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FACTORS INFLUENCING ENGAGEMENT IN PHYSICAL ACTIVITY AMONG
FEMALE CHINESE AMERICAN COLLEGE STUDENTS

by

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ABSTRACT OF THE DISSERTATION

Factors Influencing Engagement in Physical Activity among Female Chinese American

College Students

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Despite the known short and long term benefits of physical activity, participation in moderate-to-vigorous physical activity continues to decline throughout the lifespan. Female Asian college students have been shown to be the least physically active of all college students, yet there is limited research of Asian ethnic subgroups. The purpose of this study was to examine the relationship between acculturation, microaggression, social norms, and socioeconomic status and engagement in physical activity among female Chinese American college students.

A total of 203 female Chinese American students attending college in the San Francisco Bay area participated in the study. Participants completed a demographic questionnaire and four additional online surveys measuring the study variables.

The majority of study participants (78.3%) reported being physically active at levels to obtain health benefits. This entails engaging in moderate physical activity for at least 30 minutes on 5 or more days each week. The expectation of significant others, such as parents and friends, to be physically active was found to be significantly correlated to engagement in physical activity ($r = .28, p = .000$). Socioeconomic status

was also positively correlated with engagement in physical activity ($r = .14, p = .047$). Together these variables accounted for 12% of the variance in the sample, although expectations of significant others (social norms) explained 10% of the variance.

Study findings have many implications for future research and practice. Social norms and socioeconomic status only explained a small amount of the variance in physical activity. College professors are in a position to be more involved in promoting physical activity and additional factors influencing engagement in physical activity among college students should be explored. The female Chinese American college students were found to be less physically active as they get older and progressed through the college years. Although the association did not reach significance, it is important to understand factors influencing participation in PA and reasons for the decline in PA. The college setting is ideal for culturally effective intervention efforts promoting PA as a healthy lifestyle behavior.

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Dedication

This dissertation is dedicated to my loving and supportive husband, Dave. You are truly my inspiration.

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Chapter 1

The relationship between acculturation, microaggression, social norms, and socioeconomic status and engagement in physical activity among female Chinese American college students.

Problem

Although a major objective of Healthy People 2020 objectives (US Department of Health and Human Services [HHS], 2011) is to increase the number of physically active individuals, physical inactivity continues to be a major health concern in the United States (US). This is unfortunate, since regular participation in moderate-to-vigorous intensity physical activity (PA) plays an important role in improving overall health and decreasing the incidence of obesity and chronic health disorders, such as cardiovascular disease and Type 2 diabetes (HHS, 2008). Nonetheless, PA has been shown to decrease throughout the lifespan (Troiano et al., 2008) and in 2010 more than half of Asian Americans aged 18 years and older did not achieve sufficient levels of PA to obtain health benefits (Centers for Disease Control & Prevention [CDC], 2012). In 2011, physical activity guidelines were updated by the American College of Sports Medicine (ACSM) to address the high levels of physical inactivity. Guidelines recommend that adults engage in moderate-intensity cardiovascular exercise for 30 to 60 minutes on 5 or more days each week, or vigorous-intensity cardiovascular for 20 to 60 minutes on 3 or more days each week. Moderate-intensity PA is defined as PA that requires a moderate amount of effort and markedly increases the heart rate (World Health Organization [WHO], 2013), and includes brisk walking, dancing, gardening, and housework. Vigorous-intensity PA is defined as PA that requires a large amount of effort

and causes faster breathing and a significant increase in heart rate (WHO, 2013).

Examples of vigorous-intensity PA include running, fast bicycling and swimming, and competitive hockey and basketball. Recommendations also include moderate or high-intensity muscle-strengthening exercises, such as weight lifting or push-ups, on 2 or 3 days a week.

Despite these recommendations, almost half (49.4%) of college students do not meet federal PA guidelines (American College Health Association, 2012). In a study of 903 college students, Miller and colleagues (2005) reported that female students engaged in more moderate-intensity PA than males, (OR = 0.75, 95% CI: 0.56, 0.99, $p < .05$), while more male students engaged in vigorous-intensity PA (OR=1.41, 95% CI: 1.06, 1.90, $p < .05$) than female students. White students engaged in more moderate-intensity (OR=1.97, 95% CI: 1.21, 3.23, $p < .01$) and vigorous-intensity PA (OR = 1.84, 95% CI: 1.09, 3.09, $p < .05$) than African American, Asian, and Hispanic student.

