical activity for the past six days as well as the constructs of the social cognitive theory. Social support, outcome expectations, outcome expectancies, self-efficacy, and self-control to perform physical activity were included. Interestingly, the researchers found that self-efficacy and outcome expectancies interacted with each other influencing physical activity behavior among this population. The data also suggested that social support from parents and siblings might lay the foundation for physical activity development and maintenance as the girls transition to adulthood (Taymoori, Rhodes, & Berry, 2010). Studies have shown that as the transition to adulthood, especially in women, can result in a steep decline of physical activity. The next study reviewed addresses this issue using the social cognitive theory.
Due to the lack of studies on women and exercise researchers developed a study comparing women with children and those without in a workplace physical activity program. The purpose of this study was to identify social cognitive theory constructs relevant to predicting physical activity in this population. A randomized control trial for a three-month physical activity intervention was implemented in Canada. After completion women with children and those without were given a questionnaire regarding physical activity behavior and the constructs of the social cognitive theory. The physical environment, self-efficacy, and social support were measured as well as a section indicating patterns in physical activity, times per week and minutes per session. Self-efficacy was the strongest predictor of physical activity among both groups of women. Women without children indicated that exercise could relieve stress and increase confidence (outcome expectations). Women with children reported that a lack of social support for childcare responsibilities prevented participation in physical activity behavior (Tavares, Plotnikoff, & Louicades, 2009). Here the social cognitive theory constructs were used to predict behavior, but it has also been applied to health interventions.

The social cognitive theory has also been applied to a randomized control trial for overweight and obese adults in the Raleigh-Durham, NC metropolitan area. Here two interventions were implemented, the control being a weight-loss podcast intervention and the enhanced intervention being a theory-based weight-loss podcast based on the constructs of the social cognitive theory. Both programs included two podcasts per week for twelve weeks discussing physical activity to lose weight and snack limitation, while the enhanced podcast included targeting knowledge, self-efficacy, outcome expectations, and outcome expectancies associated with physical activity, nutrition, and weight loss. Results
reviewed that those in the enhanced group engaged in vigorous activity more often than
the control group. Enhanced group participants also reported an increase in knowledge
about weight-loss, physical activity, and nutrition. Although an increased amount of weight
loss was seen within the enhanced group no significant changes in the constructs tested,
with the exception of knowledge, were apparent (Turner-McGrievy et al., 2009). Although,
this study could not show an increase in any of the constructs that predict physical activity
behavior, due to the resulting increase in weight loss compared to the control group does
lead to the belief that the social cognitive theory based intervention was more efficacious.

**Interventions associated with Exercise Behavior among College Students**

According to numerous studies approximately forty to fifty percent of college
students are physically inactive (Keating, Guan, Pinero, & Bridges, 2005). In response to
this an intervention was implemented at a state university in southeast United States
assigning physical activity homework to students enrolled in a health education course. A
control group with no assigned physical activity homework was used for comparison. One
third of the health course was dedicated to physical activity meaning one day a week
students, in either group, met at the university pool, track, soccer field etc. The group
assigned physical activity homework was required to keep a log of type, length, and
intensity of their physical activity outside the classroom. Pre and post questionnaires were
given to students in both groups, before and after completion of the course, to assess the
change in vigorous physical activity frequency, moderate physical activity frequency,
strength training exercises, and flexibility.

The results of the pre-test questionnaire indicated that thirty-five percent of the
students in both groups combined were getting the recommended amounts of vigorous
activity each week, higher than the national average. The pretest also revealed that students in the group assigned physical activity homework were slightly less active than those in the control group. After completion of the course the group assigned physical activity homework significantly increase their physical activity levels for weight-management compared to the control group. Moderate and vigorous physical activity, flexibility, and strength training significantly increased in both groups (Claxton & Wells, 2009). This study demonstrates that health courses that employ exercise participation one day a week may increase exercise participation in college students.

The lack of exercise behavior in college students motivated researchers to administer a type of intervention that had not been delivered to college student populations previously. A 12-week pedometer intervention was administered to test the initial, midpoint, and final average number of steps of students enrolled in a health fitness course at large university in southeast United States. Researchers took in to account the body mass index of each student, hypothesizing that the higher BMI would result in fewer steps. Students were required to wear the pedometer at least five days a week. Before students were educated on the recommended number of daily steps a baseline step count was retrieved during week one. The average number of steps for that week indicated that the students overall were “low active.” Student charted their number of steps using a computer program while also setting weekly goals for themselves. The results showed that at each interval, week one, week six, and week twelve, there was a significant increase in steps taken by underweight, normal weight, and overweight individuals. By week twelve only twenty five percent of the students were identified as “low active,” as the number of average steps increased from approximately 7,000 (Week 1) to 10,000 (Jackson & Howton,
2008). Although this type of intervention may increase consistent moderate exercise there is still a need for interventions to target vigorous exercise mediators among college students.

Project Grad (Graduate Ready for Activity Daily) was implemented as a 16-week health-related course for university seniors in South California. The intervention consisted of students attending a 50-minute lecture on exercise science and behavioral science and a one-hour and 50-minute activity class applying the concepts learned. The comparison or control course was a two-hour a week lecture on health-related topics. Considering students were in varying stages of change, each was addressed separately. Students deemed inactive would be guided toward daily moderate-intensity exercise, while students who performed vigorous-intensity exercise were given comprehensive instruction on flexibility and strength training techniques. Social support was provided for the students through the weekly activity class. At the end of the course interviews were done to assess the changes in exercise of the participants. Although the course had no significant effect on men, it did increase the leisure time energy expenditure, strength, and flexibility activities of the women participants. Project GRAD was able to increase the social support and self-efficacy to perform exercise for women. This discrepancy between sexes could be due to the fact that more of the male participants were already considered active (sixty five percent) as opposed to the female participants (forty-seven percent) (Sallis, Calfas, Alcaraz, Gehrman, & Johnson, 1999). This study emphasized utilizing both behavioral and experimental processes of change to increase exercise in the participants, demonstrating that dual approaches may be most efficacious. Common instruments used throughout the studies mentioned above are summarized in Table 2.4.
Table 2.4

Examples of Instruments used to Assess Exercise Behavior

| • Questionnaire to assess the participants:  
  - Self-efficacy to perform the behavior  
  - Self-efficacy to overcome impediments  
  - Outcome expectancies  
  - Outcome expectations  
  - Self-control  
  - Enjoyment  
  - Social support  
| • Weight-loss podcasts targeting:  
  - Knowledge  
  - Self-efficacy  
  - Outcome expectations  
| • Community education sessions for high-risk/overweight/obese populations including:  
  - Nutrition classes  
  - Cooking classes  
| • Exercise homework within a health education course logging exercise:  
  - Type  
  - Length  
  - Intensity  
| • Pedometer interventions  

Interventions associated with Exercise Behavior among South Asians

An exercise and diet intervention was administered to South Asians 50 years or older living in New Zealand. On three occasions, throughout the intervention, the participants BMI, blood serum, adipose deposit, and other vitals related to obesity were measured. An initial group education session, discussing benefits of increased exercise as well as instructions on how to eat healthy as a South Asian in New Zealand, was administered to a community group. Informational handouts, pedometers, and diaries to keep a log of exercise and diet were distributed to individuals. Monthly group session included cooking lessons, a pedometer club, and weigh-ins. Increase in exercise as well as diet change lead to a reduction in whole body fat and abdominal fat, improvement in
cholesterol, and a reduced risk for cardiovascular disease. Although, many researchers have argued that genetics plays a role in the high rate of cardiovascular disease in South Asians, this study has shown that lifestyle changes can alleviate some of the risks. This study further states that its success could have been due to the emphasis of small behavioral modifications that lead to a significant lifestyle change not only in the participant’s lives but in their family members as well (Rush, Chandu, & Plank, 2007).

As mentioned earlier, South Asians are at a higher risk for developing heart disease than other populations. This study compares South Asian and whites, with coronary artery disease, enrolled in an outpatient cardiac rehabilitation program over a three-year period. The difference in the two populations were that the South Asians tended to be male, have lower BMI’s, be nonsmokers, and diabetic. Patient demographics, presence or absence of cardiovascular risk factors, medications being taken, compliance with the rehabilitation, and exercise outcomes were measured. For the purpose of this literature review the exercise outcomes will be the focus.

Adherence to the six-month exercise program, a part of the cardiac rehabilitation, was low in both populations, but South Asians were less likely to complete. Among women, South Asians were significantly less likely to comply with the exercise routine as white women. During the exercise tolerance test South Asians tended to show the largest change, demonstrated by their ability to reach eighty-five percent of their target heart rate compared to whites. It is important to emphasize that there was equal access to this program for both populations and no cost barrier, but still South Asians were less likely to participate in the full six-month exercise program. For the South Asians that did complete the study there was a higher change in exercise capacity than in the white population.
(Banerjee, Gupta, & Singh, 2007). This study indicates that there are barriers for South Asians to adhere to an exercise intervention other than cost and access. It is apparent that when those barriers can be addressed and a program is developed that South Asians will adhere to, they are able to benefit to a greater extent.

Summary

The purpose of Chapter two was to survey the literature focusing on the determinants of exercise in college students and South Asians, while incorporating theory-based intervention strategies that have proven successful within these populations. Much of the literature concentrated on South Asian adults or adolescents, but there was a lack of research directed toward South Asian college students. Interventions for South Asians addressing exercise behavior were difficult to find as many studies focused on diabetes prevention and a reduction in coronary heart disease as their purpose, using exercise as a secondary prevention method. The next chapter will explore the details of the study being performed here. The study design, rationale behind the study, instrumentation, and data collection and analysis will be clearly defined.
Chapter 3

Methods

Introduction

In chapter one the assumptions, limitations, delimitations, hypotheses, and operational definitions associated with exercise prevalence in adults were discussed. In chapter two a review of the literature revealed predictors of exercise in South Asian populations as well as college students. Chapter two also discussed the applications of the social cognitive theory as it relates to health education, specifically exercise. The purpose of Chapter three is to explain the rationale behind the study being performed here as well as discuss the methods and instruments used for such a study. The purpose of this study is to investigate the predictors of exercise behavior among college students of South Asian descent so that other researchers may apply this knowledge to create effective exercise interventions.

Study Design and Rationale

Given that forty percent of the South Asian population in the United States is either overweight or obese this study attempts to predict exercise behavior in South Asian college students (Misra, Patel, Davies, & Russo, 2000). Considering, exercise behavior begins to wane in the transition from high school student to young adult, college students were identified as a high-risk population for physical inactivity. Studies have shown that the development of exercise behavior in college increases the likelihood of exercise maintenance in older adulthood, as well as prevent chronic disease (Sallis, Calfas, Alcaraz, Gehrman, & Johnson, 1999). By targeting college students to determine exercise behavior predictors could increase the efficacy of future studies.
Diabetes is more prevalent in South Asian populations than their white counterparts, nineteen percent as opposed to four percent, respectively (McKeigue, Shah, & Marmot, 1991). To decrease the risk of diabetes and coronary heart disease among this high-risk population exercise behavior must be induced, as it is modifiable, unlike genes or gender. This study investigates the predictors of exercise behavior in a population that is not well represented in the literature. The expectation for this study is that the results can lay the ground work for more studies resulting in the creation of exercise interventions for South Asian college students.

The preliminary phase of this study consisted of a test-retest reliability pilot before the main phase of the study could commence. This took place the beginning of Winter Quarter 2011. For this phase 27 South Asian students at University of Cincinnati participated in taking the paper form of the survey and then two weeks later re-taking the paper form of the survey. After analysis of the results of the two surveys a correlation coefficient was determined. A correlation coefficient of 0.70 or more allowed for the study to continue on to its main phase, but any lower score would mean revisions to the validated survey.

The main phase of the study is an observational study of college students during the Spring Quarter of 2011 enrolled at two large midwestern universities. The study design consisted of an electronic survey administered to the population via Survey Monkey™. The students were invited to participate in the study via email through postings on South Asian student organizations website as well on social media pages. The survey was available between the dates of March 29, 2011 and June 26, 2011. Social support, outcome expectancies, outcome expectations, self-control, and self-efficacy constructs of the social
cognitive theory were addressed in the survey. A exercise recall for the week prior to
taking the survey was also assessed in the survey. This will allow for comparing how active
students are to their scores from each construct. The survey consists of nine sections
evaluating the above-mentioned constructs and exercise behavior of each participant,
along with demographic questions. The survey consisted of multiple-choice questions
pertaining to the above constructs mediating exercise behavior utilizing a Likert Scale and
a system of numerical ratings, 0-4.

