

ACCULTURATIVE STRESS, SOCIAL SUPPORT, AND PHYSICAL ACTIVITY  
AMONG INTERNATIONAL STUDENTS IN THE UNITED STATES

A Thesis

by

BO SOO KIM

Submitted to the Office of Graduate Studies of  
Texas A&M University  
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

December 2009

Major Subject: Kinesiology

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Approved by:

Chair of Committee,  
Committee Members,

Head of Department,

George B. Cunningham

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## ABSTRACT

Acculturative Stress, Social Support, and Physical Activity among International Students  
in the United States (December 2009).

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Chair of Advisory Committee: Dr. George B. Cunningham

The purpose of this study was to investigate the extent to which acculturative stress is associated with physical activity levels of international students, the influence of types and sources of social support on their physical activity levels, and the degree to which social support affects the relationship between their physical activity levels and acculturative stress. 215 Korean international students from Bryan-College Station, Texas, were recruited for this study. The results revealed that only the stressor of English language difficulty, one of acculturative stress, negatively influenced physical activity levels. Social support was positively associated with physical activity levels. Finally, in the role of social support between acculturative stress and physical activity levels, the support of Korean friends and American friends positively affected vigorous physical activity level. These results suggest that social support for international students is likely to be one of most important factors for their physical activity levels. Since the convenient sample of Korean international students may not be representative of international students in the United States, further study needs representative samples in order to establish the generality of international students studying in the United States. Moreover,

future research is necessary to examine various sources and types of social support which influence physical activity of international students.

## DEDICATION

To my family.

## ACKNOWLEDGEMENTS

First and foremost, I sincerely appreciate my committee chair, Dr. George B. Cunningham. I had an interest in the field of diversity management thorough his class. Also, he encouraged me to enlarge the view of the world in sport organization through the importance of diversity management. Whenever I had personally a lot of problems during the process of this research, his advice and appropriate guidance enabled me to overcome the problems. Even though the process of this study was not easy for me as an international student studying in the United States, I have learned many things from his guidance. I really appreciate his guidance again. Likewise, I would like to thank my other committee member, Dr. John N. Singer. He always treated me kindly. Also, I would like to thank Dr. Ben D. Welch. I really appreciate his kindness to me.

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## CHAPTER I

### INTRODUCTION

The many benefits of regular physical activity are clear. For instance, the U.S. Department of Health and Human Services (2008) reported that physical activity reduces various health risks such that it improves health status of children, youth, and adults. The report also showed that physical activity has numerous benefits for individuals with disabilities and racial and ethnic groups for their whole lives. According to Cheng, Stier, Kim, Xu, and Koshimizu (2004), participation in recreational and leisure-time physical activities is an important aspect in individuals' well-being, which can be enhanced by improvement of physical fitness, stress relief, and experiences of mutual interaction with a variety of people through physical activities. Several other studies also revealed that participation in physical activities has positive effects on physical and mental health of various populations in a variety of aspects: adolescents' emotional well-being (Donaldson & Ronan, 2006), suicidal behavior among high school students (Brown et al., 2007), socio-economic status (Cerin & Leslie, 2008), and immigrants (Yang, Laffrey, Stuijbergen, Im, May, & Kouzekanani, 2007).

Despite these many benefits, some of other investigations showed that there exist various barriers to physical activity, including one's health status, social influences, and being in a poor economic situation; furthermore, these barriers exist despite the fact that people realize that exercise and physical activities are very important in improvement of

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This thesis follows the style of the *Sociology of Sport Journal*.

physical and psychological health (Resnick, Orwig, Magaziner, & Wynne, 2002; Savage & Holcomb, 1998). According to Stokols (1996), these barriers are related to environmental and socio-cultural constraints. However, most studies are mainly focused on disparities in physical activities of Whites, who have higher levels of physical activity than minority groups (Centers for Disease Control and Prevention, 2000; Crespo et al., 2000). Wolin, Colditz, Stoddard, Emmons, and Sorensen (2006) pointed out that physical activity of minority populations are still left underexplored.

There is one particular population whose physical activity level was even more underexplored compared with other social classes and races: international students (Yoh, Yang, & Gordon, 2008). According to a study conducted by Hepper (2006), international students have an important effect on promoting cross-national cooperation and information exchange between cross-cultural issues. Additionally, these international student populations in the United States are gradually increasing. The number of international students studying in the United States was 623,805 which constitute 3.5% of total U.S. higher education enrollment in the 2007-2008, and it increased 7.0% from previous year (Institute of International Education, 2008). However, international college students have lower participation in physical activity than American students do (Yoh et al., 2008), although most colleges provide college students with physical activity facilities, intramurals, recreational sports, and sport events (Cheng et al., 2004). This low participation in physical activity can be attributed to many unique difficulties international students are experiencing, including cultural difference, language problems (Leong & Chou, 1996), academic stress (Misra & Castillo, 2004), and depression and

anxiety (Okazaki, 1997) in a new culture. Since international students already occupy a big portion of U.S. population and their numbers are increasing, it is important to examine their physical activity levels and figure out the way to improve their participation in physical activities.

The purpose of this thesis is to investigate international college students' physical activity in greater depth. Specifically, I examine the extent to which acculturative stress is associated with physical activities of international students, as well as the degree to which social support affects physical activity levels of these students by buffering acculturative stress. Especially, this study is focused on the roles of friends of international students as a social support. This is because social support is one of the substantial moderators to affect the relations between acculturative stress levels and physical activities of these students. The analysis of this study consists of three processes mentioned below.

First, it is necessary to examine the relationship between acculturative stress and physical activity level among international students. The United States has increasingly become a multicultural society due to the increase in racial and ethnic diversity (Smart & Smart, 1995). As a result, newcomers sometimes experience acculturative stress due to the changes in their lives for adaptation of cultural diversity in the U.S. with respect to societal, economic, and environmental aspects (Arends-Toth & Van de Vijver, 2007). These effects are especially salient among international students (Church, 1982) who face stress associated with language fluency, academic pressure, financial concern, homesickness, culture difference, and perceived discrimination (Lee, Koeske, & Sales; 2004; Sandu & Asrabadi, 1994; Wei et al., 2007, Yang & Clum, 1995; Ye, 2006; Yeh &

Inose, 2003). However, these studies have some limitations in that they are only concerned with psychological outcomes by focusing on the relationship between acculturative stress and mental health of international students. In this study, I seek to expand this understanding by investigating how acculturative stress can affect the physical activity level of international students.

Second, this thesis analyzes how social support affects physical activity level among international students. It is known that social support is a particular type of social influence to improve physical activity level (Lox, Martin Ginis, & Petruzzello, 2006). In this research stream, social support is defined as assistance, well-being, and information that individuals receive from societal organization or the other people. Indeed, the approach of social support is developed from one-dimension to multi-dimension. For example, in the paper of Giles-Corti & Donovan (2003), the physical activity level of individuals is highly correlated with the level of each social support in terms of simply one dimension (e.g. friends, family, and the number of exercise members). However, other studies based on a multidimensional approach not only look at diverse types of social support such as companionship, emotional, and informational support, but also emphasize the quality associated with social support perceived by the exerciser (Chogahara, 1999; Duncan, Duncan, & McAuley, 1993; Leslie et al., 1999; Lox et al., 2006). Moreover, previous studies about the effect of social support on physical activity explain many demographic factors except international student group: physical activity of youth students (Duncan, Duncan, & Strycker, 2005; Robbins, Stommel, & Hamel, 2008), older adults (Chogahara, 1999; Resnick et al., 2002), and women (Eyler et al., 1999).

Thus, based on a multidimensional approach, I analyze the correlation between social support and the level of physical activity among international students.

Finally, in addition to examining the main effects of social support, I also study its possible moderating effects. Since social support is also one of effective social influences to alleviate negative distress of risk factors in acculturative stress (Crockett et al., 2007; Williams & Berry, 1991), I investigate how and to what extent social support influence acculturative stress among international students who suffer from psychological problems. The role of social support in buffering acculturative stress has been examined by many studies which investigated various populations such as general population (Chohen & Wills, 1985), Mexican American college students (Crockett et al., 2007), Korean and Indian immigrant adolescents (Thomas & Choi, 2006), Chinese international students (Ye, 2006), and Korean international students (Lee, Koeske, & Sales, 2004). Thus, considering the effects of social support, this study explains how social support in a multidimensional approach decreases acculturative stress as well as enhances physical activities of international students.

### Research Questions

In drawing from this literature, I advanced the following research questions that were used to guide the thesis:

*RQ1:* What is the relationship between international students' acculturative stress and their physical activity levels?

*RQ2:* What is the relationship between international students' social support and their physical activity levels?

*RQ3:* How does social support influence the relationship between international students' acculturative stress and physical activity levels?

### Contributions

This study has the potential to make several contributions. Specifically, this study has the potential to identify solutions to the following three problems related to the level of physical activity among international students. First, the result of this paper shows whether international students under high acculturative stress (e.g. language problems, academic pressure, discrimination and so on) have lower level of physical activity. Second, this paper concentrates on the role of different types of friends of international students with respect to companionship, emotional, and informational support in a multidimensional approach on social support. Because each aspect of friendship between different ethnic groups can have different effects and causalities, international students are most likely to be influenced by their friends on campus when they live apart from their family. Finally, it is necessary to investigate how and to what extent these social

supports based on a multidimensional approach can relieve acculturative stress among international students.

### Organization

The remainder of this thesis is organized as follows. Chapter II contains the literature review, covering various aspects related to acculturative stress, social support, and physical activity among international students. Chapter III presents the methods used in this thesis, including statistical analyses to model the relationship and interaction among acculturative stress, social support, and physical activity levels in international students. The chapter also details participants and procedures. Chapter IV contains the results and interprets the findings related to three research questions. Finally, Chapter V presents overall conclusions and discusses limitations and implications.

## CHAPTER II

### REVIEW OF LITERATURE

The purpose of this study is to examine the relationship between acculturative stress and the physical activity of international students, as well as how social support affects physical activity levels of these students by buffering acculturative stress. In this chapter, I outline previous studies on physical activity among international students by focusing on the following areas: (a) the importance of physical activity, (b) international students and physical activity, (c) the acculturation process and acculturative stress of international students, (d) acculturation and physical activity, (e) acculturative stress and physical activity, (f) social support and physical activity, and (g) social support and acculturative stress.