Likewise, data from the 2001 Harvard School of Public Health College Alcohol Study (Nelson, Gortmaker, Subramanian, & Wechsler, 2007) of 10,437 male and female students from 119 U.S. 4-year colleges reveals that of all racial groups, female Asian American college students are the least likely to engage in vigorous PA (OR = 0.54, 95% CI: 0.40, 0.72, $p < .001$). However, generalization of these findings was hampered by the fact that only 2% of the sample in Miller and colleague's (2005) study and 9% of the sample in Nelson et al.'s (2007) study were Asian American and specific Asian ethnic subgroups were not identified. Inasmuch as Chinese are the largest ethnic subgroup of Asian Americans, further research is needed which addresses the particular PA beliefs and behaviors of Chinese American college students.

Physical activity is a complex health-promoting behavior influenced by various physiological and psychosocial factors (Pender, Murdaugh, & Parsons, 2002). Numerous theoretical frameworks, including Pender's health promotion model (HPM) have been used to investigate factors influencing participation in health-promoting behaviors. The HPM views individuals as interacting with their interpersonal and physical environments. Sociocultural and interpersonal influences may directly or indirectly influence health-promoting behaviors, such as PA, and ultimately enable the individual to achieve positive health outcomes.

Research has shown that PA can improve an individual's psychological outlook and cognitive function, provide social engagement, and weight and stress management (Egli, Bland, Melton, & Czech, 2011). Additional positive outcomes of PA include risk reduction for hypertension, cardiovascular disease, Type 2 diabetes, and certain cancers (US Department of Health and Human Services, 2012). Low levels of PA have found to be correlated with increased weight (Chen, Weiss, Heyman, Vittinghoff, & Lustig, 2008; Wong, Dixon, Gilbride, Chin, & Kwan, 2011), increased symptoms of depression (Elliott, Kennedy, Morgan, Anderson, & Morris, 2012; Han, Han, Luo, Jacobs, & Jean-Baptiste, 2013; Hong et al., 2009; Ku, Fox, Chen, & Chou, 2012), fatigue (Soyeur, Unalan & Elmali, 2010; Lee, Chien & Chen, 2007), and decreased bone density (Walker et al., 2007). Thus, adoption of PA as a health promoting lifestyle behavior by female Chinese American college students may result in both short-term and long-term health benefits.

A clear understanding of factors influencing engagement in PA is crucial if we want to increase the activity level of college students. Socioeconomic status (SES) is one

factor known to be associated with PA levels (Afable-Munsuz, Ponce, Rodriguez & Perez-Stable, 2010; Chen, 2009; Hu, Adler, Goldman, Weinstein, & Seeman, 2005; Nelson, Gortmaker, Subramanian, & Wechsler, 2007; Parikh, Fahs, Shelley, & Yerneni, 2009; Singh, Kogan, Siahpush, & van Dyck, 2008; Walters, Barr-Anderson, Wall, & Neumark-Sztainer, 2009). A study by Nelson and colleagues (2007) of 10,437 ethnically diverse college students showed that Asian college students of low socioeconomic position (measured as neither parent attended college) were less likely to engage in recommended levels of vigorous PA than students of high socioeconomic position (both parents attended college), OR = 0.71, 95% CI 0.71-0.94 ($p < .001$). Furthermore, there is evidence to suggest SES among Asian Americans may differ depending on their immigration status and level of acculturation.

Acculturation is a multidimensional, multidirectional process by which members of one cultural group participate in the mainstream culture while retaining some of their heritage culture (Yoon, Langrehr & Ong, 2011). Research has shown that acculturation of Asian Americans is related to adoption of positive health practices (Ayres, Atkins & Mahat, 2010; Ayres & Mahat, 2012); as well as unhealthy behaviors, such as smoking (Constantine et al., 2010; Weiss & Garbanati, 2006), alcohol use (Pedersen, Hsu, Neighbors, Lee, & Larimer, 2013), and the risk for higher BMI (Ng, McMahan, Mouttapa, Tanjasiri, & Beam, 2009; Wang, Quan, Kanaya, & Fernandez, 2011).