The type of Likert being used in this study does not utilized the typical Strongly
agree to Strongly disagree category which create some biases due to extreme answers. The
strength of the Likert scales used here was that the scales were based on frequency of
occurrence or degree of importance. The second strength of this five-point scale was that it
does not stretch the rating beyond what is optimum (i.e. a seven or nine point scale). The
third strength was summative nature of the scale, which gives a metric score. The fourth
strength was that, considering a Likert scale is the most commonly used scale, the target
population was familiar with it. Finally, the scales used in this study have either previously
been validated or were developed by the principal investigator of this study and then
validated by a panel of six experts (Appendix E).

The approach taken for the main phase of the study is that of a cross-sectional study
as it is one of the most commonly used research designs in health promotion. The
trademark of this type of design is that time is fixed and that samples are drawn from the
population at one time point as opposed to drawing samples over time (longitudinal).
Cross-sectional methods also allow for quantitative data collection that is considered much
easier to compile and analyze than qualitative data. This type of design functions to assess
relationships among variables or correlations (Crosby, DiClemente, & Salazar, 2006). In this study the relationship between the constructs of the social cognitive theory and exercise behavior are investigated.

However, a causal relationship among variables cannot be determined through cross-sectional design. It is also unable to determine directionality. For example, in this study, this means that high levels of self-efficacy may lead to exercise or exercise may lead to high levels of self-efficacy, each are equally plausible. Moreover, it is also possible that neither variable causes or influences the other, a common problem in correlational research. Although, cross-sectional design does have its limitations it can provide the foundation for more complex studies in the future. When experimental design is unethical or manipulation of variables impossible cross-sectional studies allow for a simple method of establishing correlation (Crosby, DiClemente, & Salazar, 2006).

In this study survey research will be utilized as well. The purpose of a survey, for this study, is to allow for the understanding of the characteristics of this particular population (Crosby, DiClemente, & Salazar, 2006). Meaning, this allows for the assessment of South Asian college students opinions and behaviors pertaining to exercise. A survey design will also allow for data to be collected quantitatively regarding the college students scores in each construct. Surveys allow for descriptive research, therefore attempting to provide data concerning who, what, when, where and how of exercise behavior in South Asian college students (Crosby, DiClemente, & Salazar, 2006).

Population

The participants in both phase of this study are college students identifying themselves as of South Asian descent. This means that, to participate in the study, one or
both of their parents must identify themselves as Bangladeshi, Bhutanese, Indian, Pakistani, Nepali or Sri Lankan. These students must be enrolled in a degree program, full-time or part-time during Winter (pilot study) and/or Spring Quarter (main phase) 2011 at either the Ohio University or the University of Cincinnati. The students could be either undergraduate or graduate. The study was conducted in a population of college students participating in student organizations associated with South Asian ethnicity at either of the two large midwestern universities. The sample of students that participated in the survey was 58. The students, participating in the main phase of the study, were informed in an Information Sheet approved by the UC IRB that the study was completely confidential and voluntary.

**Sampling and Sampling Procedure**

To acquire a large enough sample of South Asian college students sampling from two large midwestern universities was necessary. Using the student organization directory a list of ethnic groups represented at each university as well as their number of members was obtained (Table 3.1). These organizations must identify themselves with a South Asian ethnic group or culture to be considered for the study. It is important to note that these organizations are not exclusionary and that any South Asian college student enrolled at either Ohio University of University of Cincinnati may join these organizations. It is assumed that there is no difference between South Asian students who join these organizations and those that choose not. Considering South Asian students in these organizations were not contacted directly, only permission to join their organizations social media page was needed, by their president and/or administrators of the page
(Appendix A). Due to the nature of the study, being an electronic survey, there was little control over who chose to participate in the study.

To estimate the sample size the G Star Power 3.1.2 analysis program was used. For the majority of health promotion studies small to medium sample sizes are commonly used. For this study the effect size was chosen to be .25 based on the previous studies (Mehta, Sharma, & Bernard, 2010). The $\alpha = .05$ for this study. The power (1-Beta) = .80 using the total number of predictors to be six. The six predictors are the constructs of the social cognitive theory being assessed as predictors of exercise in this study. Using this data a sample size estimation of 62 was established (Erdfelder, Faul, & Buchner, 1996).

Table 3.1

*A List of the Student Organizations from Ohio University and University of Cincinnati Contacted to Participate in the Study.*

<table>
<thead>
<tr>
<th>Organization</th>
<th>University</th>
<th>Membership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indian Students Association</td>
<td>OU</td>
<td>108</td>
</tr>
<tr>
<td>Nepali Student Association</td>
<td>UC</td>
<td>14</td>
</tr>
<tr>
<td>Indian Students Association</td>
<td>UC</td>
<td>450</td>
</tr>
<tr>
<td>Hindu YUVA</td>
<td>UC</td>
<td>19</td>
</tr>
<tr>
<td>Sri Lankan Student Association</td>
<td>UC</td>
<td>22</td>
</tr>
</tbody>
</table>

*Instrumentation*

In the survey constructs of the social cognitive theory were tested; social support, self-efficacy to perform exercise behavior, self-efficacy to overcome impediments to participating in exercise, expectations (outcome expectations x outcome expectancies), and self-control. To assess these constructs along with exercise recall some instruments were adopted from the original developers, while other instruments were designed independently and validated by a panel of six experts. Attached is the consent, from Dr.
Sallis, to use his social support instrument and self-efficacy to overcome impediments instrument in my survey (Appendix C) and the validation accepted from the panel of six experts (Appendix D). Also, attached is consent from Dr. Rovniak to use her exercise goals questionnaire (Appendix C). An in-depth review of each construct tested along with the instrument used is included in this section.

To assess the level of exercise behavior of each student a one-week recall is presented at the beginning of the survey. The students were asked to recall their recent exercise behavior over the last seven days. For example the students were asked *Did you participate in any leisure time exercise (such as walking, yoga, aerobics, jogging, riding a bicycle, or any other activity that uses large muscle groups and make your heart beat faster) other than for your regular job or daily duties?* The student then marked *yes* or *no* for each day of the week. If the student marks *yes* then they were asked *how many minutes.* This is a way to assess the exercise the student is already involved. It is assumed that higher levels of exercise behavior will coincide with higher scores in each construct. This construct on the survey was validated by six experts after two rounds of modifications.

The construct of social support was tested in the survey by using a series of statements pertaining to regular exercise that could be said or done by a friend or family member of the participant. The participant will be asked to rate how often the statements described have been said or done over the last three months. The participants are asked to rate each question even if they are not presently attempting to exercise regularly. An example of one of the statements is *During the past 3 months, my family or friends:........Exercised with me.* The optional responses, using a Likert scale, being *none,*
rarely, a few times, often, very often, and does not apply. This portion of the survey was taken from the Social Support and Exercise Survey (Sallis et al., 1987).

The Social Support and Exercise Survey was developed by Dr. Sallis using college students as his target population. The psychometric properties of the Friends and the Family Social Support scales were evaluated separately. For the Family Support for Exercise scale factor overlap was assessed by evaluating correlation among the factors. The intercorrelation value for this scale was 0.42. A Cronbach’s alpha was used to measure internal consistency. The alpha for the Family Support for Exercise was 0.91, while the alpha for the Friends Support for Exercise was 0.84. The correlation coefficient for both the Family and the Friends Support for Exercise scales was measured to be 0.77 and 0.79, respectively (p<0.001). Participation and involvement factor of family (for the Family Support for Exercise Scale) was significantly correlated with age (r=0.22, p<0.01). The correlation between the Family and the Friends Support for Exercise scales and vigorous exercise were measured at 0.35 and 0.46, respectively (p<0.001) (Sallis, Grossman, Pinski, Patterson, & Nader, 1987).

The outcome expectations and outcome expectancies constructs have been combined in this survey and validated by the panel of six experts that reviewed it. It is a five-item scale where the participant will read a statement about exercise and rate, from one to five, how much they agree or disagree with the statement. A one rating being strongly disagree and a five rating being strongly agree. For example, Exercise:......Improves my physical appearance. The responses listed are strongly agree (5), agree (4), neither agree nor disagree (3), disagree (2), and strongly disagree (1).
The outcome expectancies, along with outcome expectations, comprise the expectations for each student based on the scores from this scale. The outcome expectancies is the value that the participant places on the outcome expectations from performing exercise. This section of the survey is listed next to the Outcome Expectations ratings, where the student is asked *Does it matter?* For example, if a student rates that exercise improves their physical appearance as a five they then must rate how much improving their physical appearance matters to them on a scale from one to five. A one rating being *it will not matter at all* and a five being *it will matter very much.* Studies have shown that when a participant's expectations (outcome expectations x outcome expectancies) is high they are more likely to perform the given behavior (Sharma & Romas, 2008).

The construct of self-control, labeled Exercise Goals on the survey, was obtained from the Exercise Goal Setting Scale with permission from Dr. Rovniak (Rovniak, Anderson, Winett, & Stephens, 2002). An example of a statement used in the survey is, *I usually set dates for achieving my exercise goals.* The students were then asked to rate how much each statement describes them from one to five. A one being a statement that *does not describe me* and a five being a statement that *describes me completely.* It is assumed that the more able the student is to set exercise goals the more exercise they participate.

The psychometric properties of Dr. Rovniak's Exercise Goal Setting Scale are as follows. The internal consistency for this scale was measured using a Cronbach's alpha to be 0.89. A pilot study for the test-retest reliability of this scale was done and the correlation coefficient was measure to be 0.87. The statements used in this scale were developed from
the pilot study as well as adopted from Weinberg’s recommendations on goal setting strategies (Rovniak, Anderson, Winett, & Stephens, 2002).

The section of the survey pertaining to ones self-efficacy to perform exercise behavior consists of five items addressing the participant’s confidence and capability of performing certain exercise behaviors. Using a Likert scale (not at all sure, slightly sure, moderately sure, sure, totally sure) the participant was asked to rate their confidence to perform each type of exercise for at least 30 minutes continuously. For example, Participate in an aerobic class, is as item included in the survey. The results suggested that higher scores of self-efficacy correlated with higher levels of exercise behavior (McAuley, White, Rogers, Motl, & Courneya, 2010). This section of the survey was validated by a panel of six experts after the necessary modifications were made.

The next portion of the survey consisted of five items involving self-efficacy to overcoming impediments. The instrument used here was obtained, with permission, from “the development of self-efficacy scales for health-related diet and exercise behaviors” (Sallis, Pinski, Patterson, Grossman, & Nader, 1988). Barriers to exercise from the scale were taken to represent the obstacles and impediment the participants may face when deciding whether or not to perform exercise behavior. The participant is asked how confident they are that they can do each statement consistently for at least six months. There responses are based on a Likert scale (not at all sure, slightly sure, moderately sure, sure, and totally sure). One of the statements presented on the survey is Stick to your exercise program even when you have excessive demands from school or work. This section is meant to allow the participant to decide how confident and capable they are to surmount the given obstacle.
The psychometric properties of the self-efficacy to overcome impediments scale developed by Dr. Sallis are as follows. The items from this scale were based on research indicating that areas of negative affect, resisting relapse, and making time for exercise are correlates of maintaining regular exercise. The internal consistency, measured using a Cronbach’s alpha, was 0.82. A pilot study to determine the correlation coefficient was also done using a test-retest reliability over a two week period. This was measured as 0.90 (Sallis, Pinski, Patterson, & Nader, 1988).

The six instruments used were compiled to create a survey assessing the constructs of the social cognitive theory as it pertains to exercise. The questions and statements presented are meant to investigate the predictors of exercise in South Asian college students. The survey consists of six sections covering each construct being tested in this study. A copy of the completed survey can be found in Appendix B. Included in the complete and validated survey were demographic questions about the participant. These questions include age, gender, nationality (Nepali, Bhutanese, Pakistani, Indian, Sri Lankan or American-born), whether or not they were a first or second generation immigrant, marital status, educational level, and major.

The literature review for this study suggested that gender plays a role in exercise behavior in South Asians. Immigrant South Asian women felt ashamed to participate in exercise as they were not accustomed to spending time outside as opposed to their native counterparts. These women also reported that a lack of culturally sensitive facilities kept them from participating in exercise (Lawton, Ahmed, Hanna, Douglas, & Hallowell, 2006). South Asian women also reported the barrier of feeling selfish for participating in physical activity other than performing housework (Sriskantharajah & Kai, 2006). In another study
South Asian women had significant difficulty in complying with a six-month exercise program compared to their male South Asian counterparts, twenty five percent and forty-three percent, respectively (Banerjee, Gupta, & Singh, 2007). Due to these findings gender was included as a covariate for this study, along with the previous mentioned constructs of social cognitive theory.