#### The Importance of Physical Activity

It is very well established that regular physical activity plays an important role in mental and physical health of individuals. According to a recent U.S. government report, *physical activity* is defined as “bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above the basal level” and *exercise*, a particular type of physical activity, is characterized by planned body movement to maintain or to enhance physical fitness (U.S. Department of Health and Human Services, 2008, p. 43). The report pointed out that regular physical activity has numerous benefits in that it reduces various health risks and improves overall well-being. These effects are observed among young children to elderly adults, individuals with disabilities, and across cultural,

racial, or ethnic backgrounds. For example, Resnick, Orwig, Magaziner, and Wynne (2002) investigated exercise behaviors in a sample of 74 older adults. The findings from this study indicated that exercise is crucial for the enhancement of both physical and psychological health (e.g. self-efficacy and outcome expectations). Cheng et al. (2004) examined the leisure time physical activity and recreational sports participation among international college students from countries including Canada, China, Japan, South Korea, and Iran in the United States. The study reported that participation in leisure and sport activities is likely to help college students to improve well-being as well as social skills. Donaldson and Ronan (2006) researched emotional well-being related to children's sports participation in a sample of 203 young adolescents. They concluded that increased levels of sports participation decrease emotional and behavioral problems. Brown et al. (2007) identified the relationships among suicidal behavior, physical activity, and sports team participation in a sample of 10,530 U.S. high school students. Their study found that the students who frequently participated in physical activity or joined a sports team had lower suicidal behaviors than nonparticipant peers do. Additionally, Yang et al. (2007) examined the level of leisure-time physical activity in a sample of 152 middle-aged Korean American women. The study showed that leisure-time physical activity is important for women immigrants to enhance health status in a new environment. Cerin and Leslie (2008) investigated the relationship between socio-economic status and leisure-time physical activity with a sample of 2,194 Australian adults. This study revealed that physical activity participation enhances social networks and self-esteem.

However, disparities of physical activity still exist in a variety of forms in spite of these many benefits. Stokols (1996) and Breslow (1996) pointed out that the barriers of health promotion are affected by environmental and social-ecological constraints related to individuals' health habits. Resnick et al. (2002) dealt with relationships between exercise behavior and social support in a sample of 74 older adults. The finding revealed that older adults have low social support for health but, they also found that friends are more likely to improve the exercise behaviors of older adults than family members or health experts. Wolin, Colditz, Stoddard, Emmons, and Sorensen (2006) pointed out that the physical activity of minority populations is still left underexplored, mentioning that Whites have higher levels of physical activity than minority populations.

#### International Students and Physical Activity

As U.S. society becomes more multicultural, physical aspects of diversity in minority groups also became very important (Cunningham, 2007). According to Paige (1990), *international students* are defined as “individuals who temporarily reside in a country other than their country of citizenship or permanent residence in order to participate in international educational exchange as students” (p. 162). Sandhu and Asrabadi (1994) found that international students can provide people with an opportunity to support cultural diversity and international understanding. International students have an important effect on promoting cross-national cooperation and information exchange between cross-cultural issues (Hepper, 2006). Moreover, these international student populations in the United States are gradually increasing. The total enrollment of

international students including language training in the United States was 1,046,468 in 2008 ( Student and Exchange Visitor Information System, 2009). Specifically, according to Institute of International Education (2008), the number of international students studying in U.S higher education excluding those for language training was 623,805 which constitute 3.5% of total U.S higher education enrollment in the 2007-2008 school years showing a 7.0% increase from the previous year. The largest portions of the international students in U.S. higher education came from India (15.2%), China (13%), and South Korea (11.1%).

Despite their prominence in American universities, research suggests that physical activity levels of international students are very low compared with other social classes and races (Yoh, Yang, & Gordon, 2008). Yoh et al. (2008) examined physical activity participation in a sample of 521 international students from Asia, Europe, South America, North America, and Africa in the United States. The study found that international college students have lower participation in physical activity than American students. Especially, international students from Asian and African countries spend less time on physical activity than those from other countries, although participation in physical activity is encouraged in every college. The importance of physical activity for college students is also emphasized in Cheng and colleagues' study (2004). This study indicated that recreational and sport activities in higher education are important for college students because these sport activities enable them to maintain health, enhance social skill, and relieve stress in college life.

### The Acculturation Process and Acculturative Stress of International Students

Acculturation represents one factor that might explain the low physical activity levels of international students. The basic tenets of this construct are presented in the following space.

Newcomers encounter a number of challenging experiences in a new environment. This process of adaptation to a new culture is first proposed by Redfield, Linton, and Herskovits (1936), who defined *acculturation* as “phenomena which results when groups of individuals having different cultures come into continuous first-hand contact, with subsequent changes in the original cultural patterns of either or both groups.” (p. 149). The Social Science Research Council (1954) reported that the phenomena of acculturation are continuous interactions of individual characteristics and cross-culturally social context. Moreover, Chance (1965) explained that acculturation is a change in individuals’ attitudes, cognition, and perceptions in order to adjust to a new society. This process of acculturation is based on four types of psychological adaptations: assimilation, integration, separation, and marginalization (Berry, 1980; Berry & Sam, 1997).

*Assimilation* occurs when individuals who do not want to maintain the identity of their own culture seek to interact with other cultures. *Integration* occurs when people simultaneously want to have both their original culture and interactions with other cultures. *Separation* refers to the phenomenon in which individuals, who maintain their original culture, avoid interactions with other cultures. *Marginalization* occurs when people have little interest in both their original culture and relationships with other cultures. Berry (2003) concluded that acculturation is an important part of cross-cultural

psychology as individuals in cultural minority groups experience continuous contact with a new culture.

*Acculturative stress*, generated by the process of acculturation, is defined as the psychological impact arising from life events in a new culture related to depression, anxiety, and uncertainty (Berry, 1976; Church, 1982). According to Berry, Kim, Minde, and Mok (1987), acculturative stress is the cause of decreasing health with psychological, physical and social aspects when newcomers experience the process of acculturation. This cultural phenomenon is already occurring in U.S. higher education (Bradley, Parr, Lan, Bingi, & Gould, 1995), as it becomes increasingly multicultural due to the increase in racial and ethnic groups (Smart & Smart, 1995). Several researchers have investigated this issue among international students in the U.S., as these persons undergo the process of cultural adaptation in different ways. These studies identified the following six acculturative stressors: English language proficiency, academic pressure, cultural adjustment, financial concern, perceived racial discrimination, and future concern.

#### *English Language Proficiency*

The language barrier is the most serious and prevalent problem for international students (Mori, 2000). According to Hayes and Lin (1994), international students who fluently speak English have better adapted to a new culture. Also, higher English ability enables international students to more easily interact with native friends. Yang and Clum (1994) investigated the relationship between life stress and cultural adjustment in a sample of 101 Asian international students. Their survey revealed that a high level of English speaking ability is likely to reduce their life stress, improving academic

achievement and developing new friendships. The conclusion is consistent with the study conducted by Nwadoria and McAdoo (1996) on an Amerasian who is a person born in Asia, to a U.S. military father and an Asian mother. The finding indicated that who reported having lower spoken English abilities tend to have a higher level of acculturative stress. Lin and Yi (1997) also concluded that many international students in the United States are more likely to experience difficulties with English language ability which is a critical stressor and causes a barrier against their academic achievement. Furthermore, lack of proper English skills has negative implications on teaching performance (e.g. graduate teaching assistants) and academic performance (Mori, 2000; Pedersen, 1991). According to Yeh and Inose's (2003) paper, international students who comfortably speak English report lower levels of acculturative distress.

The study by Constantine, Okazaki, and Utsey (2004) shows that high English fluency does not only help international students to better adapt to a new circumstance, but also affects social skills of them. This finding showed that international students with low English language proficiency have more depression in a sample of 320 African, Asian, and Latin American international college students. These results are consistent with Kuo and Roysircar's (2004) study of Chinese immigrant adolescents in Canada, as these authors found that English reading ability is strongly related to low acculturative stress. Ye (2005) pointed out that Asian international students have more difficulties with speaking and understanding English than European students do. Also, lack of English proficiency becomes one of barriers in relationship between international students and Americans because of poor communication between them. The study found that

international students with higher English proficiency have a lower level of acculturative stress in a sample of 115 East Asian international students.

### *Academic Pressure*

Since the academic achievement is an ultimate goal for international students, an academic burden causes acculturative stress in a new educational system. In a study of 29 international students, Kaczmarek, Matlock, Merta, Ames, and Ross (1994) reported that academic concern is strongly related to their adjustment to college. According to Rodriguez, Myers, Morris, and Cardoza (2000), lack of self-confidence of academic matters in typical college demands is the most serious problem in minority-status stressors that increases levels of psychological distress in 338 Latino college students. The research on 143 international students from Africa, Asia, and Middle East, Misra, Crist, and Burant (2003) also concluded that academic achievement is one of the critical stressors for international students, who have heavy pressures to accomplish high academic success and to maintain scholarship or financial support from school. The finding showed that these students in American colleges and universities are under higher academic pressure for getting higher grades than American students are.

### *Cultural Adjustment*

The experience of cultural differences such as food, climate, education system, social values, and custom is the first step in the process of acculturation when newcomers come to a new circumstance. According to Church (1982), international students who highly have their own cultural awareness of home countries toward food, language, educational system, and values have low adaptation in a new culture and also less

interaction with Americans. Dillard and Chisolm (1983) reported that international students in a multicultural context face various differences in food, climate, social values, and verbal or nonverbal communications on campus. These experiences frequently generate stress (e.g. depression and frustration), and also result in a loss of their personal identity and cultural values.