Previous studies have demonstrated a positive relationship between length of time living in the US and language spoken at home (proxies for acculturation) and levels of PA among Chinese adults (Afable-Munsuz, Ponce, Rodriguez & Perez-Stable, 2010; Novotny et al., 2012; Li & Wen, 2013; Wong, Dixon, Gilbride, Kwan, & Stein, 2013).

Analysis of the 2005 California Health Interview Survey (CHIS) data (Afable-Munsuz et al., 2010) showed the percentage of Chinese Americans, aged 18 to 64 years, who engaged in leisure-time PA increased with each subsequent generation (1st generation - 20.4%; 2nd generation - 30.2%; 3rd generation - 32.2%; chi-square $p < .05$). Similarly, analysis of the 2007 CHIS data (Li & Wen, 2013) showed the longer time spent living in the US, the more likely Chinese Americans were to meet leisure-time PA recommendations (OR = 0.547; 95% CI: 0.462-0.649, $p < .001$). These studies show evidence of the association between acculturation and PA in adult Chinese Americans. However, it is plausible that SES may moderate the relationship between acculturation and PA as Chinese Americans gain upward social mobility. Further research is needed to understand the effect of acculturation on engagement in PA among female Chinese American college students.

Theorists posit that social and environmental factors can directly and indirectly influence health-promoting behaviors (Pender, Murdaugh, & Parsons, 2006). Microaggression is a form of subtle, everyday discrimination experienced by marginalized groups in society (Sue, 2010). Research has shown that exposure to discrimination affects psychological health (Ong, Burrow, Fuller-Rowell, Ja, & Sue, 2013) and quality of life (Gee & Ponce, 2010) suggesting that microaggression may also affect psychological health and subsequently influence participation in PA.

Until recently, research on racial microaggressions focused primarily on African Americans (Solorzano, Ceja, & Yoos Aymer, 2010; Burrow & Ong, 2010; Torres, Driscoll & Burrow, 2010, Harwood, Browne Hunt, Mendenhall, & Lewis, 2012). One qualitative study among Asian Americans explored experiences of microaggression

among nine Asian American college students (Wang, Leu & Shoda, 2011). Participants in the focus group reported feeling invisible, being perceived as a foreigner in their own land, and being treated like second-class citizens. While twelve Filipino college students who participated in focus groups in another study (Nadal, Vigilia Escobar, Prado, David, & Haynes, 2012) reported similar concerns, two additional themes; 1) assumption of criminality and 2) assumption of inferior status or intellect, were also reported. These themes are consistent with previous research of racial microaggression in the African American population (Sue et al., 2008), implying there may be differences between Asian American ethnic subgroups.

In a study of 152 college freshmen, from six Asian American ethnic subgroups, participants completed online logs recording racial microaggressions, somatic symptoms, and positive and negative affect (Ong, Burrow, Fuller-Rowell, Ja, & Sue, 2013). Seventy-eight percent of the students reported experiencing some form of microaggression within the past 14 days. Multi-level analyses showed increased microaggressions being predictive of increased somatic symptoms ($y = 0.04$, $t(145) = 4.31$, $p < .001$), increased negative affect ($y = 0.31$, $t(145) = 9.65$, $p < .001$), and decreased positive affect ($y = -0.18$, $t(145) = -5.24$, $p < .001$). Although 58.5% of participants were Chinese American, participants resided in a geographical area comprised of only 8.6% Asians. These findings suggest the need for an understanding of microaggression experienced by Chinese American students in college settings with a higher percentage of Asian American students.