Another covariate that was also included in this study was whether or not the participant was a first or second generation immigrant (i.e. immigration generation). It is assumed that there would be cultural, social, and personal factors that would differ between a South Asian born in the United States and a South Asian that has come to the United States to enroll in college. Considering the culture of the South Asian region is very similar between the countries, nationality was not used as a covariate.

The permission letter from the University of Cincinnati Institutional Review Board (IRB) for the study, including the preliminary phase and main phase is attached (Appendix F). The CITI Human Subject Research course has been completed prior to submission to the IRB. The Ohio University was contacted prior to beginning this research study to gain permission to use their campus to gain access to a larger population of South Asians. The email stating their permission is also attached (Appendix I).

*Data Collection*

The data from study was collected over a six-month period starting in January of 2011 and ending at the end of June of 2011. January 2011 through March 2011 was pilot study data collection, while the remainder of the time was main phase data collection. This will allow the student members to access the survey until June 26th. To motivate students to participate an initial email discussing the study was sent out to the leaders of South
Asian student organizations, making them aware of the study, and gaining permission to post the link on their social media webpages. These emails described the study and requested permission to use the organization as a vehicle to access the South Asian population. A copy of the initial email sent to the organizations leaders is attached (Appendix A).

Data Analysis

Basic statistical procedures were used to analyze the data in this study. Descriptive statistics, like frequency and mean, were carried out for each construct tested in this study. Inferential statistical tests were also performed to draw conclusions about the data. Stepwise multiple regression analysis was used to predict the variance of exercise behavior that could be attributed to any of the constructs tested; self-efficacy to perform exercise, self-control, social support, outcome expectancy value, or self-efficacy to overcome impediments. All of the data analysis was done using SPSS 14.0 software. The alpha level for these tests was set at 0.05. For each scale that was developed for this study (self-efficacy to perform exercise, exercise recall, and expectations) the psychometric properties such as a Cronbach’s alpha for internal consistency will be obtained after data is collected for the main phase of the study. Internal validity was established in the preliminary phase (test-retest reliability).

Scoring for this study is described as follows. The seven-day exercise recall scale is a metric variable and a range from 0 to 500 minutes of exercise, maximum, each day was used to score this variable. For purposes of regression analysis this was the dependent variable, while each construct, individually scored, acted as the independent variable. If a
participant responded at more than 500 minutes of exercise per day that response was deleted and considered dishonest.

For the expectations scale there are 5 items with a highest rating of 4 corresponding to a response of 5 for both outcome expectations and outcome expectancies. The lowest possible score being a 0 corresponding to a response of 1. By multiplying 4 x 4 for 16 and then multiplying that by the number of items, 5, the highest possible score for this construct would be an 80. The lowest possible score would be 0 as 5 multiplied by 0 is 0.

For the construct of self-control, labeled Exercise Goals in the survey, a rating scale, again was used. For the highest score a response of a 5, corresponding to a score of 4 was multiplied by the number of items, 10 for a score of 40. The lowest possible score for this scale would be 0 as 10 multiplied by 0 is 0.

The self-efficacy to perform exercise scale utilized a 5-point Likert Scale. Each response corresponded to a score, not at all sure (0), slightly sure (1), moderately sure (2), sure (3), and totally sure (4). The highest possible score for this construct can be found by multiplying the maximum score the participant can receive, 4, by the number of items, 5, for a total of 20. The lowest possible score for this scale would be a 0 as 0 multiplied by 5 is 0.

For the construct of social support two scales were used family and friends social support. Each scale was identical. These scales utilized a 5-point Likert scale with each response corresponding to a score, none (0), rarely (1), sometimes (2), often (3), and very often (4). For each scale, family social support and friend social support, the highest possible score is 4 multiplied by the number of items, 5, for a total of 20. The lowest possible score for each of these scales is 0.
The construct of self-efficacy to overcome impediments utilizes a 5-point Likert scale with each response corresponding to a score, not at all sure (0), slightly sure (1), moderately sure (2), sure (3), and totally sure (4). There are 5 items for this scale for a highest score of 20 (4 x 5). The lowest possible score for this scale is 0 (0 x 5).

Summary

The purpose of Chapter 3 was to describe the methods used for this research study. This included a definition of the sample, an estimation of the sample size, and a description of each instrument used in the survey. There are a total of nine sections in this survey; a seven-day exercise recall, social support (both friends and family), outcome expectations, outcome expectancies, self-efficacy to perform exercise, self-efficacy to overcome impediments, self-control (exercise goals), and demographic information about the participants. Data collection was also described here. For data analysis stepwise multiple regression analysis was used to compare correlations between the constructs of social cognitive theory and exercise behavior (determined by the seven-day exercise recall questionnaire). The next chapter discusses the results of the study, while also addressing the demographic information obtained in the study.
Chapter Four

Introduction

Given that South Asian’s experience high rates of coronary heart disease and diabetes and that their lack of physical activity has been identified as a key contributing factor (Kolt, Schofield, Rush, Oliver, & Chadha, 2007) the purpose of this study was to determine the factors that influence exercise behavior in this population. A set of constructs of social cognitive theory; outcome expectations, outcome expectancies, self-control (exercise goals), self-efficacy, social support, and self-efficacy to overcome impediments, were used as predictors of exercise among South Asian college students at the University of Cincinnati and Ohio University.

Chapter one addressed the problem of the lack of exercise participated in by college students and South Asians alike. This chapter also explicitly stated the operational definitions, hypotheses, and research questions regarding the study. Chapter two was a review of the literature regarding exercise behaviors of South Asians and college students, as well as the programs that have previously been implemented regarding these groups and exercise. This chapter also explored the application of social cognitive theory. Chapter three identified the methods being utilized in the study as well as detailed accounts of the instrument and the constructs it was to measure. This chapter also addressed the participants, data analysis techniques, and the procedures used in the study.

Chapter four addresses, first, the results of the pilot study testing the Exercise Behavior Survey. This includes the correlation coefficient regarding the reliability of the instrument and some interpretation of the results. The next part of the chapter will reveal
the Cronbach’s alpha for the sub-scales of the instrument used. The demographic and
background descriptions of the participants will be presented here as well. Lastly,
descriptive statistics and inferential statistics, using regression modeling, will be shown
here.

Pilot Study

The sample for the pilot study was comprised of 27 University of Cincinnati
students, graduate and undergraduate, of South Asian descent currently taking courses
during Winter Quarter 2011. Using SPSS statistical analysis software the Pearson
correlation coefficients for each construct of social cognitive theory and of the seven-day
exercise recall subscale were determined (Table 4.1). For the constructs of outcome
expectancies and outcome expectancies the two constructs were multiplied resulting in the
construct of expectations and a correlation coefficient was determined from that.

Table 4.1

Correlation Coefficients for each of the Constructs of Social Cognitive Theory and the Seven-
Day Exercise Recall Subscale (n=27).

<table>
<thead>
<tr>
<th>Sub-Scale</th>
<th>Correlation Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise Recall</td>
<td>0.77**</td>
</tr>
<tr>
<td>Expectations</td>
<td>0.71**</td>
</tr>
<tr>
<td>Exercise Goals</td>
<td>0.94**</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>0.75**</td>
</tr>
<tr>
<td>Family Social Support</td>
<td>0.85**</td>
</tr>
</tbody>
</table>
Friends Social Support 0.71**
Self-efficacy to overcome impediments 0.52**

**. Correlation is significant at the 0.01 level.

Test-retest reliability is the degree of association between sets of measurements taken at two or more different times. For this study the instrument was administered twice within a two-week period. A correlation coefficient above 0.70 has been deemed acceptable in research in psychology and education (Guilford, 1973). Each of the subscales were above the 0.70 cut-off except for self-efficacy to overcome impediments. This subscale was developed by Dr. Jim Sallis and adopted for this instrument with permission from him.

Instrumentation

To test the reliability, specifically the internal consistency, a Cronbach’s alpha coefficient measurement was completed. Table 4.2 displays the Cronbach’s alpha coefficient for each sub-scale measuring the constructs of social cognitve theory. For outcome expectations the Cronbach’s alpha coefficient was 0.91 and for outcome expectancies it was 0.90. For exercise goals (self-control) the Cronbach’s alpha coefficient was 0.94, for family social support it was 0.915, and for friends social support it was 0.91. For the constructs of self-efficacy to participate in exercise and self-efficacy to overcome barriers the Cronbach’s alpha coefficient was measured as 0.81 and 0.82, respectively. It is important to note that the “rule of thumb” created by George and Mallery (2003) for Cronbach’s alpha reliability coefficients is that greater than 0.90 is excellent, greater than 0.80 is good, and greater than 0.70 is acceptable. Considering this, the Cronbach’s alpha coefficients for all the sub-scales are either excellent or good with regards to internal consistency or degree of association.
Table 4.2

*Cronbach’s Alpha for each Sub-scale of the Exercise Behavior Survey*

<table>
<thead>
<tr>
<th>Sub-Scale</th>
<th>Cronbach’s Alpha Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcome Expectations</td>
<td>0.90</td>
</tr>
<tr>
<td>Outcome Expectancies</td>
<td>0.90</td>
</tr>
<tr>
<td>Exercise Goals</td>
<td>0.94</td>
</tr>
<tr>
<td>Family Social Support</td>
<td>0.92</td>
</tr>
<tr>
<td>Friends Social Support</td>
<td>0.91</td>
</tr>
<tr>
<td>Self-Efficacy to Participate in Exercise</td>
<td>0.81</td>
</tr>
<tr>
<td>Self- Efficacy to Overcome Barriers</td>
<td>0.82</td>
</tr>
</tbody>
</table>

Construct validity by factor analysis was performed on the survey used in this study for each sub-scale including self-efficacy (to perform exercise), outcome expectations, outcome expectancies, exercise goals (self-control), family social support, friends social support, and self-efficacy to overcome barriers. Maximum Likelihood Analysis was the extraction method used. For each of the sub-scales or constructs one factor was extracted (Table 4.3). The eigenvalues or variances extracted for of the subscales were 2.45 for self-efficacy to participate in exercise, 3.35 for outcome expectations, 3.31 for outcome expectancies, 6.01 for exercise goals, 3.24 for family social support, and 3.30 for friend social support, and 2.38 for self-efficacy to overcome barriers. The Kaiser Criterion states that only factors with eigenvalues greater than one can be retained and the eigenvalues for
each of these sub-scales was greater than one. For the factor loading cut off, determined by
the sample size, Stevens (2002) states that the critical value be doubled. For this study the
sample size of 58 was used (a sample size of 50 was used for simplicity purposes) and the
critical value was determined to be 0.361. 0.361*2 is 0.722. For a critical value cut off of
0.722 the majority of statements from each subscale meet the cut off (Table 4.3).