Investigating the influence of self-construal between two groups in the comparison study of 220 East Asian and American college students, Cross (1995) explained that East Asian students find cultural adaptation more challenging than American students do, due to differences in two cultural aspects: collectivism and individualism. For example, East Asian students are characterized by *collectivism* in which the individuals are owned by their relationships with other important people or in groups. In contrast, American students are characterized by *individualism* which means an entity of being different from relationships with other people or group memberships. This explanation is consistent with Mori (2000), Constantine et al. (2004), and Ye (2006). International students have wide cultural gaps in social relationships with American students because American students in individual-oriented society have much less permanent friendships than do Asian international students (Mori, 2000). In the study of 320 African, Asian, and Latin American international college student, those students with collectivistic cultures not only have a tendency to foster interdependence in social obligations, but also tend to minimize expressing personal concerns because they do not want to burden others with their own problems (Constantine et al., 2004). Most international students from Asian countries have a strong collectivistic orientation,

whereas the students in western countries show individualism (Ye, 2006). As a result, these studies concluded that international students need to adjust different cultures because fundamental differences in cultural values exist.

### *Financial Concern*

Financial concern is regarded as one of the important factors to cause acculturative stress. It is erroneous assumption that most international students are wealthy (Mori, 2000). Church (1982) mentioned that financial concern is one of the most serious problems for international students seeking cultural adjustment. According to Yang and Clum's (1994) research, international students have some limitations to apply for financial aid and employment opportunities (e.g. teaching assistants and research assistants). Lin and Yi (1997) reported that financial concern of international students is, in part, caused by legal responsibility to maintain full-time registration and the fact that they have little access to financial loans or scholarships. Mori (2000) also indicated that international students have limited opportunities for employment outside the schools and for federal financial aid due to immigration regulation. This study is concurred with the research of Rodriguez et al. (2000) about the relationship between psychological adjustment and acculturative stress in a sample of 338 Latino college students. The finding inferred that financial problems have a negative effect on their college life. Also, these students who have economic disadvantage tend to experience the increased academic failure. In contrast, Misra et al. (2003) attained the different conclusion that financial concern among international students is the lowest predictor to affect

acculturative stress compared with academic concern, cultural adjustment, perceived discrimination in their life stressors.

### *Perceived Racial Discrimination*

Previous studies have examined the aspect of perceived racial discrimination in various minority groups related to acculturative stress. In a study of 214 multicultural college undergraduate students, Mena, Padilla, and Maldonado (1987) pointed out that perceived discrimination is the most stressful aspect in the process of acculturation. They found that students with higher ethnic identity have more acculturative stress and lower self-esteem resulting from discrimination. This finding is consistent with the report of the International Student Association (Pedersen, 1991). The report mentioned that American students have the apathy toward international students; they are likely to be little interested in the difficulties of international students. Sandhu and Asrabadi (1994) also indicated that U.S. students are rarely aware of necessity to be socialized with international students, who face social barriers with respect to both cultural and language differences. As a result, international students feel socially alienated on campus. The findings revealed that perceived discrimination contributed the highest percentage (38.3%) to the total variance compared with other factors: homesickness (9.0%), perceived hate (7.2%), fear (6.1%), culture shock (3.2%), and guilt (3.1%) in a study of 128 international students (Sandhu & Asrabadi, 1994). These finding is consistent with Gil, Vega, and Dima's (1994) and Finch and Vega's (2003) studies. Foreign-born boys are more likely to have higher levels of perceived discrimination than boys who are born in the U.S. according to the study of 6,760 boys among both immigrant and native-born

Hispanics (Gil et al., 1994). Perceived discrimination has negative effects on individuals who seek social support in a sample of 3012 Mexican-origin adults (Finch & Vega, 2003). According to Ye (2005), perceived discrimination is an important factor related to social utility motivation and entertainment motivation in 115 East Asian international students.

#### *Future Concern*

Lin and Yi (1997) pointed out that international students have anxieties or readjustment in securing employment when they return to their country after graduation. Mori (2000) also indicated that future concern of international students becomes more stressful after their graduation. The study mentioned that future concerns include the students' future career plans and also their changed identity because their values, beliefs, and customs are likely to be altered in a new country during their prolonged stay in U.S.

#### Acculturation and Physical Activity

Previous studies have examined that acculturation is strongly related to health behaviors in minority populations. Crespo, Smit, Carter-Pokras, and Andersen (2001) investigated the relationship between acculturation and leisure-time physical inactivity in Mexican American adults. The study found that Mexican Americans who are comfortable with English or were born in the U.S. have a higher prevalence of leisure-time physical activity than those whose main language is Spanish or who were born in Mexico. The result is consistent with the study of Evenson and colleague (2004), who found that Latina immigrants with higher acculturation are likely to be more physically active. Also, those who were younger than 25 years when they arrived to the U.S. have higher levels of

physical activity, but length of residence in the U.S. is not associated with physical activity level among them. Wolin et al. (2006) investigated physical activity related to language acculturation in multiethnic populations. The finding revealed that people with high language acculturation have higher level of physical activity than those with low language acculturation. On the other hand, Yang et al. (2007) did not agree with other studies. They examined the relationship between acculturation and leisure-time physical activity in a sample of 152 midlife Korean American women, and results showed that the level of acculturation was not associated with the level of leisure-time physical activity among them.

#### Acculturative Stress and Physical Activity

According to Berry et al. (1987), acculturative stress is a stressful predictor to reduce health status including psychological, physical, and social aspects. Mallinckrodt and Leong's research (1992) mentioned that it is necessary to be aware of the relationship between stress and physical symptoms among international students. This research is consistent with the study of Smart and Smart (1995) explaining that various risk factors for physical illness are derived from psychological stress imposed by acculturation process among Hispanic immigrants. Moreover, both exercise and physical activity are very important in the improvement of physical health and psychological benefits (Resnick et al., 2002; Savage & Holcomb, 1998). Finch and Vega (2003) investigated acculturative stress (e.g. perceived discrimination, language conflict, and legal status stress), social support and physical health in a sample of 3012 Mexican-origin adults aged

18-59. They found that the only discrimination negatively affects health status among Latinos, but high social support moderates perceived discrimination. These studies have emphasized the importance of relationship between acculturative stress and physical activity. However, few studies investigated the relationship between acculturative stress and physical activity among international students in U.S.

### Social Support and Physical Activity

Previous studies have examined the effect of social support either on physical activity or acculturative stress. Social support is an important resource in social environment to mediate the relationship between psychological and physical problems; people with low social support are likely to have stressful life conditions, and the lack of social support causes their psychological symptoms and physical disease (Schaefer, Coyne, & Lazarus, 1981). *Social support* is defined as the comfort, assistance, well-being, and information that individuals receive from formal or informal contacts with societal organization or the other people (Cohen, Underwood, & Gottleb, 2000; Lox, Martin Ginis, & Petruzzello, 2006; Wallston, Alagna, DeVellis, & Devellis, 1983).

While social support has been examined from a one-dimensional perspective, there is increasing evidence that the construct is comprised of multiple dimensions (e.g., Lox, Martin Ginis, & Petruzzello, 2006). Given that the multidimensional approach provides a more complete picture of social support, I review that literature and its affect on acculturation stress and physical activity.

*Types and Sources of Social Support and Physical Activity: Multi-dimension Approach*

Schaefer et al. (1981) examined three types of perceived social support, including emotional, informational, and tangible support, and their relation to physical health status in a sample of 100 men and women 45-64 years old. The result explained that all the variables of social support have a positive effect on physical health. Wallston and colleague's review (1983) reported that various sources or types of social support contribute to different outcomes in physical health. Chogahara (1999) surveyed social influences in a multidimensional scale on physical activity in a sample of 479 adults aged 55 and older. This study was focused on three resources of support including family, friend, and health expert and three types of support containing companionship, esteem, and informational support. The findings showed that types of social support have different impacts on physical activity of the old. For example, friends in companionship support had a higher effect on physical activity of old adults than did family and health experts in companionship support. These studies are consistent with the observed relationship between social relationships and health in the study by Cohen et al. (2000). This study indicated that both the sources and types of emotional, informational, and instrumental support differently influence health risk, recovery from physical illness, and behaviors for health such as exercise, diet, and smoking. For example, beneficial information plays a major role in health behaviors related to health-risk situation in that exercise members could provide people with information regarding appropriate programs, medical services, food, and risk factors for health.

Recently, Lox et al. (2006) examined social influence on exercise. Their work focused on four sources of support- family members including parents, exercise partners, exercise class leaders, and physicians, and particular five types of support- instrumental, emotional, informational, companionship, and validation support. This study indicated that different sources of support differently influence behaviors of exercisers.

*Instrumental support* involves tangible and practical assistances (e.g. spotting equipment at the gym, driving to exercise class, or babysitting). *Emotional support* provides exercisers with encouragement, comfort, and praise to enhance the levels of physical activity. *Informational support* involves appropriate program suggestions, directions, and advice from family members, friends, fitness experts or health practitioners. *Companionship support* provides exercisers with the availability of people such as family, friends, or exercise members. *Validation* involves the evaluation of exercise process which confirms feelings, experiences problems, and health status compared with other exercisers.

Robbins, Stommel, and Hamel (2008) investigated the relationship between social support and physical activity with regard to age and gender differences in a sample of 105 boys and 101 girls. This study was also focused on different sources of support (e.g. family members, peers, gym teachers, and coaches) and forms of support (e.g. encouragement and transportation). The findings showed that boys and girls receive different supports from family members according to age and gender. For example, older girls perceive peers, gym teachers, and coaches as more important sources of social

support than family members. Moreover, parental transportation and encouragement are strongly related to increase in the levels of physical activity.