Gee and Ponce (2010) analyzed data from the 2003 and 2005 CHIS to explore the relationship between racial discrimination and health-related quality of life. Quality of

life (QOL) was derived from responses to one question on the participant's self-rated general health and three questions specific to the participants' physical and mental health. Participants reported 1) the number of days, over the previous 30 days, that poor physical or mental health prevented them from doing their usual activities; 2) the number of days their physical health (physical illness and injury) was not good; and 3) the number of days their mental health (stress, depression, and problems with emotions) was not good. A decreased QOL was defined as a higher number of activity-limited and unhealthy days. Data, from a single racial discrimination question, showed that Chinese Americans who experienced discrimination were more likely to report a poor quality of life than those who did not experience discrimination (OR = 1.52, 95% CI: 1.09, 2.09). Single measure items may underestimate the incidence and effects of discrimination. Research utilizing a more comprehensive measure of multiple dimensions of discrimination, both blatant and subtle, is needed to add to our knowledge of the affect of microaggression on health promoting lifestyle behaviors such as PA.

Pender and colleagues (2006) also theorize that expectations of significant others (social norms) influence health behaviors. Research has shown that social norms influence at-risk behaviors of college students, including tobacco use (Romero & Pulvers, 2013), alcohol use (Carciooppolo & Jensen, 2012; Cho, 2006; Martens et al., 2006), substance use (Martens et al., 2006), and sexual activity (Adams & Rust, 2006; Martens et al., 2006; Scholly et al., 2005). However, there is a scarcity of research on the influence of social norms on PA among college students.

The majority of studies exploring PA among Asian Americans have focused on middle aged and older adults. Through focus groups Taylor and colleagues (2008)

explored PA among 46 male and female Chinese immigrants aged 19 to 78 years (59% \geq 45 years). Half of the participants had immigrated to Seattle, WA while half of the participants had immigrated to Vancouver, Canada. Over half (57%) of the participants had resided in North America for less than 10 years. The majority of participants were born in Mainland China (52%). The authors did not report demographic differences between U. S. and Canadian participants. Although specific questions on social norms were not asked, participants reported that they felt it was inappropriate for older people to engage in PA, especially vigorous PA. Female participants reported a preference for “soft” types of exercise such as tai chi. Im and colleagues (2012) conducted focus groups to explore attitudes towards PA with 17 female Asian Americans, aged 40-60 years. Over one-third (35.3%) of the study participants were Chinese American. Study participants reported that traditionally, intellectual pursuits are highly commended. Physical activity was not encouraged during their childhood; rather the main focus was on academic performance. Participants also reported that Chinese culture considers exercise to be part of their everyday household chores; there is no need to go to a gym. Family is highly valued in the Chinese culture. As such, the highest priority for women is caring for their children and PA is their lowest priority. Any extra time is spent with family group activities. Although Chinese American college students may share some beliefs regarding PA with other age groups, they may have their own unique beliefs. It is possible that Chinese American students’ experiences with microaggression may also moderate the relationship between social norms and their participation in PA.

Although regular participation in moderate-to-vigorous intensity PA is known to provide health benefits, there is a scarcity of empirical studies on engagement in PA

among female Chinese American college students. The purpose of this study was to explore factors influencing engagement in PA among this understudied group. The college years are ideal for promoting regular participation in PA as a healthy lifestyle behavior that students will continue throughout their adult years.

Problem Statement

What are the relationships between SES, acculturation, microaggression, and social norms and engagement in physical activity among female Chinese American college students?

Subproblems

Among female Chinese American college students:

1. Is acculturation related to engagement in physical activity?
2. Is microaggression related to engagement in physical activity?
3. Are social norms related to engagement in physical activity?
4. Is socioeconomic status related to engagement in physical activity?
5. Does microaggression mediate the relationship between acculturation and engagement in physical activity?
6. Does microaggression mediate the relationship between social norms and engagement in physical activity?
7. Does SES moderate the relationship between acculturation and engagement in physical activity?
8. Does the combination of acculturation, microaggression, social norms, and socioeconomic status predict engagement in physical activity?

The Centers for Disease Control and Prevention (2011) defines PA as body movement produced by the contraction of skeletal muscle that increases energy expenditure above a basal level. Moderate to vigorous PA is defined in the literature as a PA that makes your heart beat faster, and makes you breathe faster (Borracino et al., 2009; Nelson, Gortmaker, Subramanian, & Wechsler, 2007). Physical activity was operationalized as the score on the International Physical Activity Questionnaire (IPAQ).