Table 4.3

Construct Validity Measurements for each Sub-scale of the Exercise Behavior Survey

<table>
<thead>
<tr>
<th>Sub-Scale</th>
<th>Factor</th>
<th>Eigenvalue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-efficacy</td>
<td>1</td>
<td>2.45</td>
</tr>
<tr>
<td></td>
<td>1. Walk briskly</td>
<td>0.842</td>
</tr>
<tr>
<td></td>
<td>2. Jump rope</td>
<td>0.457</td>
</tr>
<tr>
<td></td>
<td>3. Jog</td>
<td>0.740</td>
</tr>
<tr>
<td></td>
<td>4. Ride a bicycle</td>
<td>0.815</td>
</tr>
<tr>
<td></td>
<td>5. Participate in an aerobics class</td>
<td>0.568</td>
</tr>
<tr>
<td>Outcome Expectations</td>
<td>1</td>
<td>3.35</td>
</tr>
<tr>
<td></td>
<td>1. Improves my physical appearance</td>
<td>0.719</td>
</tr>
<tr>
<td></td>
<td>2. Makes my mood better, in general</td>
<td>0.811</td>
</tr>
<tr>
<td></td>
<td>3. Helps me feel less tired</td>
<td>0.864</td>
</tr>
<tr>
<td></td>
<td>4. Makes me more mentally alert</td>
<td>0.874</td>
</tr>
</tbody>
</table>
5. Improves my endurance to perform daily activities  0.812

Outcome Expectancies  1  3.31

1. Improves my physical appearance  0.677
2. Makes my mood better, in general  0.864
3. Helps me feel less tired  0.839
4. Makes me more mentally alert  0.879
5. Improves my endurance to perform daily activities  0.794

Exercise Goals  1  6.01

1. I often set exercise goals  0.754
2. I usually have more than one exercise goal  0.619
3. I usually set dates to achieving my exercise goals  0.876
4. My exercise goals help to increase my motivation for doing exercise  0.748
5. I tend to break more difficult exercise goals into a series of smaller steps  0.898
6. I usually keep track of my progress in meeting my exercise goals  0.856
7. I usually achieve the exercise goals I set for myself  0.747
8. If I do not reach an exercise goal, I analyze what went wrong  0.711
9. I make my exercise goals public by telling other people
<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>about them</td>
<td>0.735</td>
</tr>
<tr>
<td>Family Social Support</td>
<td>1</td>
</tr>
<tr>
<td>1. Exercised with me</td>
<td>0.964</td>
</tr>
<tr>
<td>2. Offered to exercise with me</td>
<td>0.914</td>
</tr>
<tr>
<td>3. Gave me encouragement to stick to my exercise program</td>
<td>0.702</td>
</tr>
<tr>
<td>4. Gave me helpful reminders to exercise</td>
<td>0.667</td>
</tr>
<tr>
<td>5. Help plan activities around my exercise schedule</td>
<td>0.735</td>
</tr>
<tr>
<td>Friends Social Support</td>
<td>1</td>
</tr>
<tr>
<td>1. Exercise with me</td>
<td>0.794</td>
</tr>
<tr>
<td>2. Offered to exercise with me</td>
<td>0.831</td>
</tr>
<tr>
<td>3. Gave me encouragement to stick to my exercise program</td>
<td>0.809</td>
</tr>
<tr>
<td>4. Gave me helpful reminders to exercise</td>
<td></td>
</tr>
<tr>
<td>5. Help plan activities around my exercise schedule</td>
<td>0.773</td>
</tr>
<tr>
<td>Self-Efficacy to Overcome Barriers</td>
<td>1</td>
</tr>
<tr>
<td>1. Get up early, even on weekends, to exercise</td>
<td>0.610</td>
</tr>
<tr>
<td>2. Stick to you exercise program after a long tiring day of school/work</td>
<td>0.743</td>
</tr>
<tr>
<td>3. Attend a social event/party only after exercising</td>
<td>0.583</td>
</tr>
<tr>
<td>4. Stick to your exercise program even when you have excessive demands from school/work</td>
<td>0.823</td>
</tr>
</tbody>
</table>
5. Read or study less in order to exercise more

0.664

Respondents

The sample is comprised of 58 students that participated in various stages of the survey, but only 54 completed the survey in full. A number of participants did not complete all of the demographic questions with age, educational major, and immigration generation being left blank by four of the participants that completed the survey. The sample size was determined to be 62. Considering that, 54 participants is very near the calculated sample size.

The number of South Asian students attending University of Cincinnati and Ohio University is difficult to determine due to the fact that South Asians tend to be lumped in to the category of Asians. In 2010 there were 5 Bangladeshi, 12 Sri Lankan, 133 Indian, 9 Pakistani, and 7 Nepali international students enrolled at Ohio University (“International Student Enrollment”, 2010). International South Asian students at University of Cincinnati for 2010 include 550 Indian, 4 Bangladeshi, 11 Pakistani, 19 Nepali, and 36 Sri Lankan students (“University of Cincinnati Student Fact Book Autumn 2010”, 2010). Unfortunately, this data does not include permanent residents and possibly second immigration generation students both of which meet the criteria for the study.
Demographic Characteristics

Tables 4.4, 4.5, 4.6, and 4.7 present data related to the demographic characteristics of the participants. There were 46 students out of the 58 that began the survey that entered their age in to the survey. Of these participants the mean age was 23.95 years with a range from 18-42 years and standard deviation of 3.38 (Table 4.4).

Table 4.4

Summary of the Range of Ages of South Asian Student Participants (n=46)

<table>
<thead>
<tr>
<th>Variable (in years)</th>
<th>n</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>46</td>
<td>18</td>
<td>42</td>
<td>23.95</td>
<td>3.38</td>
</tr>
</tbody>
</table>

Table 4.5 contains data regarding the frequency of educational majors of the undergraduate and graduate students that participated in the survey. It is important to note that the engineering sciences category includes mechanical, chemical, computer, and electrical engineering, but have been combined into one category for analysis purposes. The majority of students were from the engineering sciences (n=28, 48.3%). Next in descending order was medicine (n=4, 6.9%), information systems (n=3, 5.2%), followed by chemistry, computer science, health promotion & education, and molecular genetics with the same frequency (n=2, 3.4%). Many of the other educational majors were at a frequency of 1 (1.7%) such as biochemistry, biology, business, environmental science, marketing, toxicology, microbiology, and quantitative analysis.

Table 4.5

Educational Majors of South Asian Student Participants (n=58)
<table>
<thead>
<tr>
<th>Educational Major</th>
<th>n</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Response</td>
<td>7</td>
<td>12.1</td>
<td>12.1</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>1</td>
<td>1.7</td>
<td>13.8</td>
</tr>
<tr>
<td>Biology</td>
<td>1</td>
<td>1.7</td>
<td>15.5</td>
</tr>
<tr>
<td>Business</td>
<td>1</td>
<td>1.7</td>
<td>17.2</td>
</tr>
<tr>
<td>Chemistry</td>
<td>2</td>
<td>3.4</td>
<td>20.7</td>
</tr>
<tr>
<td>Computer Science</td>
<td>2</td>
<td>3.4</td>
<td>24.1</td>
</tr>
<tr>
<td>Engineering Sciences</td>
<td>28</td>
<td>48.3</td>
<td>72.4</td>
</tr>
<tr>
<td>Environmental Science</td>
<td>1</td>
<td>1.7</td>
<td>74.1</td>
</tr>
<tr>
<td>Health Promotion and Education</td>
<td>2</td>
<td>3.4</td>
<td>77.6</td>
</tr>
<tr>
<td>Information Systems</td>
<td>3</td>
<td>5.2</td>
<td>82.8</td>
</tr>
<tr>
<td>Marketing</td>
<td>1</td>
<td>1.7</td>
<td>84.5</td>
</tr>
<tr>
<td>Medicine</td>
<td>4</td>
<td>6.9</td>
<td>91.4</td>
</tr>
<tr>
<td>Microbiology</td>
<td>1</td>
<td>1.7</td>
<td>93.1</td>
</tr>
<tr>
<td>Molecular Genetics</td>
<td>2</td>
<td>3.4</td>
<td>96.5</td>
</tr>
<tr>
<td>Quantitative Analysis</td>
<td>1</td>
<td>1.7</td>
<td>98.2</td>
</tr>
<tr>
<td>Toxicology</td>
<td>1</td>
<td>1.7</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4.6 contains the nominal demographic data from the student participants. Of the 58 students that began the survey 54 (93.1%) completed the entire survey, including the nominal demographic data. The data below is based on a sample size of 54 due to the
loss of four respondents. For gender, 24 of the participants, 44.4%, were female, and 30 or 55.6% were male. A first generation immigrant is defined as the first immigrant from their family to come to US, but was born abroad, in this case in South Asia. A second generation immigrant is any person born in the United States, but has parents, grandparents, great-grandparents that were born abroad in South Asia. For both immigration generations the students must still have at least one parent of South Asian decent. For this study the majority of participants were first generation immigrants (n=44, 81.5%), while 10 (18.5%) participants were second generation immigrants. The majority of students (n=50, 92.6%) were graduate students while only four students (7.4%) were undergraduate. Parent institution for this study could be either University of Cincinnati (n=51, 94.4%) or Ohio University (n=3, 5.6%). The majority of students were enrolled at University of Cincinnati.

Table 4.6

Nominal Demographic Characteristics of South Asian Student Participants (n=54)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency (n)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td>1. Female</td>
<td>24</td>
<td>44.4</td>
</tr>
<tr>
<td>2. Male</td>
<td>30</td>
<td>55.6</td>
</tr>
<tr>
<td>Immigration Generation</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td>1. First</td>
<td>44</td>
<td>81.5</td>
</tr>
<tr>
<td>2. Second</td>
<td>10</td>
<td>18.5</td>
</tr>
<tr>
<td>Educational Status</td>
<td>Frequency (n)</td>
<td>Percent</td>
</tr>
<tr>
<td>--------------------</td>
<td>---------------</td>
<td>---------</td>
</tr>
<tr>
<td>Undergraduate</td>
<td>4</td>
<td>7.4</td>
</tr>
<tr>
<td>Graduate</td>
<td>50</td>
<td>92.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parent Institution</th>
<th>Frequency (n)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Cincinnati</td>
<td>51</td>
<td>94.4</td>
</tr>
<tr>
<td>Ohio University</td>
<td>3</td>
<td>5.6</td>
</tr>
</tbody>
</table>

In the last table of the demographic characteristics, Table 4.7, the breakdown by ethnicity of the student participants was completed. Again, only 54 (93.1%) of the 58 participants completed this section of the demographics. According to the responses 51 (94.4%) of the participants were of Indian descent, followed by 2 (3.7%) being of Sri Lankan descent, and lastly 1 (1.85%) was of Pakistani descent. No participants in the survey responded as of Bhutanese, Bangladeshi, or Nepali descent.

Table 4.7

_Ethnicity Breakdown of South Asian Student Participants (n=54)_

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Frequency (n)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indian</td>
<td>51</td>
<td>94.4</td>
</tr>
<tr>
<td>Sri Lankan</td>
<td>2</td>
<td>3.7</td>
</tr>
<tr>
<td>Pakistani</td>
<td>1</td>
<td>1.85</td>
</tr>
<tr>
<td>Bhutanese</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bangladeshi</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
A crosstabulation of gender and education was completed along with a Pearson Chi-Square to determine if there is a statistically significant relationship. Table 4.8 displays the crosstabulation. The Pearson Chi-Square completed for the crosstabulation of gender and education was 0.145. The percentage of the total for both gender and education year is in parentheses.

**Table 4.8**

*Crosstabulation of Gender and Education*

<table>
<thead>
<tr>
<th></th>
<th>Fresh. (%)</th>
<th>Soph. (%)</th>
<th>Senior (%)</th>
<th>Graduate (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Female</td>
<td>2 (100)</td>
<td>1 (100)</td>
<td>1 (100)</td>
<td>20 (37)</td>
<td>24 (44.4)</td>
</tr>
<tr>
<td>2. Male</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>30 (55.6)</td>
<td>30 (55.6)</td>
</tr>
<tr>
<td>Total</td>
<td>2 (3.7)</td>
<td>1 (1.85)</td>
<td>1 (1.85)</td>
<td>50 (98)</td>
<td>54</td>
</tr>
</tbody>
</table>

**Descriptive Statistics**

For each construct of social cognitive theory used in this study a distribution of the scores of the participants in the study was listed (Table 4.9). The constructs used were expectations (outcome expectancies x outcome expectations), exercise goals (self-control), friends and family social support, self-efficacy to participate in exercise, and self-efficacy to overcome barriers. For the construct of exercise goals or self-control the range of possible scores was 0-40 and the observed range of scores of participants was 0-38. The average
score for exercise goals was 15.89 with a standard deviation of 10.05. For the construct of family social support the possible range of scores was 0-20 and the observed range of scores was 0-19. The mean score of participants for this construct was 7.33 with a standard deviation of 6.12. For the construct of friend social support the possible range of scores was 0-20 with an observed range of scores of 0-13. The mean score for friend social support was 8.31 with a standard deviation of 5.32. For the construct of self-efficacy to participate in exercise (listed as self-efficacy here) the possible range of scores was 0-20 and the observed range was the same. The mean score for this construct was 12.67 with a standard deviation of 4.85. Self-efficacy to overcome barriers had a possible range of scores of 0-20 with an observed range of 0-17. The mean score for this construct was 6.98 with a standard deviation of 4.97.