### Social Support and Acculturative Stress

The importance of social support has been emphasized with respect to the sources of social support as well as different types of social support. Schaefer et al. (1981) investigated three types of perceived social support such as emotional, informational, and tangible support related to stressful life events in a sample of 100 men and women 45-64 years old. The findings showed that emotional and tangible supports have crucial functions to reduce depression and informational support is related to positive morale. Alvan, Belgrave, and Zea (1996) examined the types or sources of social support related to stress in a sample of 77 Latino College students. The finding revealed that emotional support from friends is more helpful than family when they have difficulties in academic adjustment and face racism. Choi (1997) investigated the relationship between four types of social support (e.g. belonging, emotional, tangible, and self-esteem) and five types of acculturative stress (e.g. family/cultural, immigration, marital, occupational/economic, and parental) in a sample of 271 Korean immigrants. The finding showed that social support buffers acculturative stress and decreases depressive symptoms both in men and women. Also, it showed that tangible and self-esteem support help reduce acculturative stress for women. Finch and Vega (2003) explained the relationship between acculturative stress and social support on physical health in a sample of 3012 Mexican-origin adults. They found that both instrumental and religious types of social support

moderate the level of discrimination as acculturative stress on self-rated health. Lee, Koeske, and Sales (2004) investigated the role of sources and types social support on both acculturative stress and mental health. They concluded that family as a source of social support does not serve as a buffer compared with friendship, but both emotional and practical types of social support play a major role in stressful symptoms. Ye (2006) surveyed the relationship between acculturative stress and interpersonal social support related to online use in ethnic social groups with a sample of 112 Chinese international students. The study disclosed that these students with high amounts of emotional and informational support from online ethnic groups have less acculturative stress such as negative feelings, perceived discrimination, and hatred excluding fear.

### Purpose

The purpose of this study is to investigate the extent to which acculturative stress is associated with physical activities of international students, as well as the degree to which social support affects physical activity levels of these students by buffering acculturative stress. Especially, this study is focused on the roles of friends of international students as a social support. I assume that social support from friends in a multidimensional approach is one of the substantial moderators to affect the relations between acculturative stress levels and physical activities of these students. Thus, quantitative methodology is used to measure the following research questions:

*RQ1:* What is the relationship between international students' acculturative stress and their physical activity levels?

*RQ2*: What is the relationship between international students' social support and their physical activity levels?

*RQ3*: How does social support influence the relationship between international students' acculturative stress and physical activity levels?

## CHAPTER III

### METHOD

#### Research Design

The purpose of this chapter is to provide an overview of the methods used to address the study's research questions. Specifically, I describe the sample selection, procedures, measure, and data analysis in detail.

#### Sample Selection

I gather data from Korean students studying in the United States. The decision to focus on Korean students is based on two factors. First, students from South Korea represent a large proportion (11.1%) of international students studying in the United States (Institute of International Education, 2008). Thus, by focusing on Koreans, I am able to understand factors that influence physical activity pattern among a large segment of the international student population. The second reason has to do with between-group variance. International students from different countries have different cultural characteristics. However, Korean international students are characterized by collectivism in a cultural aspect as same as other Asian, African, and Latin American students compared with American students characterized by individualism (Constantine et al. 2004; Cross, 1995; Mori, 2000; Ye, 2006).

## Procedures

The collection of data is exercised through contacts with Korean international students from two libraries, Korean Student Association, One Korean church, One Korean Catholic Church, and English Language Institute in Bryan and College Station areas, Texas. After explaining the purpose of the study, I ask participants to respond to the self-administered survey.

## Measures

Measures in this study consist of four sections, including participants' demographic information, physical activity, acculturative stress, and social support. All questionnaires are translated into Korean and back translated into English. Also, the original English version is attached because the research recruits Korean international students who conveniently understand Korean, as well as participants who are comfortable in both English and Korean.

### *Demographic Information*

The demographic questionnaire includes participants' information including age, gender, marital status, income, educational level, and length of residency in the United States.

### *Physical Activity*

Physical activity is measured with International Physical Activity Questionnaire (IPAQ) which is modified to examine physical activity level of Korean international

students (Craig et al., 2003). A telephone method is modified to a self-administered method. Craig et al (2003) reported Spearman's correlation coefficient of 0.8 for IPQA.

### *Acculturative Stress*

Acculturative stress is used with measurement of the index of life stress (ILS) for the study of cultural adjustment among Asian international students (Yang & Clum, 1995). The ILS consists of 31 items including six acculturative stressors: English language proficiency, academic pressure, cultural adjustment, financial concern, perceived racial discrimination, and future concern. The response range is originally from 0 (never) to 3 (often), but modified version in this study was used with added ranges from 1 (never) to 7 (often). Yang and Clum (1995) reported the test-retest reliability of .87 and the internal consistency estimate of .86 for ILS.

### *Social Support*

Social support for physical activity is utilized with adapted and modified measurement from a Multidimensional Scale for Social Influences on Physical Activity developed by Chogahara (1999). Three sources of support on original scale is modified from "family, friends, and health experts" to "Korean friends and American friends" and participants' range of the original scale is from 1 (never) to 4 (very often), but modified range is utilized with added ranges from 1 (never) to 7 (very often). The questionnaire in a multidimensional approach consists of 15-item self-report measure assessing both two sources and three types of support including companionship, informational, and emotional support. Chogahara (1999) reported the two week test-retest stability of .86.

### Data Analysis

Data analysis contains descriptive statistics including frequencies, means, and standard deviations and reliability estimates of acculturative stress and social support. Additionally, three research questions are interpreted through multiple regression analyses.

## CHAPTER IV

### RESULTS

This chapter presents the results of this study including the demographic information of the sample, the descriptive statistics for each variable, and reliability of measures in acculturative stress and social support. Additionally, this chapter shows and interprets findings related to three research questions.

#### Demographic Information of Participants

The demographic characteristics and the descriptive statistics are reported in Table 1. The participants for this research were recruited from Korean international students of two libraries, Korean Student Association, one Korean church, one Korean Catholic Church, and the English Language Institute in Bryan and College Station areas, Texas. The total number of respondents was 215. The age of the participants ranged from 18 to 47 with a mean of 29.45 years old ( $SD = 5.05$ ). A total of 157 (73.0%) of the participants were male and 58 (27.0%) were female. Most students ( $n = 109$ , 50.7%) were pursuing a doctoral degree, which was more than those pursuing their undergraduate degree ( $n = 38$ , 17.7%), master's degree ( $n = 53$ , 24.7%), or who were taking English Language Institute classes ( $n = 15$ , 7.0%). The single and the married in marital status of participants were respectively 121 (56.3%) and 94 (43.7%). The income level was distributed in the following manner: less than \$19,999 ( $n = 114$ , 53.0%), \$20,000 to \$39,999 ( $n = 79$ , 36.7%), \$40,000 to \$59,999 ( $n = 16$ , 7.4%), \$60,000 to 79,999 ( $n = 4$ ,

1.9%), and more than \$ 80,000 ( $n = 2$ , 0.9%). Finally, the length of residence in the United States of the participants were respectively less than one year ( $n = 64$ , 29.8%), one year to three years ( $n = 66$ , 30.7%), three years to five years ( $n = 42$ , 19.5%), and more than five years ( $n = 43$ , 20%).

Table 1

*Demographic Information and Descriptive Statistics of Participants (N = 215)*

|  | <i>f</i> | %    | M     | SD   |
|--|----------|------|-------|------|
| Age                                      |          |      | 29.45 | 5.05 |
| Gender                                   |          |      |       |      |
| Male                                     | 157      | 73   |       |      |
| Female                                   | 58       | 27   |       |      |
| Educational Level                        |          |      |       |      |
| Undergraduate                            | 38       | 17.7 |       |      |
| Master                                   | 53       | 24.7 |       |      |
| Doctoral                                 | 109      | 50.7 |       |      |
| ELI (English Language Institute)         | 15       | 7    |       |      |
| Marital Status                           |          |      |       |      |
| Single                                   | 121      | 56.3 |       |      |
| Married                                  | 94       | 43.7 |       |      |
| Income per Year                          |          |      |       |      |
| Less than \$19,999                       | 114      | 53.0 |       |      |
| \$20,000 to \$39,999                     | 79       | 36.7 |       |      |
| \$40,000 to \$59,999                     | 16       | 7.4  |       |      |
| \$60,000 to \$79,999                     | 4        | 1.9  |       |      |
| More than \$ 80,000                      | 2        | 0.9  |       |      |
| Length of Residence in the United States |          |      |       |      |
| Less than one year                       | 64       | 29.8 |       |      |
| One year to Three years                  | 66       | 30.7 |       |      |
| Three years to Five years                | 42       | 19.5 |       |      |
| More than Five years                     | 43       | 20.0 |       |      |

## Reliability of Measures

### *Acculturative Stress*

Almost all the questions on acculturative stress had acceptable reliability. Acculturative stress includes six acculturative stressors: English language proficiency, academic pressure, cultural adjustment, financial concern, perceived racial discrimination, and future concern. The internal consistency of the English language proficiency, academic pressure, cultural adjustment, financial concern, perceived racial discrimination, and future concern was supported by a Cronbach's alpha of .77, .63, .73, .80, .82, and .71, respectively. The relatively low value for academic pressure means that results concerning this variable should be interpreted with caution.

### *Social Support*

All the questions on social support had highly acceptable reliability. Social support is divided into six social supports: Korean companionship support, American companionship support, Korean informational support, American informational support, Korean emotional support, and American emotional support. The internal consistency of Korean companionship support, American companionship support, Korean informational support, American informational support, Korean emotional support, and American emotional support was supported by a Cronbach's alpha of .95, .93, .93, .95, .97, and .97 respectively.

### Analysis of Research Questions

*Research Question 1: What is the relationship between international students' acculturative stress and their physical activity levels?*

The bivariate correlations for the primary study including the eight variables are shown Table 2. Each stressor of academic pressure, cultural adjustment, financial concern, discrimination, and future concern did not have a significant relationship to vigorous physical activity and moderate physical activity. Only the stress of English language proficiency was significantly correlated with vigorous physical activity ( $r = .28, p < .05$ ) and moderate physical activity ( $r = -.16, p < .05$ ) for seven days. In coefficients for multiple regression analysis, the stress of English language proficiency negatively influence both vigorous physical activity ( $B = -.19, p < .05$ ) (see Table 3) and moderate physical activity ( $B = -.25, p < .05$ ) (see Table 4).