Chinese are defined as persons having origins in Mainland China and Hong Kong (Terrazas & Batalova, 2010). For this study Chinese Americans were participants who self-identified as Chinese American, including first and second-generation immigrants, and subsequent generations of Chinese Americans. Participants included students who identified their place of origin as Mainland China, Hong Kong, or Taiwan.

Socioeconomic status is conceptually defined as the social standing of an individual (American Psychological Association, 2013). Socioeconomic status was operationalized as the family income quintiles.

Acculturation is the process of change in which members of one cultural group adopt the beliefs and behaviors of another cultural group through continual interactions (Suinn, Ahuna, & Khoo, 1992). Level of acculturation was operationalized as the mean score on the General Ethnicity Questionnaire – Chinese (GEQ-C) and American (GEQ-A) versions (Tsai, Ying, & Lee, 2000).

The term microaggression was first defined by Chester Pierce, a psychiatrist, in the 1970s and further defined by Sue, Bucceri et al. (2007) as brief, everyday intentional or non-intentional verbal, behavioral, or environmental insults to people of color.

Microaggression was operationalized as the score on the Racial and Ethnic Microaggressions Scale (REMS) (Nadal, 2011).

Social norms are theoretically defined as the expectations of significant others (Pender, Murdaugh, & Parsons, 2006), such as parents and peers, regarding acceptable health behaviors. Social norms were operationalized as the participant's score on the Pender's Exercise Norms Scale.

Delimitations

The literature indicates that Asian Americans have lower levels of PA than other racial groups (Miller, Staten, Rayens, & Nolan, 2005; Troiano et al., 2012) and female college students are less physically active than male college students (Arliss, 2007, Miller et al., 2005). Chinese Americans represented the largest percentage of Asian Americans (22%) on the 2010 US Census. Therefore, study participants included female college students who self-identified as Chinese American. The sample was delimited to those individuals who can read and understand English and had no physical or medical restrictions that precluded them from walking one mile continuously without resting.

Significance

Asians are the fastest growing minority group in the US with Chinese the largest ethnic subgroup representing 22% of the Asian American population in 2010. Between 2000 and 2010 the Asian population in the US increased over 40% while the overall U. S. population increased less than 10% (Reeves & Bennett, 2004). Population predictions (US Census Bureau, 2011) estimate a 161% increase in the U. S. Asian population by the year 2050 compared to a 44% increase in the total U. S. population. In addition, the number of Asian American high school graduates enrolled in college in 2012 (82.2%)

outpaced Whites (66.6%), Blacks (58.2%), and Hispanics (70.3%) (US Bureau of Labor Statistics, 2013). Given the rapid increase in the Asian American population it is essential to assess activity levels among Chinese American college students and identify factors influencing their engagement in PA. The college years are an opportune time for students to decide that healthy behaviors, such as PA, should be an integral part of their daily lives.

High body mass index (BMI) is known to be a risk factor for cardiovascular disease and Type 2 diabetes. Ironically, Asian Americans are at risk of these disorders at a lower BMI than other ethnic groups (Centers for Disease Control & Prevention, 2011). A study of 2,071 Chinese American immigrants (mean age 52.7 ± 13.8) by Rajpathak and Wylie-Rosett (2011) found a high prevalence of impaired fasting blood sugar and diabetes among participants with a low BMI ($< 23.0 \text{ kg/m}^2$) and increased waist circumference ($p = .03$) in addition to participants with a high BMI ($\geq 23.0 \text{ kg/m}^2$) and increased waist circumference ($p < .0001$). This study highlights the need for Chinese American college students to become physically active at a level to lower their risk for overweight and diabetes.

Historically, Asians have been studied as a homogenous group (Ayres, Atkins & Mahat, 2010; Ayers & Mahat, 2012; Cho, 2006; Maglione & Hayman, 2009; Nelson, Gortmaker, Subramanian, & Wechsler, 2007; Pedersen, Hsu, Neighbors, Lee, & Larimer, 2013; Scholley, Katz, Gascoigne, & Holch, 2005; Unger, Reynolds, Shakib, Spruijt-Metz, & Johnson, 2004) or grouped with other ethnic groups (Egli, Bland, Melton, & Czech, 2011; Nguyen-Michel, 2006; Singh, Kogan, Siahpush, & van Dyck, 2008). Yet, when studied as distinct ethnic groups, health disparities, such as rates of obesity,