Table 4.9

_Distribution of Means and Standard Deviations for Social Cognitive Theory Constructs and Exercise (n=58)_

<table>
<thead>
<tr>
<th>Construct</th>
<th>n</th>
<th>Possible Range</th>
<th>Observed Range</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise (in minutes)</td>
<td>58</td>
<td>0-3500</td>
<td>0-480</td>
<td>143.69</td>
<td>112.9</td>
</tr>
<tr>
<td>Expectations</td>
<td>56</td>
<td>0-80</td>
<td>12-48</td>
<td>35.59</td>
<td>9.54</td>
</tr>
<tr>
<td>Exercise Goals (Self-control)</td>
<td>54</td>
<td>0-40</td>
<td>0-38</td>
<td>15.89</td>
<td>10.05</td>
</tr>
<tr>
<td>Family Social</td>
<td>54</td>
<td>0-20</td>
<td>0-19</td>
<td>7.33</td>
<td>6.12</td>
</tr>
</tbody>
</table>
### Support

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Friend Social</td>
<td>54</td>
<td>0-20</td>
<td>0-13</td>
<td>8.31</td>
<td>5.32</td>
</tr>
</tbody>
</table>

### Support

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Efficacy</td>
<td>54</td>
<td>0-20</td>
<td>0-20</td>
<td>12.67</td>
<td>4.85</td>
</tr>
<tr>
<td>Self-Efficacy to</td>
<td>54</td>
<td>0-20</td>
<td>0-17</td>
<td>6.98</td>
<td>4.97</td>
</tr>
</tbody>
</table>

### Overcome Barriers

#### Inferential Statistics

Stepwise multiple regression analysis was performed using the total exercise scores of each participant in minutes as the dependent variable and the independent variable being each construct used in the study. Only self-efficacy to participate in exercise was shown to have an adjusted $R^2$ that was statistically significant with a $p=0.020$ (Table 4.10). This means that only the construct of self-efficacy could be attributed to explain some of the variance of exercise participation measured by the seven-day exercise recall sub-scale. 8.2% of the variance of the dependent variable was explained by the construct of self-efficacy. Figure 4.1 displays the normal distribution of the dependent variable, total exercise in minutes per week, of the participants. The residuals in the normal P-P plot of regression were found to be linear (Figure 4.2).

Table 4.10

*Stepwise Multiple Regression Analysis of Total Exercise in Minutes as Predicted by Self-Efficacy (adjusted $R^2=0.082$)*
<table>
<thead>
<tr>
<th>Source</th>
<th>Unstandardized Coefficients</th>
<th>Standard Error</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>61.391</td>
<td>37.550</td>
<td></td>
<td>1.635</td>
<td>0.108</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>6.626</td>
<td>2.772</td>
<td>0.315</td>
<td>2.391</td>
<td>0.020</td>
</tr>
</tbody>
</table>

The covariates of gender and immigration generation were also examined using multiple regression analysis using SPSS. Gender (p = 0.355) and immigration generation (p = 0.885) were not predictive of exercise behavior in this sample (Table 4.11).

Table 4.11

*Multiple Regression Analysis of Exercise in Minutes and Gender and Immigration Generation*

<table>
<thead>
<tr>
<th>Source</th>
<th>Unstandardized Coefficients</th>
<th>Standard Error</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>131.038</td>
<td>23.388</td>
<td></td>
<td>5.603</td>
<td>0.000</td>
</tr>
<tr>
<td>Gender</td>
<td>27.475</td>
<td>29.444</td>
<td>0.132</td>
<td>0.933</td>
<td>0.355</td>
</tr>
<tr>
<td>Immigration</td>
<td>-5.376</td>
<td>37.106</td>
<td>-0.021</td>
<td>-0.145</td>
<td>0.885</td>
</tr>
<tr>
<td>Generation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 4.1

*Histogram Demonstrating Normal Distribution of the Dependent Variable (Total Exercise) in minutes*

![Histogram](image-url)
Figure 4.2

*Normal P-P Plot of Regression Standardized Residual of Total Exercise in Minutes*

*Summary*

Chapter 4 displayed the results of both the pilot and main phase studies. The stability of the instrument was determined to be above acceptable levels. Descriptive statistical analyses of the demographic data as well as the scores for each sub-scale (construct) were also listed. In general, the scores for not only exercise, but for all the constructs were relatively low among this South Asian pool. Inferential statistical analyses
attempting to determine which, if any, of the independent variables, the construct, attributed to the variance of the dependent variable, exercise behavior. Only self-efficacy to participate in exercise was shown to be statistically significant for stepwise multiple regression analysis. Internal consistency and construct validity measurements were also completed here demonstrating that the sub-scales for each construct showed a high level of association and that the constructs both convergent and discriminant.

Chapter 5 will analyze the data listed here and determine the reasons that the scores for each sub-scale, in general, were low for the participants. This chapter will also attempt to determine the reasons that only the self-efficacy subscale can be attributed to the variance of the exercise behavior. Finally, each hypothesis will be analyzed to determined whether or not the null should be rejected or not.
Chapter 5

Conclusions and Discussions

Introduction

Chapter one addressed the problem, need, and purpose of the study along with the research questions and hypothesis regarding exercise behavior. In Chapter two a literature review of exercise among college students, South Asians, and the prevalence and determinants of this behavior were analyzed. Also, in chapter two a literature review of the application of social cognitive theory in health education and exercise was also reviewed. Chapter three discussed the study design, data collection and analysis techniques, as well as the instrumentation and sampling procedures. In chapter four the results of the pilot study phase and main phase were listed, as well as the results of regarding the analysis of the instrument. Descriptive statistics and inferential statistics were also listed here.

In chapter five the results listed in chapter four are analyzed, particularly, the seven hypotheses stated in chapter one using the stepwise multiple regression analysis data and R². This data will be used to determine if the null hypothesis is to be rejected. Also, in this chapter the recommendations for future studies, conclusions, and implications of the results will be determined.

Testing Research Hypotheses

Hypothesis 1.

Predictive hypothesis (H₁): South Asian college students who place a higher value on expectations for exercise will exhibit exercise behavior more often than South Asian college students who place a lower value on expectations. Stepwise multiple regression models were used to determine the relationship between expectations and exercise
behavior. P= 0.111 and expectations were excluded as being a predictor of exercise behavior in this study. Based on these results the null hypothesis which stated that there would be no differences in exercise behavior between South Asian students who place higher value on expectations and South Asian students who place lower value on expectation was not rejected.

_Hypothesis 2._

**Predictive Hypothesis (H₁) 2.** South Asian college students who have higher levels of self-efficacy to perform exercise will exhibit exercise behavior more often than South Asian college students who have lower levels of self-efficacy to perform exercise. Stepwise multiple regression analysis was used to determine the whether or not the variance of the dependent variable, exercise, could be attributed to the self-efficacy sub-scale. The adjusted R²=0.082 with a standard error of the estimate of 97.9 and a p value=0.020. In this case, the null hypothesis, which stated that there would be no significant differences between South Asian college students who have higher levels of self-efficacy to perform exercise and South Asian students who have lower levels of self-efficacy to perform exercise in regards to their exercise behavior, was rejected.

_Hypothesis 3._

**Predictive Hypothesis (H₂) 3.** South Asian college students who have higher levels of self-efficacy to overcome barriers to exercise will exhibit exercise behavior more often than South Asian college students who have lower levels of self-efficacy to overcome barriers to exercise. Stepwise multiple regression models were used to determine the relationship between self-efficacy to overcome barriers and exercise behavior. With a p= 0.822, self-efficacy to overcome barriers was excluded as a predictor. Based on these results the null
hypothesis, which stated that there would be no differences in exercise behavior between South Asian students who have higher levels of self-efficacy to overcome barriers to exercise and South Asian students who have lower values if self-efficacy to overcome barrier to exercise was not rejected.

**Hypothesis 4.**

*Predictive Hypothesis (Hₚ) 4.* South Asian college students who have higher levels of self-control toward exercise will exhibit exercise behavior more often than South Asian college students who have lower levels of self-control towards exercise. Stepwise multiple regression models were used to determine the relationship between self-control (exercise goals) and exercise behavior. A p = 0.379 revealed that this variable should be excluded as a predictor of exercise. Based on these results the null hypothesis, which stated that there would be no significant differences in exercise behavior between South Asian students with higher levels of self-control and South Asian students with lower levels of self-control, was not rejected.

**Hypothesis 5.**

*Predictive Hypothesis (Hₚ) 5.* South Asian college students with higher levels of social support for exercise will exhibit exercise behavior more often than South Asian college students with lower levels of social support for exercise. Stepwise multiple regression models were used to determine the relationship between social support (both family and friends) and exercise behavior. For family social support a p = 0.165 was found and for friend social support a p = 0.779 was found. Based on these results the null hypothesis, which stated that there would be no significant differences in exercise behavior between
South Asian students who had higher levels of social support for exercise and South Asian students who had lower levels of social support for exercise, was not rejected.

_Hypothesis 6._

_Predictive Hypothesis (H₆):_ South Asian college students who are first generation immigrants to the United States will exhibit exercise behavior more often than South Asian college students who are second generation immigrants to the United States. For immigration generation, using multiple regression analysis, a p = 0.855 was found. Based on these results the null hypothesis, which stated that there would be no significant differences in exercise behavior between South Asians who are first generation immigrants and South Asians who are second generation immigrants, was not rejected.

_Hypothesis 7._

_Predictive Hypothesis (H₇):_ South Asian college students who are women will exhibit exercise behavior more often than South Asian college students who are men. For gender, using multiple regression analysis, a p = 0.355 was found. Based on these results the null hypothesis, which stated that there would be no significant differences in exercise behavior between South Asians who are female and South Asians who are male, was not rejected.

**Conclusions**

The purpose of this study was to ascertain the determinants of exercise behavior among South Asian college students using constructs of social cognitive theory operationalized into an electronic survey. Results of this study demonstrated that only the construct of self-efficacy to participate in exercise could be attributed for some of the variance of the exercise behavior of the participants. Only one of the seven hypothesis was found to be significant, self-efficacy to participate in exercise did act as a predictor of
exercise behavior. The covariates of gender and immigration generation were not shown to act as predictors of exercise behavior and did not demonstrate a significant relationship with exercise behavior in this study.

*Self-efficacy and Exercise Behavior*

The results revealed that self-efficacy to participate in exercise behavior does act as a predictor for exercise behavior. This demonstrates that the South Asian students participating in this study that had higher levels of confidence to perform specific physical activity exercises were more likely to participate in physical activity. Previous studies have shown that by improving the self-efficacy of college students has lead to an increase in physical activity (Suminski & Petosa, 2006). A meta-analysis of studies by Stretcher and colleagues (1986) revealed that self-efficacy was the most important factor in predicting healthy behaviors and creating behavior change (Stretcher, DeVellis, Becker, & Rosenstock, 1986). Not surprising then that self-efficacy was the only predictive factor of exercise behavior in this study.

*Self-efficacy to Overcome Barriers and Exercise Behavior*

The results revealed that self-efficacy to overcome barriers to exercise was not a predictor of exercise behavior in this study. This means that self-efficacy to overcome barriers to exercise does not influence, significantly, whether or not, or how much, the participants in this study participate in exercise. In a study of Pakistani/Bangladeshi immigrants in the UK it was shown that a strong work ethic acted as a barrier to participation. Considering many of the participants here were enrolled in graduate level studies, requiring a strong work ethic with a demanding schedule, it is difficult to explain the results, but a study by Brown (2005) may reveal a possible reason. Previous studies
regarding physical activity in college students found that facility obstacles and fatigue played a role in preventing students from participating in physical activity (Brown, 2005). In this study those types of barriers were not addressed in the self-efficacy to overcome barriers sub-scale rather academic performance and social activities were the focus.

*Family and Friends Social Support and Exercise Behavior*

The results demonstrated that neither friend nor family social support plays a role as a predictor of exercise behavior. This means that higher levels of social support, form either friend or family, does not necessarily influence physical activity participation among South Asian college students. This differs from studies of both college students and South Asians. In one study by Buckworth & Nigg (2004) a strong correlation between social support and physical activity behavior in male college students was found. In a study of older South Asian immigrants in the United States social support was shown to be strongly predictive of physical activity behavior (Jonna
alagadda & Diwan, 2005). An explanation for the results of the study here could be due to South Asian college students, first or second immigrants, are accustomed to being apart from their family and friends when going away for college.

*Expectations and Exercise Behavior*

Based on the results expectations (outcome expectations x outcome expectancies) did not act as a predictor of exercise behavior. If a person places high or low values on expectations of exercise will not influence, significantly, their exercise behavior. This is differing from the literature, as a study of middle-aged Asian Indian women revealed that expectations of the benefits and outcomes of physical activity influenced, significantly, the likelihood of the women participating in physical activity behavior (Mehta, Sharma, &
Bernard, 2010). An explanation of the results differing here could be that many of the respondents are students, not middle-aged, and therefore not as concerned with their health status. Another explanation could be found in a study of Indian immigrants in the United States stating that due to the lack of exposure to physical activity in their home country, the benefits (expectations) of physical activity many not transcend cultures for this population (Seo, Torabi, Jiang, Fernando-Rojas, & Park, 2009). Lastly, in a study from 2002 researchers found that there was a strong need for education of the benefits of physical activity for Asian Indian immigrants in the United States as they were not aware of or did not fully understand the benefits of this activity (Jonalagadda & Diwan, 2002).