Table 2

*Bivariate Correlations between Each Stressor of Acculturative Stress and Physical Activity Levels*

| Variable                        | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8    |
|---------------------------------|--------|--------|--------|--------|--------|--------|--------|------|
| 1. Vigorous Physical Activity   | 1.00   |        |        |        |        |        |        |      |
| 2. Moderate Physical Activity   | .278** | 1.00   |        |        |        |        |        |      |
| 3. English Language Proficiency | -.137* | -.163* | 1.00   |        |        |        |        |      |
| 4. Academic Pressure            | -.047  | -.013  | .441** | 1.00   |        |        |        |      |
| 5. Cultural Adjustment          | -.014  | -.123  | .402** | .118   | 1.00   |        |        |      |
| 6. Financial Concern            | .022   | -.007  | .388** | .263** | .277** | 1.00   |        |      |
| 7. Discrimination               | .081   | .041   | .321** | .191** | .490** | .274** | 1.00   |      |
| 8. Future Concern               | -.115  | -.008  | .388** | .418** | .243** | .424** | .197** | 1.00 |

\*\* $p < .01$ ., \* $P < .05$ .

Table 3

*Coefficients for Multiple Regression Analysis: Relationships between Acculturative Stress and Vigorous Physical Activity*

|                              | B     | Std. Error | Beta  | T      | Sig. |
|------------------------------|-------|------------|-------|--------|------|
| (Constant)                   | 1.710 | .414       |       | 4.134  | .000 |
| English Language Proficiency | -.193 | .090       | -.183 | -2.146 | .033 |
| Academic Pressure            | .035  | .080       | .035  | .435   | .664 |
| Cultural Adjustment          | -.011 | .117       | -.007 | -.091  | .928 |
| Financial Concern            | .098  | .074       | .103  | 1.313  | .191 |
| Discrimination               | .180  | .107       | .134  | 1.688  | .093 |
| Future Concern               | -.131 | .084       | -.127 | -1.568 | .118 |

Table 4

*Coefficients for Multiple Regression Analysis: Relationships between Acculturative Stress and Moderate Physical Activity*

|                              | B     | Std. Error | Beta  | T      | Sig. |
|------------------------------|-------|------------|-------|--------|------|
| (Constant)                   | 2.205 | .489       |       | 4.505  | .000 |
| English Language Proficiency | -.254 | .106       | -.202 | -2.385 | .018 |
| Academic Pressure            | .042  | .095       | .035  | .442   | .659 |
| Cultural Adjustment          | -.237 | .138       | -.140 | -1.708 | .089 |
| Financial Concern            | .048  | .088       | .043  | .546   | .585 |
| Discrimination               | .237  | .126       | .148  | 1.874  | .062 |
| Future Concern               | .052  | .099       | .042  | .523   | .602 |

*Research Question 2: What is the relationship between international students' social support and their physical activity levels?*

Bivariate relationships between six social supports and two physical activities are listed in Table 5. American companionship support was significantly related to vigorous physical activity ( $r = .18, p < .01$ ) and moderate physical activity ( $r = .19, p < .01$ ). Korean informational support ( $r = .14, p < .05$ ), American informational support ( $r = .20, p < .01$ ), Korean emotional support ( $r = .19, p < .01$ ), and American emotional support ( $r = .22, p < .01$ ) are significantly related to vigorous physical activity. In coefficients for multiple regressions analysis, there were no significant relationships between each variable of social support and vigorous physical activity (see Table 6). However, American companionship ( $B = .31, p < .01$ ) and Korean emotional support ( $B = .23, p = .019$ ) had a direct effect on moderate physical activity (see Table 7).

Table 5

*Bivariate Correlations between Each Variable of Social Support and Physical Activity Levels*

| Variable                          | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8    |
|-----------------------------------|--------|--------|--------|--------|--------|--------|--------|------|
| 1. Vigorous Physical Activity     | 1.00   |        |        |        |        |        |        |      |
| 2. Moderate Physical Activity     | .278** | 1.00   |        |        |        |        |        |      |
| 3. Korean Companionship Support   | .109   | .036   | 1.00   |        |        |        |        |      |
| 4. American Companionship Support | .183** | .190** | .096   | 1.00   |        |        |        |      |
| 5. Korean Informational Support   | .141*  | .042   | .616** | .077   | 1.00   |        |        |      |
| 6. American Informational Support | .195** | .100   | -.007  | .697** | .145*  | 1.00   |        |      |
| 7. Korean Emotional Support       | .187** | .125   | .647** | .070   | .642** | .073   | 1.00   |      |
| 8. American Emotional Support     | .222** | .078   | .066   | .632** | .023   | .763** | .205** | 1.00 |

\*\* $p < .01$ , \*  $p < .05$ .

Table 6

*Coefficients for Multiple Regression Analysis: Relationships between Social Support and Vigorous Physical Activity*

|                                | B     | Std. Error | Beta  | T     | Sig. |
|--------------------------------|-------|------------|-------|-------|------|
| (Constant)                     | .348  | .343       |       | 1.015 | .312 |
| Korean Companionship Support   | -.025 | .080       | -.030 | -.316 | .752 |
| American Companionship Support | .067  | .094       | .070  | .719  | .473 |
| Korean Informational Support   | .050  | .085       | .060  | .593  | .554 |
| American Informational Support | .029  | .118       | .031  | .249  | .804 |
| Korean Emotional Support       | .107  | .081       | .135  | 1.314 | .190 |
| American Emotional Support     | .095  | .088       | .127  | 1.085 | .279 |

Table 7  
*Coefficients for Multiple Regression Analysis: Relationships between Social Support and Moderate Physical Activity*

|                                | B     | Std. Error | Beta  | T      | Sig. |
|--------------------------------|-------|------------|-------|--------|------|
| (Constant)                     | 1.151 | .410       |       | 2.808  | .005 |
| Korean Companionship Support   | -.086 | .095       | -.087 | -.903  | .368 |
| American Companionship Support | .306  | .112       | .267  | 2.742  | .007 |
| Korean Informational Support   | -.080 | .102       | -.081 | -.791  | .430 |
| American Informational Support | .024  | .141       | .022  | .174   | .862 |
| Korean Emotional Support       | .229  | .097       | .244  | 2.354  | .019 |
| American Emotional Support     | -.133 | .105       | -.150 | -1.270 | .205 |

*Research Question 3: How does social support influence the relationship between international students' acculturative stress and physical activity levels?*

Moderated regression analysis was conducted to test role of social support between acculturative stress and physical activity levels. Acculturative stress, Korean social support, and American support were standardized and then entered first, followed by the three 2-way interactions (Korean social support  $\times$  American social support, Korean social support  $\times$  acculturative stress, and American social support  $\times$  acculturative stress) entered in the second step. Finally, one 3-way interaction (acculturative stress  $\times$  Korean social support  $\times$  American social support) was entered at Step 3. Table 8 shows that acculturative stress did not have effect on vigorous physical activity, but Korean social support ( $B = .203, p = .030$ ) and American social support ( $B = .286, p = .003$ ) had significantly effect on vigorous physical activity. The first order effects accounted for 7% of the variance ( $p < .001$ ). The two-way interactions did not account for a significant portion of the variance, nor did the three way interaction term. With respect to participation in moderate physical activity (see Table 9), none of the first order effects, 2-way interactions, or the 3-way interaction were significant.

Table 8

*Coefficients for Multiple Regression Analysis: Predicting Vigorous Physical Activity in Primary Analysis*

|  | B     | Std. Error | Beta  | t     | Sig. |
|--|-------|------------|-------|-------|------|
| Step 1   |       |            |       |       |      |
| Acculturative Stress   | -.024 | .094       | -.018 | -.260 | .795 |
| Korean Social Support  | .203  | .092       | .146  | 2.192 | .030 |
| American Social Support  | .286  | .094       | .206  | 3.029 | .003 |
| Step 2   |       |            |       |       |      |
| Korean Social Support × American Social Support                        | .196  | .100       | .142  | 1.959 | .051 |
| Korean Social Support × Acculturative Stress                           | .031  | .092       | .024  | .339  | .735 |
| American Social Support × Acculturative Stress                         | .023  | .084       | .019  | .279  | .781 |
| Step 3   |       |            |       |       |      |
| Acculturative Stress × Korean Social Support × American Social Support | -.076 | .082       | -.068 | -.930 | .353 |

Table 9

*Coefficients for Multiple Regression Analysis: Predicting Moderate Physical Activity in Primary Analysis*

|  | B     | Std. Error | Beta  | t      | Sig. |
|--|-------|------------|-------|--------|------|
| Step 1   |       |            |       |        |      |
| Acculturative Stress   | -.082 | .114       | -.050 | -.718  | .474 |
| Korean Social Support  | .110  | .112       | .067  | .982   | .327 |
| American Social Support  | .190  | .115       | .116  | 1.654  | .100 |
| Step 2   |       |            |       |        |      |
| Korean Social Support × American Social Support                        | -.139 | .122       | -.085 | -1.140 | .255 |
| Korean Social Support × Acculturative Stress                           | .049  | .112       | .031  | .435   | .664 |
| American Social Support × Acculturative Stress                         | .116  | .102       | .079  | 1.136  | .257 |
| Step 3   |       |            |       |        |      |
| Acculturative Stress × Korean Social Support × American Social Support | .113  | .100       | .085  | 1.140  | .256 |

## CHAPTER V

### CONCLUSIONS

The purpose of this study was to investigate physical activity levels for international college students. Specifically, the study examined the extent to which acculturative stress was associated with physical activity levels of international students, as well as the degree to which social support influenced relationships between physical activity levels of these students and acculturative stress. Moreover, this chapter provides limitations of the study, implications for future research.

First, this study examined the relationships between international students' acculturative stress and their physical activity levels in the last seven days. Acculturative stress includes six stressors: English language proficiency, academic pressure, cultural adjustment, financial concern, perceived racial discrimination, and future concern. In the result of this study, only the stressor of English language proficiency negatively influenced physical activity levels. The conclusion is consistent with previous studies related to English language ability. According to Mori (2000), the language barrier is the most serious and prevalent problem for international students. Many international students in the United States are more likely to experience difficulties with English language ability which is a critical stressor (Lin & Yi, 1997). Nwadiora and MacAdoo (1996) pointed out that Amerasian refugees who reported having lower spoken English abilities tend to have a higher level of acculturative stress. Furthermore, the stressor of English ability negatively influenced more the level of moderate physical activity than

the level of vigorous physical activity did. However, findings in this study shows that other stressors such as academic pressure, cultural adjustment, financial concern, perceived racial discrimination, and future concern did not influence physical activity levels.