hypertension, and cancer, are evident (Asian American Network for Cancer Awareness, Research and Training, 2012; Barnes, Adams, & Powell-Griner, 2008). Data from the biannual California Health Interview Survey (CHIS) is frequently analyzed to determine health behaviors and outcomes including PA levels among non-institutionalized California youth (Babey, Hastert & Wolstein, 2013) and adults (Afable-Munsuz, Ponce, Rodriguez & Perez-Stable, 2010; Choi, Wilbur, & Kim, 2011; Kandula & Lauderdale, 2005; Maxwell, Crespi, Alano, Sudan, & Bastani, 2012). Data analysis of 3,465 Asian American adults (Maxwell et al., 2012) from the 2005 CHIS found Chinese American females engaged in significantly less moderate PA than female Japanese and Filipina Americans ($p < .05$) and significantly less vigorous-intensity PA than Filipina Americans ($p < .05$). Although this study shows ethnic subgroup differences in participation in PA, CHIS data does not distinguish between younger and older adults. Research may provide evidence of factors unique to female Chinese American college students that influence their participation in PA and can inform development of culturally effective interventions.

Asian Americans are a heterogeneous population encompassing ethnic subgroups with distinct cultural values and beliefs, and health behaviors. It is imperative to produce data representative of each unique subgroup. Yet, there is a paucity of literature exploring PA among female Chinese American college students. The purpose of this study was to address this knowledge gap and provide empirical data on the relationship between SES, acculturation, microaggression, and social norms and engagement in PA among female Chinese American college students. This study will generate knowledge to inform culturally effective interventions to promote PA as a healthy lifestyle behavior.

Chapter 2

Review of the Literature

The health benefits of regular participation in moderate to vigorous-intensity physical activity (PA), such as brisk walking, cycling, or participating in sports, are well known especially as an approach to decrease the incidence of chronic disorders, such as hypertension, cardiovascular disease and type 2 diabetes. Nonetheless, in 2010, 51.7% of Asian immigrants living in the United States, aged 18 years and older, reported no leisure-time PA (Centers for Disease Control & Prevention, 2012). Leisure-time physical activity (LTPA) is defined as PA outside of occupational PA or for transportation. In fact, Chinese Americans aged 18-85 years are significantly less likely than Whites to meet recommended levels of LTPA ($OR = .472, p < .001$) (Li & Wen, 2013).

The purpose of this research was to explore the relationships between acculturation, microaggression, social support, and socioeconomic status (SES) and engagement in PA among female Chinese American college students. The theoretical framework guiding the research, along with empirical and theoretical support will be discussed. Study hypotheses will also be presented.