*Self-control (Exercise Goals) and Exercise Behavior*

Due to the results of this study self-control was excluded as a predictor of exercise behavior. This means that a South Asian college student who sets and tracks their exercise goals is not significantly more likely to participate in exercise behavior that a South Asian college student who does not set or track their exercise goals. A previous study regarding Asian Indian women revealed an inverse relationship between education level and self-control scores (Mehta, Sharma, & Bernard, 2010). Therefore, the more educated the women the less likely for them to participate in exercise. Although, no inverse relationship was found in this study it can act as an explanation as to reasoning for self-control not playing a positive role in influencing South Asian participants, of which the majority are graduate level students, exercise behavior. Furthermore, in a study of Asian Indian immigrants in the United States, forty eight percent stated they had difficulty maintaining an exercise regimen (Misra, Patel, Davies, & Russo, 2000).

*Gender and Exercise Behavior*
Based on the results of this study gender did not act as a predictor of exercise behavior in South Asian college students. This means that whether or not the student was male or female did not make a significant difference into whether or not they participated in or how much they participated in exercise. Previous studies of the older South Asian immigrant population coincide with the results of this study demonstrating that gender does not influence physical activity behavior in this population (Jonnalagadda & Diwan, 2005). In another study, that compared students of different ethnicity, it was shown that for Caucasian, South Korean, and Puerto Rican students gender was predictive of physical activity behavior, but not for Indian students (Seo, Torabi, Jiang, Fernando-Rojas, & Park, 2009).

*Immigration Generation and Exercise Behavior*

Considering the results of this study immigration generation, whether first or second, did not significantly predict exercise behavior. This means that the students in this study, whether new to the United States or born here, were not influenced by their immigration generation in regards to exercise behavior. Previous studies of older South Asian immigrants revealed that those immigrants that had been longer residence to the US and those with a more bicultural or American identity participated in physical activity more often than those who have not lived in the US as long and felt acculturated (Jonnalagadda & Diwan, 2005). Although, the results of this study differed, it may be explained by the previous study being of older South Asian immigrants who may have more difficulty becoming assimilated to a new culture, while younger South Asian immigrants may find the transition easier.
Discussion

The seven-day exercise recall data was demonstrated to be normally distributed and no log transformation was deemed necessary. For inferential statistics, namely stepwise multiple regression analysis, the seven-day exercise recall was used as the dependent variable against each of the constructs as independent variables. There have been no studies, previously, attempting to determine the predictors of exercise behavior in South Asian college students. From the literature review in chapter two predictors of exercise behavior in college students included social support, barriers to using the facility, and lack of time or motivation. For South Asians the predictors included self-efficacy, knowledge, facility obstacles, intimidation, and lack of time. Due to this it was determined that a survey measuring self-efficacy, ability to overcome barriers, self-control, social support, and motivating factors (expectations) would be appropriate to predict exercise behavior. Although, the literature review did reveal the above predictors it failed to disclose any quantitative evaluation methods that have been used on the specific population studied here.

For social support (family and friends) there was no statistically significant correlation between the social support scores and exercise behavior. It is important to note that many South Asian students in the United States are away from home, either due to going away to college (second generation immigrants) or because they are international students (first generation immigrants) studying abroad in the United States. Due to these phenomena it is not unlikely that many of these students have become accustomed to being away from their family so that family, and possibly friend, social support are not determinants of their behavior.
For self-efficacy to perform exercise there was a significant correlation between the scores for this construct and exercise behavior. It was determined that students with higher scores for self-efficacy to perform exercise, meaning those that are more confident they can perform certain exercises (walk briskly, jump rope, jog, ride a bicycle, and participate in an aerobics class), participate in higher levels of exercise.

There was no statistically significant correlation for self-efficacy to overcome barriers to exercise and exercise behavior for the South Asian participants in this study. This means that the barriers to participating in exercise included in the sub-scale pertaining to excessive demands at work/school or studying less to work out more were not predictors of exercise behaviors. The literature review revealed that South Asians, in general, highly regard academic performance. This suggests that more studies regarding school and work demands and exercise behavior need to be done.

Exercise goals, or self-control, measured the ability of the participants to set exercise goals and stick to an exercise routine. There was not a statistically significant association between exercise goals scores and exercise behavior.

For expectations, measuring how much the participants believe that the outcomes listed would happen multiplied by how important they are to them, there was not a statistically significant correlation between expectations and exercise behavior.

Limitations of the Study

The results were based on self-reported responses and could have included both participant bias and dishonesty. The seven-day recall could be a potential problem being that is was a survey-based study. Participants could have misinterpreted or misunderstood some of the questions, thereby misrepresenting their responses. Although the pilot test did
reveal that the survey had a high level of reliability/stability. Participants were not selected from random from a large sample pool, but were limited to college students at two large public universities in Ohio. The South Asian population represents smaller ethnic subgroups with differing attitudes and beliefs towards exercise. For this study, the Asian Indian population was overrepresented. Ethnicity was not used as a covariate for this study, it was expected that immigration generation and gender would play a larger role in predicting exercise behavior.

Other limitations not disclosed in previous chapters of this study include the small sample size for the study, making it difficult to generalize the data to a larger South Asian student population. There were no incentives used in this study, which may have helped increase the number of participants. Students also had the ability to take the survey more than once, during the main phase, as that could not be monitored. Also, students from the University of Cincinnati were overrepresented in the study, possibly due to the PI being enrolled at that institution. Also, due to the nature of the study, a survey, some students may be more inclined to complete online surveys than others causing self selection bias. Lastly, the instrument used here was newly developed, although the internal consistency and stability coefficients were determined to be high.

Implications for Practice

The findings of this study demonstrate the need for more studies regarding predictors and determinants of exercise behavior in South Asian college students. Considering, no other studies similar in scope to this study were found during the literature review it is imperative that more studies like it are to be conducted in the near future. Although, only one construct, self-efficacy to participate in exercise, was found to act as a
predictor of exercise behavior, that demonstrates the need for interventions focused on increasing levels of self-efficacy in South Asian college students.

When examining the exercise behavior of the college student in this study the average weekly exercise participation in minutes was 143.69 with a standard deviation of 112.9. The recommended amount of exercise in a week is 150 minutes of moderate activity, in addition to two or more days a week of strength training or 75 minutes per week of vigorous activity and two or more days a week of strength training. Although, it was recorded in the survey as to whether or not the students were participating in strength training, moderate exercise, or vigorous exercise, it can be assumed that many of the students are not receiving the recommended levels of exercise each week. The implication of this is that there is a need for more studies regarding South Asian college students to understand the factors influencing their lack of exercise participation.

This study also demonstrated that immigration generation, whether the student was a first or second generation immigrant, did not influence their exercise behavior. This implies that an intervention for South Asian college students does not necessarily need to differentiate between the international South Asian students that just arrived in the United States for studies and those that were born and raised in the United States. But it must be taken in to account the fact that the sample size for this study was small and the number of first generation immigrants greatly outnumbered the number of second generation immigrants and conclusions regarding immigration generation and exercise behavior cannot be made until further studies are completed.

Also revealed in this study was the lack of influence of social support on the exercise behavior of South Asian college students. As discussed previously this could be due to the
fact that most college students are away from home, in general, and that South Asian college students, specifically those that are international, have become accustomed to having low levels of social support from friends and family abroad. This implies that the de-emphasis of social support in exercise interventions for South Asian college students may need to occur as it may not play as large a role as previously thought.

The findings in this study conclude that only self-efficacy to participate in exercise played a statistically significant role in predicting exercise behavior. It is important to note that the implications of this assume that the other constructs are do not act as predictors, but it must be remembered that the sample size for this population was small and further studies are needed to conclude whether or not other factors may play a role in exercise behavior in South Asian college students. It is important to note that factors such as self-efficacy to overcome barriers to exercise as well self-control may play a larger role than revealed in this study. Considering that a person ability to create exercise goals and overcome barriers could influence their self-efficacy to participate in exercise. To imply that only self-efficacy to participate in exercise is a predictor for this group would be false, until further studies are done to test the relationship among the other constructs mentioned above.

*Recommendations for Future Research*

There is a definite need for future research into the predictors of exercise behavior among South Asian college students. Considering the prevalence of diabetes among South Asians is 19% as opposed to 4% in the general population in the United States, it is imperative that more studies be done regarding the modifiable methods of reducing diabetes in this population (McKeigue, Shah, & Marmot, 1991). Forty percent of South
Asians in the United States are either overweight or obese. Reiterating the need for studies into determinants of exercise behavior in this population (Misra, Patel, Davies, & Russo, 2000).

Not only are the risk factors associated with not participating in exercise more prevalent among South Asian populations, but that lack of studies specifically for this population increases the need for more studies. It is recommended that more observational studies take place before an actual intervention is put into effect for this population. More studies, with a larger sample size, examining the role of academic performance, cultural barriers, and self-efficacy to participate in exercise are needed. Considering, this study did not touch on the endemic nature of exercise participation for South Asian populations there is need to examine this further.

Studies on university campuses pertaining to exercise behavior and determinants of that behavior are both popular and numerous as can be seen from the extensive literature review in that area. Unfortunately, many of these studies fail to include South Asian countries as choices included in demographic data, instead, many of the exercise assessment studies only include Asian as a category. It is strongly recommended that universities in the United States begin using more specific terms that differentiate South Asians from the Asian continent so due to the fact that they are one of the fastest growing immigrant populations in the US. Furthermore, this group has its own unique genetic predispositions for certain disease and differing risks, from other Asian groups, for diabetes, overweight and obesity, as well as cardiovascular disease.

In the future, due to the literature review demonstrating the effectiveness of web-based exercise intervention for college student, this may be a viable option for South Asian
college students. A program that contains modules, each one representing a separate variable or construct that has been shown to act as a predictor for exercise in this population, that could be done at one’s leisure may be helpful. Including a hands-on course with other South Asian college students where a licensed instructor demonstrates the proper use of the machines, allowing students to become familiar with the exercise equipment may also be an effective strategy to implement within the web-based intervention.

It is important to note that in future studies the PI must use incentives to encourage South Asian students to participate in the study. The downfall of this study was due to the small sample size of 58 individuals total. To collect more generalizable data a larger sample size must be encouraged to participate. It is important to emphasize the health risks associated with South Asian populations and the alternatives to decreasing these risks through exercise. This is the first study of its kind and there is an urgent need for similar studies to take place in the near future.

Summary

The findings from this study demonstrate the need to implement more studies identifying the factors that influence exercise behavior among South Asian college students. A study of a larger sample size encompassing more than two midwestern universities would assist in collecting data that can be generalized. This study demonstrated that self-efficacy predicts exercise among South Asian populations, therefore, an intervention for South Asian college students should include increasing their levels of self-efficacy to participate in exercise. It was also revealed that, currently, South Asian students are not participating in the recommended levels of exercise, and that more exploratory studies
need to be done to understand the reasons behind their low levels of exercise compared to the general U.S. population.
References


Appendix A
Initial Email: Study Explanation

May 7, 2010

Hello (President of the Student Organization’s name here),

I am a graduate student at University of Cincinnati doing a research study about South Asian college students and physical activity. The title of my study is *Using social cognitive theory to predict exercise behavior in South Asian college students at two Midwestern universities*. I got your information from the Ohio University (or University of Cincinnati) student organization directory. I am interested in using your group, along with other student organizations of South Asian origin, to conduct my study. I will be using an electronic survey through Survey Monkey, but I need to gain access to the South Asian students at OU and UC. Before I can begin my project I need a written letter of permission to use your organization as an access point to South Asian college students.

This study is important because of the lack of knowledge known about the exercise habits and behaviors of South Asians currently in the literature. This survey will help expand the knowledge of the thoughts, beliefs, and behaviors of South Asians regarding exercise. With your help and cooperation I think more information could be made available about a population that is underrepresented in current behavioral/health research.

If you have any questions about my project, please feel free to email me or call me at anytime. I would really appreciate your help!