The second purpose of this study was to investigate the relationships between social support for international students and their physical activity levels in the last seven days. Social support was focused on two sources of social support including Korean friends and American friends, and three types of social support including companionship, informational, and emotional support in a multidimensional approach. The results show that American companionship support was engaged in both the level of vigorous physical activity and moderate physical activity in the last seven days. Moreover, Korean friends and American friends in informational support, Korean friends and American friends in emotional support positively influence the level of vigorous physical activity but not the level of moderate physical activity. The result is consistent with the study conducted by Chogahara (1999) on physical activity in adults aged 55 and older. The findings showed that different types of social support have different impacts on physical activity of the old. For example, friends in companionship support had a higher effect on physical activity of old adults than did family and health experts in companionship support. In another study (Cohen, Underwood, & Gottlieb, 2000), the authors found that informational support plays a major role in health behaviors related to health-risk situation in that exercise members could provide people with information regarding appropriate programs, medical services, food, and risk factors for health.

Finally, the study focused on the role of social support between acculturative stress of international students and their physical activity levels. The results in this study show that the effects of acculturative stress were not moderated by either Korean or American social support. However, Korean social support and American social support had significantly effect on the level of vigorous physical activity, but not the level of moderate physical activity.

### Summary

Even though physical activity has many benefits with regard to physical, psychological, socio-economic aspects, international students are one particular population whose physical activity level was underexplored compared with other social classes and races (Cerin & Leslie, 2008; Donaldson & Ronan, 2006; Wolin et al., 2006). The purpose of this study was to investigate the extent to which acculturative stress is associated with physical activity levels of international students, the influence of types and sources of social support on their physical activity levels, and the degree to which social support affects the relationship between their physical activity levels and acculturative stress. The participants for this research were recruited by 215 Korean international students in Bryan and College Station areas, Texas. The results revealed that physical activity levels of international students are associated with acculturative stress and social support in a multidimensional approach. Only the stressor of English language ability, one of acculturative stressors, negatively influences physical activity levels. Social support in a multidimensional approach is positively correlated with physical

activity levels. Especially, Korean support and American support positively affected vigorous physical activity level in the role of social support between acculturative stress and physical activity levels. Therefore, these results suggest that social support for international students is likely to be one of most important factors for their physical activity levels.

### Limitations

A limitation of this study must be addressed. First, the convenience sampling method of Korean international students is not likely to be representative of international students in the United States, even though international students from Asian countries, African, and Latin America have similar problems such as language difficulty or cultural differences, as well as having similarly cultural characteristics of collectivistic orientation (Constantine et al., 2004; Mori, 2000; Ye, 2006). Therefore, further study needs representative samples in order to establish the generality of international students studying in the United States. Second, more than 75% of the participants were graduate students ranged from 23 to 47 of age in this study. The participants' age is likely to influence the stressors' levels differently. For instance, in relationships between acculturation and physical activity, when Latinas were younger than 25 years, they who arrived to the U.S. had more physically active than Latinas who arrived to the U.S. when they were older 25 years (Evenson et al., 2004). Finally, social support in this study was focused on two sources of social support (Korean friends and American friends) and three types of social support (companionship, informational, and emotional support) in a

multidimensional approach. However, future research is necessary to examine in various sources of social support, such as student recreation center, international student association, or international student services for the students' physical activity participation.

### Implications

The physical activity of minority populations is still left underexplored (Wolin et al., 2006). Little is known about relationships acculturative stress and physical activity, and how social support influence relationships between acculturative stress and physical activity for international students. According to the results in this study, the barrier of English language difficulty had negatively effect on participation of physical activity among Korean international students even though most of them want to participate in physical activity with American friends. However, the results show that American social support positively influences the level of physical activity among Korean international students. Therefore, sport researchers may need more interest and social support for international students as one of minority groups.

The results in this study will likely be applied in international students' attendance of sport events like college sports or professional sports. Kwon and Trail (2001) appointed out the importance of international students as an underdeveloped target market of sport events for international students' attendance. The findings may be helpful to comprehend sport attendance of international students as understanding their cultural characteristics or behavioral pattern through psychological aspects. Therefore, future

study may need to investigate the relationship between sport attendance and acculturative stress and the role of social support among international students considering the relationship between international students' physical activity levels and their attendance of sport events.

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## APPENDIX A

## SECTION I

*Q1.* Please answer how often you feel the way described in each of the statements below by circling the one number which most closely your own personal experience living in the U.S.

1. My English embarrasses me when I talk to people.  
Never 1    2    3    4    5    6    7 Very Often
2. I don't like the religions in the U.S.A.  
Never 1    2    3    4    5    6    7 Very Often
3. I worry about my academic performance.  
Never 1    2    3    4    5    6    7 Very Often
4. I worry about my future career in my home country.  
Never 1    2    3    4    5    6    7 Very Often
5. I can feel racial discrimination toward me from other students.  
Never 1    2    3    4    5    6    7 Very Often
6. I'm not doing as good as I want to in school.  
Never 1    2    3    4    5    6    7 Very Often
7. My English makes it hard for me to read articles, books, etc.  
Never 1    2    3    4    5    6    7 Very Often
8. It's hard for me to develop opposite-sex relationships here.  
Never 1    2    3    4    5    6    7 Very Often
9. I don't like the ways people treat each other here.  
Never 1    2    3    4    5    6    7 Very Often
10. I don't like American food.  
Never 1    2    3    4    5    6    7 Very Often

11. People treat me badly just because I am a foreigner.  
Never 1 2 3 4 5 6 7 Very Often
12. I owe money to others.  
Never 1 2 3 4 5 6 7 Very Often
13. I think that people are very selfish here.  
Never 1 2 3 4 5 6 7 Very Often
14. I don't like the things people do for their entertainment here.  
Never 1 2 3 4 5 6 7 Very Often
15. I can feel racial discrimination toward me in stores.  
Never 1 2 3 4 5 6 7 Very Often
16. I worry about whether I will have my future career in the U.S.A.  
Never 1 2 3 4 5 6 7 Very Often
17. Americans' way of being too direct is uncomfortable to me.  
Never 1 2 3 4 5 6 7 Very Often
18. I study very hard in order not to disappoint my family.  
Never 1 2 3 4 5 6 7 Very Often
19. I can feel racial discrimination toward me from professors.  
Never 1 2 3 4 5 6 7 Very Often
20. I can't express myself well in English.  
Never 1 2 3 4 5 6 7 Very Often
21. It would be the biggest shame for me if I fail in school.  
Never 1 2 3 4 5 6 7 Very Often
22. I worry about my financial situation.  
Never 1 2 3 4 5 6 7 Very Often

23. I don't like American music.

Never 1 2 3 4 5 6 7 Very Often

24. I can feel racial discrimination toward me in restaurants.

Never 1 2 3 4 5 6 7 Very Often

25. My financial situation influences my academic study.

Never 1 2 3 4 5 6 7 Very Often

26. I worry about my future: will I return to my home country or stay in the U.S.A.

Never 1 2 3 4 5 6 7 Very Often

27. I haven't become used to enjoying the American holidays.

Never 1 2 3 4 5 6 7 Very Often

28. I don't want to return to my home country, but, I may have to do so.

Never 1 2 3 4 5 6 7 Very Often

29. My English makes it hard for me to understand lectures.

Never 1 2 3 4 5 6 7 Very Often

30. I want to go back to my home country in the future, but I may not be able to do so.

Never 1 2 3 4 5 6 7 Very Often

31. My financial situation makes my life here very hard.

Never 1 2 3 4 5 6 7 Very Often

## SECTION II

Q2. For each of the following questions, use the scale to describe how often, during the past 12 months, your Korean friends and American friends have provided the kind of support described. Place a number from 1 to 7 in each of the corresponding boxes, with 1 being never and 7 being very often.

Never 1 2 3 4 5 6 7 Very Often

| Companionship Support  | Korean Friends | American Friends |
|--|----------------|------------------|
| 1. Made plans with you for doing a physical activity together?                     | 1 2 3 4 5 6 7  | 1 2 3 4 5 6 7    |
| 2. Teamed up with you to engage in a physical activity together?                   | 1 2 3 4 5 6 7  | 1 2 3 4 5 6 7    |
| 3. Promised you that would participate in a physical activity with you?            | 1 2 3 4 5 6 7  | 1 2 3 4 5 6 7    |
| 4. Given you helpful reminders to do a physical activity together with them?       | 1 2 3 4 5 6 7  | 1 2 3 4 5 6 7    |
| 5. Changed their schedules so you could do a physical activity together with them? | 1 2 3 4 5 6 7  | 1 2 3 4 5 6 7    |

| Informational Support  | Korean Friends | American Friends |
|--|----------------|------------------|
| 6. Informed you about the expected positive effects of a physical activity on your health and fitness?       | 1 2 3 4 5 6 7  | 1 2 3 4 5 6 7    |
| 7. Explained to you why a physical activity is important to improve your health?                             | 1 2 3 4 5 6 7  | 1 2 3 4 5 6 7    |
| 8. Clarified for you how you may achieve your health goals through a physical activity?                      | 1 2 3 4 5 6 7  | 1 2 3 4 5 6 7    |
| 9. Suggested a physical activity program or facility which might assist your health?                         | 1 2 3 4 5 6 7  | 1 2 3 4 5 6 7    |
| 10. Explained to you about the amount or intensity of physical activity necessary for improving your health? | 1 2 3 4 5 6 7  | 1 2 3 4 5 6 7    |



## SECTION III

*Q4.* This section will ask you questions about the time you spent being physically active in the last 7 days. Think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

READ: Now, think about all the vigorous activities which take hard physical effort that you did in the last 7 days. *Vigorous physical activities* make you breathe much harder than normal and may include heavy lifting, digging, aerobics, or fast bicycling.

1. During the last 7 days, on how many days did you do vigorous physical activities?

\_\_\_\_\_ Days per week

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

\_\_\_\_\_ Hours per weekday \_\_\_\_\_ Minutes per weekday

READ: Now, think about activities which take moderate physical effort that you did in the last 7 days. *Moderate physical activities* make you breathe somewhat harder than normal and may include carrying light loads, bicycling at a regular pace or double tennis. Do not include walking. Again, think about only those physical activities that you did for at least 10 minutes at a time.

3. During the last 7 days, on how many days did you do moderate physical activities?

\_\_\_\_\_ Days per week

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

\_\_\_\_\_ Hours per weekday \_\_\_\_\_ Minutes per weekday

READ: Now, think about the time you spent *walking* in the last 7 days. This includes at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise, or leisure.

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

\_\_\_\_\_ Days per week

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

\_\_\_\_\_ Hours per weekday \_\_\_\_\_ Minutes per weekday

READ: Now, think about the time you spent *sitting* on week days during the last 7 days. Include time spent at work, at home, while doing course work, and during leisure time. This may include time spent sitting at a desk, visiting friends, reading or sitting or lying down to watch television.

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

\_\_\_\_\_ Hours per weekday \_\_\_\_\_ Minutes per weekday

## SECTION IV

Please answer the following questions about your personal information.

Q5. Age:

Q6. Gender:    Male            Female

Q7. Educational Level

- a. Undergraduate
- b. Masters Degree
- c. Doctoral Degree
- d. English Language Institute(ELI)

Q8. Marital Status

- a. Single
- b. Married
- c. Divorced
- d. Separated

Q9. Total Household Income (1250Won/\$): including support from parents + RA, TA, GA+ a part time job

- a. Less than \$ 19,999
- b. \$ 20,000 to \$ 39,999
- c. \$ 40,000 to \$ 59,999
- d. \$ 60,000 to \$ 79,999
- e. More than \$ 80,000

Q10. Length of Residence in the United States

- a. Less than One year
- b. One year to Three years
- c. Three years to Five years
- d. More than Five years

## APPENDIX B

## SECTION I

Q1. 미국 유학생 생활 동안 개인적 경험에 관해, 여러분이 느끼시는 부분 중 가장 적합하다고 생각되는 하나를 답변해 주십시오 (O 표시).

1. 다른 사람과 대화를 할 때, 나의 영어 실력이 부끄럽거나 서투르다. (My English embarrasses me when I talk to people).  
Never 1    2    3    4    5    6    7 Very Often
2. 나는 미국에서 종교적 활동을 좋아한다. (I don't like the religions in the U.S.A.).  
Never 1    2    3    4    5    6    7 Very Often
3. 나는 나의 학업 성적을 걱정 하고 있다. (I worry about my academic performance).  
Never 1    2    3    4    5    6    7 Very Often
4. 나는 졸업 후 한국으로 돌아갔을 때, 장래 직업에 대해 걱정하고 있다. (I worry about my future career in my home country).  
Never 1    2    3    4    5    6    7 Very Often
5. 나는 다른 학생들로부터 인종 차별을 느낀 적이 있다 (I can feel racial discrimination toward me from other students).  
Never 1    2    3    4    5    6    7 Very Often
6. 나는 학교 생활에서 내가 원하는 만큼 잘하고 있다. (I'm not doing as good as I want to in school).  
Never 1    2    3    4    5    6    7 Very Often
7. 나는 영어 실력 때문에 저널이나 책 등을 읽는데 어려움을 느낀다. (My English makes it hard for me to read articles, books, etc).  
Never 1    2    3    4    5    6    7 Very Often
8. 나는 미국에서 이성과의 관계를 발전시키는데 어려움을 느낀다. (It's hard for me to develop opposite-sex relationships here).  
Never 1    2    3    4    5    6    7 Very Often
9. 나는 미국에서 사람들간에 서로를 대하는 방식들을 좋아한다. (I don't like the ways people treat each other here).  
Never 1    2    3    4    5    6    7 Very Often

10. 나는 미국음식을 좋아한다. (I don't like American food).
- Never 1    2    3    4    5    6    7 Very Often
11. 내가 외국인이기 때문에, 사람들은 나를 차별한다. (People treat me badly just because I am a foreigner).
- Never 1    2    3    4    5    6    7 Very Often
12. 나는 다른 사람들 혹은 금융기관에 관련된 곳에 빚이 있다. (I owe money to others).
- Never 1    2    3    4    5    6    7 Very Often
13. 나는 미국에서 사람들이 이기적이라고 생각한다. (I think that people are very selfish here).
- Never 1    2    3    4    5    6    7 Very Often
14. 나는 미국에서 사람들이 하는 문화 활동들을 (영화, 음악, 혹은 오락활동) 좋아한다. (I don't like the things people do for their entertainment here).
- Never 1    2    3    4    5    6    7 Very Often
15. 나는 가게에 갔을 때, 인종 차별을 느낀다. (I can feel racial discrimination toward me in stores).
- Never 1    2    3    4    5    6    7 Very Often
16. 나는 졸업 후 미국에서 직장을 구할 것인지 그러지 않을 것인가에 대해 걱정하고 있다. (I worry about whether I will have my future career in the U.S.A.)
- Never 1    2    3    4    5    6    7 Very Often
17. 미국인들의 지나친 직선적 삶의 방식에 나는 불편함을 느낀다. (Americans' way of being too direct is uncomfortable to me).
- Never 1    2    3    4    5    6    7 Very Often
18. 나는 가족들을 실망 시키지 않기 위해 매우 열심히 공부한다. (I study very hard in order not to disappoint my family).
- Never 1    2    3    4    5    6    7 Very Often
19. 나는 교수들로부터 인종차별을 느낀다. (I can feel racial discrimination toward me from professors).
- Never 1    2    3    4    5    6    7 Very Often
20. 나는 영어로 내 자신을 잘 표현하지 못한다. (I can't express myself well in English).
- Never 1    2    3    4    5    6    7 Very Often
21. 만일 내가 미국에서의 학교 생활에 실패(중퇴, 퇴학)한다면, 그것은 내게 가장 부끄러운 일이다. (It would be the biggest shame for me if I fail in school).
- Never 1    2    3    4    5    6    7 Very Often

22. 나는 나의 재정적 상황에 대해 걱정하고 있다 (학비, 생활비). (I worry about my financial situation).
- Never 1    2    3    4    5    6    7 Very Often
23. 나는 미국 음악을 좋아하지 않는다. (I don't like American music).
- Never 1    2    3    4    5    6    7 Very Often
24. 내가 레스토랑에 갔을 때, 나는 인종차별을 느낀다. (I can feel racial discrimination toward me in restaurants).
- Never 1    2    3    4    5    6    7 Very Often
25. 나의 재정적 상황은 나의 학업에 영향을 미친다. (My financial situation influences my academic study).
- Never 1    2    3    4    5    6    7 Very Often
26. 나는 졸업 후 미국에 머무르지, 한국으로 돌아 갈지에 대한 미래에 대한 걱정을 하고 있다. (I worry about my future: will I return to my home country or stay in the U.S.A.).
- Never 1    2    3    4    5    6    7 Very Often
27. 나는 미국의 공휴일(독립기념일, 할로윈)에 대한 역사적 문화적 차이를 이해하고, 즐기는 것에 익숙하지 않다. (I haven't become used to enjoying the American holidays).
- Never 1    2    3    4    5    6    7 Very Often
28. 나는 졸업 후 한국으로 돌아 가길 원하지 않지만, 나는 그렇게 될 것 같다 (예, 미국에서 직장을 구하기 힘들기 때문에) (I don't want to return to my home country, but, I may have to do so).
- Never 1    2    3    4    5    6    7 Very Often
29. 나의 영어 실력은 수업을 이해하는데 어려움을 느끼게 한다. (My English makes it hard for me to understand lectures).
- Never 1    2    3    4    5    6    7 Very Often
30. 나는 졸업 후 한국으로 돌아가길 원하지만, 그러지 않을 지도 모른다. (예, 미국에서 직장을 다닐 수도 있기 때문에) (I want to go back to my home country in the future, but I may not be able to do so).
- Never 1    2    3    4    5    6    7 Very Often
31. 나의 재정적 상황 때문에 미국에서 생활(학비, 생활비)하기에 매우 힘들다. (My financial situation makes my life here very hard).
- Never 1    2    3    4    5    6    7 Very Often

## SECTION II

Q2. 아래의 질문들은 지난 12개월 동안, 당신의 한국교우 그리고 미국 교우가 여러분의 신체활동에 있어서 얼마나 자주 사회적 지원(도움)을 주었는가에 대한 질문들입니다. 한국교우 그리고 미국 교우, 각각에 대해 가장 적합하다고 생각되는 값들을 빈 공간에 기입해 주십시오. (O 표시).

정의:

- 1) 한국교우는 전공과목 선후배, 동문회 선후배, 종교활동 지인들, 이웃 등으로 정의됨.
- 2) 미국교우는 전공과목 친구, 학교 친구, 종교 활동 지인들, 이웃 등으로 정의 됨.