Thank you,
Taj Haider

513-448-8847
haidertl@mail.uc.edu
Appendix B
Instrumentation

I. Recent Exercise Think carefully about the past week. Did you participate in any leisure time exercise (such as walking, yoga, aerobics, jogging, riding a bicycle, or any other activity that uses large muscle groups and make your heart beat faster) other than for your regular job or daily duties? If you circle yes, write the number of minutes on each line.

<table>
<thead>
<tr>
<th>Day</th>
<th>Frequency</th>
<th>Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunday</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>Tuesday</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>Saturday</td>
<td>yes</td>
<td></td>
</tr>
</tbody>
</table>

II. Outcome Expectations/Expectancies Questionnaire How much do you agree that the following would occur if you were to engage in exercise? How much would it matter to you if these things did occur?

Use this scale to tell us if you agree the following will happen:

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Use this scale to tell us how much it will matter:

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>It will not matter at all</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exercise:</th>
<th>DO YOU AGREE? (0-4)</th>
<th>DOES IT MATTER? (0-4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Improves my physical appearance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Makes my mood better in general</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Helps me feel less tired in general</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Makes me more mentally alert</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Improves my endurance to perform daily activities</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

III. Exercise Goals Questionnaire The following questions refer to how you set exercise goals and plan exercise activities. Please indicate the extent to which each of the statements below describes you.
Use this scale to tell us if you agree the following will happen:

<table>
<thead>
<tr>
<th></th>
<th>Does not describe me</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Describes me completely</th>
</tr>
</thead>
<tbody>
<tr>
<td>i.</td>
<td>If I do not reach</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>intense analysis</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>What went wrong</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>b.</td>
<td>I have more than one</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>j.</td>
<td>I break my goal.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>c.</td>
<td>I usually get</td>
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<td></td>
<td>publicly by</td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td>me and my other goals.</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td>My exercise goals</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>help to increase my</td>
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<td></td>
<td>exercise.</td>
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<td>e.</td>
<td>I tend to break</td>
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<td></td>
<td>exercise goals down</td>
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<td></td>
<td>into a series of</td>
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<td>f.</td>
<td>I usually keep track</td>
<td></td>
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<td></td>
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<td></td>
<td>of my progress in</td>
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<td></td>
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<tr>
<td>g.</td>
<td>I have developed a</td>
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<td></td>
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<td></td>
<td>series of steps for</td>
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<td></td>
<td>reaching my exercise</td>
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<tr>
<td>h.</td>
<td>I usually achieve</td>
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<td></td>
<td>the exercise goals I</td>
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<td>i.</td>
<td>If I do not reach</td>
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<td></td>
<td>an exercise</td>
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<td>goal, I analyze</td>
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<td></td>
<td>what went</td>
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<td></td>
</tr>
</tbody>
</table>
IV. Self-Efficacy Questionnaire Below is a list of different types of exercise. For each item rate how confident you are that you could perform the following behavior for **at least 30 minutes continuously**.

<table>
<thead>
<tr>
<th>How confident are you that you can:</th>
<th>NOT AT ALL SURE</th>
<th>SLIGHTLY SURE</th>
<th>MODERATELY SURE</th>
<th>SURE</th>
<th>TOTALLY SURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Walk briskly</td>
<td></td>
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<tr>
<td>b. Jump rope</td>
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<tr>
<td>c. Jog</td>
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<td>d. Ride a bicycle</td>
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<tr>
<td>e. Participate in an aerobic class</td>
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</table>

V. Family Social Support Questionnaire Below is a list of things people might do or say to someone who is trying to exercise regularly. If you are not trying to exercise, then some of the questions may not apply to you, but please read and give an answer to every question.

Please rate each question *once*. Rate how often any members of your **family** has said or done what is described during the last three months.

<table>
<thead>
<tr>
<th>During the past 3 months my family:</th>
<th>NONE</th>
<th>RARELY</th>
<th>SOMETIMES</th>
<th>OFTEN</th>
<th>VERY OFTEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Exercised with me.</td>
<td></td>
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<td>b. Offered to exercise with me.</td>
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<tr>
<td>c. Gave me helpful reminders to exercise.</td>
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<tr>
<td>d. Gave me encouragement to stick to my exercise program.</td>
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<tr>
<td>e. Help plan activities around my exercise schedule.</td>
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</tbody>
</table>

VI. Friends Social Support Questionnaire Below is a list of things people might do or say to someone who is trying to exercise regularly. If you are not trying to exercise, then some of the questions may not apply to you, but please read and give an answer to every question.
Please rate each question once. Rate how often any of your friends, classmates or acquaintances has said or done what is described during the last three months.

<table>
<thead>
<tr>
<th>During the past 3 months my friends:</th>
<th>NONE</th>
<th>RARELY</th>
<th>SOMETIMES</th>
<th>OFTEN</th>
<th>VERY OFTEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Exercised with me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Offered to exercise with me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Gave me helpful reminders to exercise.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Gave me encouragement to stick to my exercise program.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Help plan activities around my exercise schedule.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

VII. Self-Efficacy to Overcome Impediments Questionnaire Below is a list of things people might do while trying to increase or continue regular exercise (jogging, walking briskly, aerobic class, or bicycle riding). Whether you exercise or not, please rate how able you are that you could really motivate yourself to do things like these consistently, for at least 6 months.

<table>
<thead>
<tr>
<th>How sure are you that you can do these things?</th>
<th>NOT AT ALL SURE</th>
<th>SLIGHTLY SURE</th>
<th>MODERATELY SURE</th>
<th>SURE</th>
<th>TOTALLY SURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Get up early, even on weekends, to exercise</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Stick to your exercise program after a long tiring day of school/work</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Attend a social event/party</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>only after exercising</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Stick to your exercise program even when you have excessive demands from school or work</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Read or study less in order to exercise more</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**IX. Demographic Information:**

1. Age
2. Gender
3. Immigration Generation
   a. First
   b. Second
4. Ethnicity
   a. Nepali
   b. Bhutanese
   c. Pakistani
   d. Indian
   e. Sri Lankan
   f. Caucasian
   g. More than 2 of the above
5. Marital Status
   a. Single
   b. Married
   c. Divorced
   d. Widowed
6. Education level
   a. Freshmen
b. Sophomore

c. Junior

d. Senior

e. Graduate Student

7. Major

8. Scoring:

Scale I, Exercise Recall, is a metric variable and a range from 0 to 500 minutes of exercise, maximum, each day was used to score this variable. For purposes of regression analysis this was the dependent variable, while each construct, individually scored, acted as the independent variable. If a participant responded at more than 500 minutes of exercise per day that response was deleted and considered dishonest.

For scales II and III, Outcome Expectations/Expectancies and Exercise Goals, respectively, take the number that the participant circled to correspond to a score 1 (0), 2 (1), 3 (2), 4 (3), and 5 (4).

For scales V and VI, Family Social Support and Friend Social Support, respectively, each response corresponds to a score: none (0), rarely (1), sometimes (2), often (3), and very often (4). The higher score the higher level of social support the participant has for exercise.

For scales IV and VII, Self-efficacy to perform exercise and Self-efficacy to overcome impediments, respectively, each response corresponds to a score: not at all sure (0), somewhat sure (1), moderately sure (2), sure (3), and totally sure (4). The higher the score the higher the self-efficacy of that participant.
Appendix C:

Email consent for the use of the self-efficacy to overcoming impediments scale and social support scale from Dr. James F. Sallis on May 24, 2010.

From: Jim Sallis [sallis@mail.sdsu.edu]
Sent: Wednesday, May 19, 2010 12:56 AM
To: Haider, Taj (haider1l)
Subject: RE: Social Support and Exercise Survey

Taj

Thanks for your interest in the scales. You are welcome to use them and don’t need any special permission. You can find supporting information on my website. Good luck with your study.

Jim Sallis

James F. Sallis, Ph.D.
Professor of Psychology, San Diego State Univ
Director, Active Living Research. www.activelivingresearch.org

3900 Fifth Avenue, Suite 310, San Diego, CA 92103
ph: 619-260-5535; fax 619-260-1510; sallis@mail.sdsu.edu; I CANNOT KEEP UP WITH MY EMAILS; FOLLOW-UP IF I DO NOT REPLY

www.drjamessallis.sdsu.edu
Appendix C:

Email consent for the use of the *goal setting* scale from Dr. Liza S. Rovniak on September 8, 2010.

**From:** Liza Rovniak [lrovniak@hmc.psu.edu]  
**Sent:** Wednesday, September 08, 2010 1:13 PM  
**To:** Haider, Taj (haiderl)  
**Subject:** Re: Permission to use your instrument

Hi Taj,

You are very welcome to use my goal setting instrument. Please just cite my article in your Reference section to indicate the source of the instrument. Thank you, and good luck with your research.

Liza
Appendix D:

Panel of Experts

1. Amy Bernard, Ph.D., MCHES

   Associate Professor

   526, Teachers College

   University of Cincinnati

   P. O. Box 210068

   Cincinnati, OH 45221-0068

   (Expertise: theory)

2. Manoj Sharma, M.B; B.S., MCHES, Ph.D.

   Professor

   526, Teachers College

   University of Cincinnati

   P. O. Box 210068

   Cincinnati, OH 45221-0068

   (Expertise: theory/subject matter)

3. Ranjita Misra, Ph.D., CHES, FMALRC

   Associate Professor

   Texas A&M University

   (Expertise: target population)
4. Richard Suminski, Ph.D., M.P.H., FACSM

   Associate Professor

   SEP 468

   Kansas City University of Medicine and Biosciences

   (Expertise: theory/subject matter)

5. Eileen Anderson

   Associate Professor

   Virginia Technical University

   Center for Research in Health Behavior

   109 Williams Hall

   Blacksburg, VA 24061

   (Expertise: subject matter)

6. David Claxton, M.S. Ed.

   Associate Professor

   Reed 100

   Western Carolina University

   (Expertise: theory/subject matter)
Appendix E:
Letter to the Panel of Experts, 1st Round

June 1, 2010

Dear [Expert’s name here]:

I am a graduate student in the Master’s of Public Health program at the University of Cincinnati. I am conducting my graduate research in the area of predictors of exercise among South Asian college students. The title of my thesis is "Using social cognitive theory to predict exercise behavior among college students of South Asian descent at two large Midwestern universities."

I attend on employing an online survey based study, using Survey Monkey, to sample a population of South Asian college students at the Ohio State University and the University of Cincinnati. I am developing questionnaires for this purpose. Based on your expertise in either the subject matter, target population, theory, and/or instrumentation I am requesting that you comment on the instrument questions and scaling methods in the attached instrument. I have provided the constitutive and operational definitions of each construct of the social cognitive theory being tested in this instrument so that you may use that information to comment upon the following:

Readability: Is the meaning of each item clear and language appropriate for undergraduate and above reading level?

Face Validity: Does each item appear to measure the intended construct as operationally defined?

Content Validity: Do the items adequately assess each construct within the universe of content?

I have attached the entire instrument for your perusal, although only the first five instruments need be validated. The latter instruments have been validated previously and permission has been obtained from Dr. Jim Sallis to use these in this study. Please give your feedback for the three areas mentioned above, in this space provided after each question. Please return the questions and the instrument with your valuable comments by June 15, 2010. After making changes based on the inputs from you (and the other five experts) I will send the improved copy of the instruments back to you for your final feedback and inputs. If you have any questions I can be reached at 740-352-6512 (cell). I really appreciate you taking the time to help me with my study.

Thank you,
Taj Haider
Appendix E:
Letter to Panel of Experts, 2\textsuperscript{nd} Round

September 26, 2010

Dear (Expert’s name here):

Attached is my modified instrument. You will notice that two scales have been highlighted in red. The reason for this is because one of the experts suggested that I combine the Outcome Expectancies and Outcome Expectations scales. In red is the combined scale and below it, also in red, is the Outcome Expectancies scale separated. Please comment on which one you prefer. I put both in because a different expert commented that the students may get confused by having two constructs in one scale (construct validity).

You will also notice that two scales are in blue. An expert commented that my self-efficacy to perform exercise scale should be a self-regulatory efficacy scale instead, according to Bandura. My problem with eliminating my self-efficacy to perform exercise scale is that I already have a self-efficacy to overcome impediments scale that is very similar to the self-regulatory efficacy scale I have developed. My question to you is what should I do about this? Feel free to look at the scales I have gained permission to use from Dr. Sallis so that you may compare the impediments and regulatory (in blue) scales.

Overall, I have changed the wording of many of my statements, as well as the directions for each scale, and replaced exercise with exercise so that everything is cohesive.

Just a reminder of what you will be looking for is listed below and attached is the operational definitions.