Never 1    2    3    4    5    6    7 Very Often

| 교우들에 의한 도움 혹은 권유<br>(Companionship Support)   | Korean Friends | American Friends |
|---|----------------|------------------|
| 1. 당신의 신체활동 시, 각각의 교우가 얼마나 당신과 함께 운동을 계획 함께 합니까? (Made plans with you for doing a physical activity together?)                              | 1 2 3 4 5 6 7  | 1 2 3 4 5 6 7    |
| 2. 당신의 신체활동 시, 각각의 교우가 얼마나 함께 합니까? (Teamed up with you to engage in a physical activity together?)  | 1 2 3 4 5 6 7  | 1 2 3 4 5 6 7    |
| 3. 당신의 신체활동 시, 각각의 교우가 얼마나 함께 신체활동을 함께 약속 합니까? (Promised you that would participate in a physical activity with you?)                       | 1 2 3 4 5 6 7  | 1 2 3 4 5 6 7    |
| 4. 당신의 신체활동 시, 각각의 교우가 얼마나 도움을 줍니까? (Given you helpful reminders to do a physical activity together with them?)                             | 1 2 3 4 5 6 7  | 1 2 3 4 5 6 7    |
| 5. 당신의 신체활동 시, 각각의 교우가 당신의 신체활동을 위해 얼마나 그들의 스케줄을 조정해 줍니까? (Changed their schedules so you could do a physical activity together with them?) | 1 2 3 4 5 6 7  | 1 2 3 4 5 6 7    |

| 정보적 지원 (Informational Support)  | Korean Friends | American Friends |
|---|----------------|------------------|
| 6. 각각의 교우가 신체활동이 당신의 건강에 긍정적 효과를 기대할 수 있는지를 얼마나 알려 주었습니까? (Informed you about the expected positive effects of a physical activity on your health and fitness?)           | 1 2 3 4 5 6 7  | 1 2 3 4 5 6 7    |
| 7. 각각의 교우가 신체활동이 왜 당신의 건강 향상을 위해 중요한지를 얼마나 설명해 주었습니까? (Explained to you why a physical activity is important to improve you health?)                                      | 1 2 3 4 5 6 7  | 1 2 3 4 5 6 7    |
| 8. 각각의 교우가 신체활동이 어떻게 당신의 건강을 향상 시킬 수 있는지를 얼마나 명확히 설명해 주었습니까? (Clarified for you how you may achieve your health goals through a physical activity?)                       | 1 2 3 4 5 6 7  | 1 2 3 4 5 6 7    |
| 9. 각각의 교우가 당신의 건강을 향상 시키기 위해 얼마나 신체활동 프로그램 혹은 시설을 권유하였습니까? (Suggested a physical activity program or facility which might assist your health?)                            | 1 2 3 4 5 6 7  | 1 2 3 4 5 6 7    |
| 10. 각각의 교우가 당신의 건강 향상을 위해 얼마나 신체활동의 시간 혹은 강도가 필요한지를 설명해 주었습니까? (Explained to you about the amount or intensity of physical activity necessary for improving your health?) | 1 2 3 4 5 6 7  | 1 2 3 4 5 6 7    |

| 감성적 지원 (Emotional Support)  | Korean Friends | American Friends |
|---|----------------|------------------|
| 11. 각각의 교우가 당신의 숙련된 신체 활동의 기술에 대해 얼마나 칭찬 해주었습니까? (Complimented you on the mastery of a physical activity skill?)                                      | 1 2 3 4 5 6 7  | 1 2 3 4 5 6 7    |
| 12. 각각의 교우가 다른 사람에 비해 뛰어난 당신의 신체활동 수준에 대해 얼마나 칭찬해주었습니까? (Praised you that your physical activity level is superior to that of other people your age?) | 1 2 3 4 5 6 7  | 1 2 3 4 5 6 7    |
| 13. 각각의 교우가 당신의 신체활동들에 대해 얼마나 잘한다는 확신을 주었습니까? (Affirmed that you have done well in your physical activity?)   | 1 2 3 4 5 6 7  | 1 2 3 4 5 6 7    |
| 14. 각각의 교우가 당신의 신체활동의 다재다능 함을 얼마나 인정해 주었습니까? (Shown their respect for your versatility in physical activity?)   | 1 2 3 4 5 6 7  | 1 2 3 4 5 6 7    |
| 15. 각각의 교우가 당신의 신체활동 능력에 대해 자부심을 갖도록 얼마나 당신에게 알려 주었습니까? (Told you that you should be proud of your physical activity skills?)                         | 1 2 3 4 5 6 7  | 1 2 3 4 5 6 7    |

Q3. 만일 미국의 친구들이 당신에게 신체활동을 함께 하자고 권유 한다면, 당신은 그들과 함께 하실 의향이 있습니까? (If American friends encourage you to participate in physical activity, how likely do you participate in physical activity with American friends?)

Never 1 2 3 4 5 6 7 Very Often

## SECTION III

Q4. 다음은 지난 과거 7일 동안, 당신이 얼마 동안 신체활동을 하였는지에 대한 설문지입니다. 가장 적합하다고 생각되는 것들에 대해 각 문항에 날 수 (몇 일), 시간, 분을 기입해 주십시오.

1) 정의: 격렬한 신체활동 (Vigorous Physical Activity) 은 당신의 신체활동 중 매우 강도 높은 운동으로 정의됨. 예를 들어, 개인적 강도 높은 운동 (웨이트 트레이닝, 러닝), 격렬한 수영이나 테니스 단식, 혹은 풀 타임 농구, 배구, 등 (Vigorous activities make you breathe much harder than normal and may include heavy lifting, digging, aerobics, or fast bicycling).

1. 지난 7일 동안, 몇 일이나 격렬한 신체활동을 하였습니까? (During the last 7 days, on how many days did you do vigorous physical activities?)

\_\_\_\_\_일(Days per week)

2. 지난 7일 동안 하루 평균, 얼마나 격렬한 신체활동을 하였습니까? (How much time did you usually spend doing vigorous physical activities on one of those days?)

\_\_\_시간 (Hours per weekday) \_\_\_분 (Minutes per weekday)

2) 정의: 적절한 신체활동 (Moderate Physical Activity) 은 평상시 보다 조금 더 힘든 강도의 운동으로 정의됨. 예를 들면, 적절한 웨이트 트레이닝, 가벼운 러닝, 격렬하지 않는 테니스 복식 게임, 적절한 속도의 자전거 타기 등 (Moderate physical activities make you breathe somewhat harder than normal and may include carrying light loads, bicycling at a regular pace or double tennis).

3. 지난 7일 동안, 몇 일이나 적당한 신체활동을 하였습니까? (During the last 7 days, on how many days did you do moderate physical activities?)

\_\_\_\_\_일 (Days per week)

4. 지난 7일 동안 하루 평균, 얼마나 적당한 신체활동을 하였습니까? (How much time did you usually spend doing moderate physical activities on one of those days?)

\_\_\_시간 (Hours per weekday) \_\_\_분 (Minutes per weekday)

3) 정의: 걷기 (Walking) 는 한번에 최소 10 분 이상 걸어 다닌 신체활동으로서, 집에서 학교, 걸어서 다른 장소로 이동, 걷기 운동을 포함하여 정의함. (Think about the time you spent walking in the last 7 days. This includes at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise, or leisure).

5. 지난 7 일 동안, 한번에 최소 10 분 이상 걸어 다닌 날이 몇 일이나 됩니까? (During the last 7 days, on how many days did you walk for at least 10 minutes at a time?)

\_\_\_\_\_일(Days per week)

6. 지난 7 일 중 하루 평균, 걸어 다닌 시간이 얼마나 됩니까? (How much time did you usually spend walking on one of those days?)

\_\_\_\_시간 (Hours per weekday) \_\_\_\_분 (Minutes per weekday)

4) 정의: 앉아 있기 (Sitting) 는 지난 주중 동안에, 집, 학교, 도서관, 혹은 텔레비전 시청 등을 위해 앉아 있는 시간으로 정의함. (Think about the time you spent sitting on week days during the last 7 days. Include time spent at work, at home, while doing course work, and during leisure time. This may include time spent sitting at a desk, visiting friends, reading or sitting or lying down to watch television).

7. 지난 주 (주말 제외), 하루 평균 앉아 있었던 시간이 얼마나 됩니까? (During the last 7 days, how much time did you usually spend sitting on a week day?)

\_\_\_\_시간 (Hours per weekday) \_\_\_\_분 (Minutes per weekday)

## SECTION IV

개인적 정보에 대한 질문에 답변해 주십시오.

Q5. 나이(Age):

Q6. 성별(Gender): Male      Female

Q7. 교육 정도 (Educational Level)

- e. 대학생 (Undergraduate)
- f. 석사과정 (Masters Degree)
- g. 박사과정 (Doctoral Degree)
- h. 영어 어학원생 (English Language Institute(ELI))

Q8. 결혼 여부 (Marital Status)

- e. 미혼 (Single)
- f. 결혼 (Married)
- g. 이혼 (Divorced)
- h. 별거 (Separated)

Q9. 총 수입 (Total Household Income) (환율 1250 원/\$): 한국에서 지원받는 돈+ RA, TA, GA+ 기타(아르바이트)

- f. 25,000,000 만원 이하 (Less than \$ 19,999)
- g. 25,000,001 – 50,000,000 (\$ 20,000 to \$ 39,999)
- h. 50,000,001 – 75,000,000 (\$ 40,000 to \$ 59,999)
- i. 75,000,001 – 100,000,000 (\$ 60,000 to \$ 79,999)
- j. 100,000,001 이상 (More than \$ 80,000)

Q10. 미국에서 거주한 기간 (Length of Residence in the United States)

- e. 1 년 이하 (Less than One year)
- f. 1 년 1 개월 – 3 년 (One year to Three years)
- g. 3 년 1 개월 – 5 년 (Three years to Five years)
- h. 5 년 1 개월 이상 (More than Five years)

APPENDIX C  
CONSENT FORM

Your participation in a survey related to physical activity engagement is needed. As a sport management researcher at Texas A&M University, I am conducting research to understand factors that influence people's physical activity levels. In total, some 200 people will be asked to participate in this study.

Participation will require about 15 minutes answering the questionnaire. You may refuse to answer any question on the survey if it makes you feel uncomfortable. Your responses will be anonymous, and no institution or individual taking part in the study will be identified. Your participation in this study is completely voluntary. Further, there are no risks associated with participation. Finally, you will benefit from participating in the study by aiding in the understanding of factors that influence physical activity levels. You can also request a copy of the results to be sent to you.

This research study has been reviewed and approved by the Institutional Review Board - Human Subjects in Research, Texas A&M University. For research related problems or questions regarding subjects' rights, the Institutional Review Board may be contacted through Ms. Melissa McIlhaney, IRB Coordinator, Office of Research Compliance, (979) 458-4067, [mcilhaney@tamu.edu](mailto:mcilhaney@tamu.edu).

Hopefully you will find time in your busy schedule to participate in this study. If you have any comments or concerns with the study, you can contact Bo Soo Kim by phone at 979-739-1328 (cell) or at [sohogogh@neo.tamu.edu](mailto:sohogogh@neo.tamu.edu).

## VITA

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## EDUCATION

- M. S. Texas A&M University, December 2009  
Major: Sport Management
- B. S. Dong-A University, South Korea, February 2005  
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