Readability: Is the meaning of each item clear and language appropriate for undergraduate and above reading level?

Face Validity: Does each item appear to measure the intended construct as operationally defined?

Content Validity: Do the items adequately assess each construct within the universe of content?

Please give your feedback for the three areas mentioned above, in this space provided after each question. Please return the questions and the instrument with your valuable comments by October, 2010. If you have any questions I can be reached at 513-448-8847 (cell). I really appreciate you taking the time to help me with my study.

Thank you,
Taj Haider
January 24, 2011

Taj Haider
Department of Health Promotion & Education

RE: IRB # 10-11-24-04E "Using Social Cognitive Theory to Predict Physical Activity Behavior Among College Students of South Asian Decent at Two Large Midwestern Universities"

The University of Cincinnati Institutional Review Board has reviewed your research project and has granted approval under Expedited category 45 CFR 46.110.

<table>
<thead>
<tr>
<th>APPROVAL DATE:</th>
<th>January 16, 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXPIRATION DATE:</td>
<td>January 16, 2012</td>
</tr>
</tbody>
</table>

The following document versions are included in this approval.
Protocol v.1-16-11
Consents (phase 1 consent and survey info sheet) v. 1-16-11
Recruitment (initial email and script for students) v. 1-16-11

The research MUST be conducted EXACTLY as approved. You must report to the Chair of the UC IRB any changes affecting the protocol upon which this certification is based. No changes may be made without prior approval by the Board except those necessary to eliminate immediate hazards.

Attached you will find some or all of the following:
1. APPROVED consent(s): document is locked and shows the IRB approved/expires date stamp. You MUST use this version (with IRB approved / expires date stamp) with your participants.
2. Investigator Responsibilities: these apply to all UC research team members involved with human subject research.

Should your project extend beyond the expiration date, you must submit a Progress Report form A MONTH BEFORE THE EXPIRATION DATE indicating that the project is continuing. You will need to attach to the Progress Report a copy of the first signed consent (with IRB approved / expires date stamp) to document use of the approved versions.

IT IS YOUR RESPONSIBILITY to keep track of your project’s expiration date and to submit a Progress Report either to continue or to close your study. If the IRB does not reapprove your research by the specified expiration date, ALL research activities MUST STOP, including recruitment and enrollment of participants, interventions and interactions with current participants, collection of data, and data analysis.

Please note, this approval is through the U.C. IRB only. You may be responsible for reporting to other regulatory officials (e.g., VA Research and Development Office, UC Health- University Hospital). Please check with your Institution and Department to ensure you have met all reporting requirements.

Julie Waltz-Gerlach, BSN, MPH, CIP
Vice Chair, UC IRB

Statement regarding International Conference on Harmonisation and Good Clinical Practices
The University of Cincinnati Institutional Review Board is duly constituted (fulfilling FDA requirements for diversity), has written procedures for initial and continuing review of clinical trials: prepares written minutes of convened meetings, and retains records pertaining to the review and approval process; all in compliance with requirements defined in 21 CFR Parts 50, 56 and 312 Code of Federal Regulations. This Institution is in compliance with the ICH GCP as they correspond to FDA/DHHS regulations.

An affirmative action/equal opportunity Institution
Appendix G:  
Informed Consent Document for Preliminary Phase

Adult Consent Form for Research  
University of Cincinnati  
Department: Health Promotion and Education, College of Education, Criminal Justice, and Human Services  
Principal Investigator: Taj Haider  
Faculty Advisor: Dr. Manoj Sharma

Title of Study: “Using social cognitive theory to predict physical activity behavior among college students of South Asian descent at two large Midwestern universities”

Introduction:  
You are being asked to take part in a research study. Please read this paper carefully and ask questions about anything that you do not understand.

Who is doing this research study?  
The person in charge of this research study is Taj Haider of the University of Cincinnati (UC) Department of Health Promotion and Education, College of Education, Criminal Justice, and Human Services.

What is the purpose of this research study?  
The purpose of this research project is to expand on the knowledge of physical activity in South Asian college students. There is currently little to no information regarding physical activity in South Asian college students and this study could add to that small pool of knowledge.

Who will be in this research study?  
About 30 people will take part in the first phase of the study. You may be in this first phase of the study if you are a college student identifying yourself as of South Asian descent. This means that, to participate in the study, one or both of your parents must identify themselves as Bangladeshi, Bhutanese, Indian, Pakistani, Nepali or Sri Lankan. In this phase of the study you must either be a full-time or part-time student during Winter Quarter 2011 at the University of Cincinnati, graduate or undergraduate.

What will you be asked to do in this research study, and how long will it take?  
You will be asked to complete a survey about your exercise within the last seven days, your attitude towards exercise, your expectations about exercise, your ability to work an exercise program into your schedule, and the support you feel to exercise. It will take about ten minutes to complete. You may complete the survey in one of the reserved rooms on East or West campus or request to complete the survey in private. In two weeks you will be asked via email to return to one of the rooms (or in private) and complete a second survey.
Are there any risks to being in this research study?
There are minimal risks associated with participating in this study. Those risks are boredom and tiredness from completing the survey.

Are there any benefits from being in this research study?
There are no direct benefits to you from participating in this study.

Will you have to pay anything to be in this research study?
No payment is required.

What will you get because of being in this research study?
You will not receive anything from participating in this study.

Do you have choices about taking part in this research study?
If you do not want to take part in this research study you can leave this document unsigned and exit the classroom, there are no consequences to not participating in the study.

How will your research information be kept confidential?
Information about you will be kept private by keeping your survey responses locked in a cabinet in the private home of the investigator, Taj Haider. The information obtained from the survey will only be seen by Taj Haider. Your email will be written on your survey, but only Taj Haider will have access to your personal email, and your responses.

Your information will be kept in a file locked in a cabinet in the Principal Investigator’s home for approximately three years. After that it will be shredded by a shredder.

Agents of the University of Cincinnati may inspect study records for audit or quality assurance purposes.

What are your legal rights in this research study?
Nothing in this consent form waives any legal rights you may have. This consent form also does not release the investigator, the institution, or its agents from liability for negligence.

What if you have questions about this research study?
If you have any questions or concerns about this research study, you should contact Taj Haider at 513-448-8847 or by email at haidertl@mail.uc.edu

The UC Institutional Review Board – Social and Behavioral Sciences (IRB-S) reviews all non-medical research projects that involve human participants to be sure the rights and welfare of participants are protected.

If you have questions about your rights as a participant or complaints about the study, you may contact the Chairperson of the UC IRB-S at (513) 558-5784. Or, you may call the UC Research Compliance Hotline at (800) 889-1547, or write to the IRB-S, 300 University Hall, ML 0567, 51 Goodman Drive, Cincinnati, OH 45221-0567, or email the IRB office at irb@ucmail.uc.edu.
Do you HAVE to take part in this research study?
No one has to be in this research study. Refusing to take part will NOT cause any penalty or loss of benefits that you would otherwise have. You may start and then change your mind and stop at any time. To stop being in the study, you should tell Taj Haider and she will discard your responses.

Agreement:
I have read this information and have received answers to any questions I asked. I give my consent to participate in this research study. I will receive a copy of this signed and dated consent form to keep.

Participant Name (please print) ________________________________

Participant Signature ___________________________ Date _______

Signature of Person Obtaining Consent _________________ Date ______
Appendix H:
Information Sheet for Main Phase of the Study

Information Sheet for Research
University of Cincinnati
Department: Health Promotion and Education, College of Education, Criminal Justice, and Human Services
Principal Investigator: Taj Haider
Faculty Advisor: Dr. Manoj Sharma

Title of Study: “Using social cognitive theory to predict exercise behavior among college students of South Asian descent at two large Midwestern universities.”

Introduction:
You are being asked to take part in a research study. Please read this paper carefully and ask questions about anything that you do not understand.

Who is doing this research study?
The person in charge of this research study is Taj Haider of the University of Cincinnati (UC) Department of Health Promotion and Education, College of Education, Criminal Justice, and Human Services.

What is the purpose of this research study?
The purpose of this research project is to expand on the knowledge of exercise in South Asian college students. There is currently little to no information regarding exercise in South Asian college students and this study could add to that small pool of knowledge.

Who will be in this research study?
About 184 people will take part in this phase of the study. You may be in this study if you are a college student identifying yourself as of South Asian descent. This means that, to participate in the study, one or both of your parents must identify themselves as Bangladeshi, Bhutanese, Indian, Pakistani, Nepali or Sri Lankan. In this phase of the study you must either be a full-time or part-time student during Winter Quarter 2011 at the University of Cincinnati or Ohio University. You can be either a graduate or undergraduate student.

What will you be asked to do in this research study, and how long will it take?
You will be asked to complete a survey about your exercise within the last seven days, your attitude towards exercise, your expectations about exercise, your ability to work an exercise program into your schedule, and the support you feel to exercise. It will take about ten minutes to complete. The research will take place anywhere you have access to the internet as the survey is electronic. By following the link at the bottom of this page you can begin the survey on Survey Monkey.

Are there any risks to being in this research study?
The risks of participating in this study are minimal and they include boredom and tiredness.

**Are there any benefits from being in this research study?**
There are no direct benefits to you from being in this study.

**Will you have to pay anything to be in this research study?**
You will not receive any payment for being in this study.

**What will you get because of being in this research study?**
Nothing will be provided to you for being in this study.

**Do you have choices about taking part in this research study?**
If you do not want to take part in this research study you do not have to follow the link provided at the bottom of this page. There are no consequences to not participating in this study.

**How will your research information be kept confidential?**
Information about you will be kept private by keeping your responses on a password locked personal computer of the Principal Investigator. Survey Monkey is a completely anonymous service that allows you to respond to the survey without recording your identity. None of your responses can be matched to you.

Your information will be kept on the password secured personal computer of Taj Haider for three years. After that it will be permanently erased by Taj Haider and discarded.

Agents of the University of Cincinnati may inspect study records for audit or quality assurance purposes.

**What are your legal rights in this research study?**
Nothing in this consent form waives any legal rights you may have. This consent form also does not release the investigator, the institution, or its agents from liability for negligence.

**What if you have questions about this research study?**
If you have any questions or concerns about this research study, you should contact Taj Haider at 513-448-8847 or by email at haiderti@mail.uc.edu.

The UC Institutional Review Board – Social and Behavioral Sciences (IRB-S) reviews all non-medical research projects that involve human participants to be sure the rights and welfare of participants are protected.

If you have questions about your rights as a participant or complaints about the study, you may contact the Chairperson of the UC IRB-S at (513) 558-5784. Or, you may call the UC Research Compliance Hotline at (800) 889-1547, or write to the IRB-S, 300 University Hall, ML 0567, 51 Goodman Drive, Cincinnati, OH 45221-0567, or email the IRB office at irb@ucmail.uc.edu.
**Do you HAVE to take part in this research study?**
No one has to be in this research study. Refusing to take part will NOT cause any penalty or loss of benefits that you would otherwise have. You may start and then change your mind and stop at any time. To stop being in the study, you should tell

**BY SUBMITTING YOUR COMPLETED SURVEY (or BY TAKING PART IN THESE ACTIVITIES)**
YOU INDICATE YOUR CONSENT FOR YOUR ANSWERS TO BE USED IN THIS RESEARCH STUDY.

PLEASE KEEP THIS INFORMATION SHEET FOR YOUR REFERENCE.

LINK TO SURVEY HERE
Appendix I:
Permission Letter from University of Cincinnati

The purpose of this email is to grant Taj Hider permission to seek out various student organization presidents to assist in information gathering for his study “Using social cognitive theory to predict physical activity among college students of South Asian descent at two large midwestern universities.”

We have our 300 student organizations and we provide a directory on our website so individuals on and off campus can have access to a contact person in that organization.

If you have any questions, please let me know.

Dr. Downing

Dr. Stacy L. Downing | Director, Student Activities and Leadership Development
University of Cincinnati | 455 Steger Student Life Center | Cincinnati, OH 45221-0136
513.556.6115 Office | 513.556.6077 Fax | stacy.downing@uc.edu | www.uc.edu/sald
Develop as a leader. Grow as a person.

cid:image001.gif@01CA3873.2B898DF0 Find us on Facebook to discover more about SALD!
Appendix I:
Permission Letter from Ohio University

Dear Taj,

The information listed on the Student Organization Directory is public information and you can contact the officers of student organization to see if they will participate in your survey. You do not need approval from our office to contact the student organizations. It will be the decision of each organization that you contact as to whether or not they choose to respond.

Thank you and good luck with your degree.

Thank you,

Ann Addington