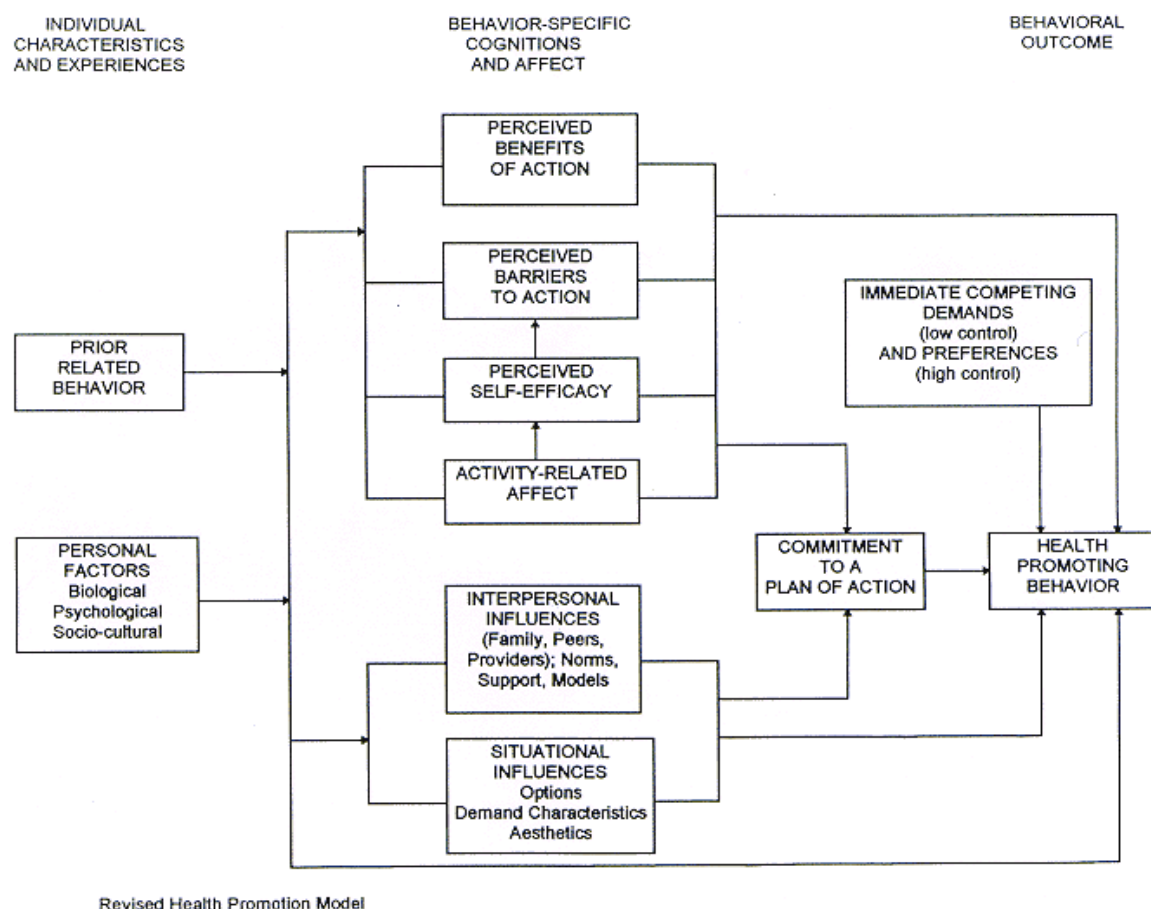
Theoretical Framework: The Health Promotion Model

The Health Promotion Model (HPM), initially developed in the early 1980s as a theoretical framework for exploring the complex biopsychosocial factors influencing health-promoting behaviors (Pender, Murdaugh, & Parsons, 2002), integrates constructs from the expectancy-value theory (benefits of the behavior) and the social cognitive theory (perceived self-efficacy). According to Pender, Murdaugh, and Parsons (2006) health promotion is the motivation and desire to increase well-being and actualize human

health potential through purposeful activity and ultimately achieve positive health outcomes. Motivation to engage in health-promoting behaviors, such as PA, exists throughout childhood and adulthood, but the form of motivation may differ. For example youth may be primarily concerned with improvement in physical appearance, while an adult may be motivated to improve stamina.

Variables in the HPM influencing health-promoting behaviors are categorized as: 1) individual characteristics and experiences; 2) behavior-specific cognitions and affect; 3) interpersonal and situational influences; 4) commitment to plan of action and 5) immediate demands and preferences. Subgroups within these categories are depicted in Figure 1. The HPM offers flexibility for research studies to focus on variables relevant to a specific population of interest and health behavior. The majority of research studies utilizing the HPM have focused on the constructs of perceived self-efficacy, benefits of and barriers to health behavior, and personal factors (Pender, Murdaugh, & Parsons, 2002). This study focused on personal factors (sociocultural: SES, and acculturation), interpersonal influences (social norms), and situational influences (microaggression) as they related to health-promoting behavior operationalized as physical activity.

Figure 1. The Health Promotion Model (1996). Retrieved from <http://nursing.umich.edu/faculty-staff/nola-j-pender>



According to Pender, Murdaugh, and Parsons (2006), an individual's unique characteristics and personal experiences impact health behaviors. The HPM suggests that personal factors have both a direct and indirect influence on health behaviors. Some personal factors, such as age, cannot be modified in future interventions. However, such factors may be relevant for explaining engagement in a specific health-promoting behavior.

According to the HPM, social norms are the standards and expectations of significant others, such as parents, peers, and healthcare providers, regarding a health

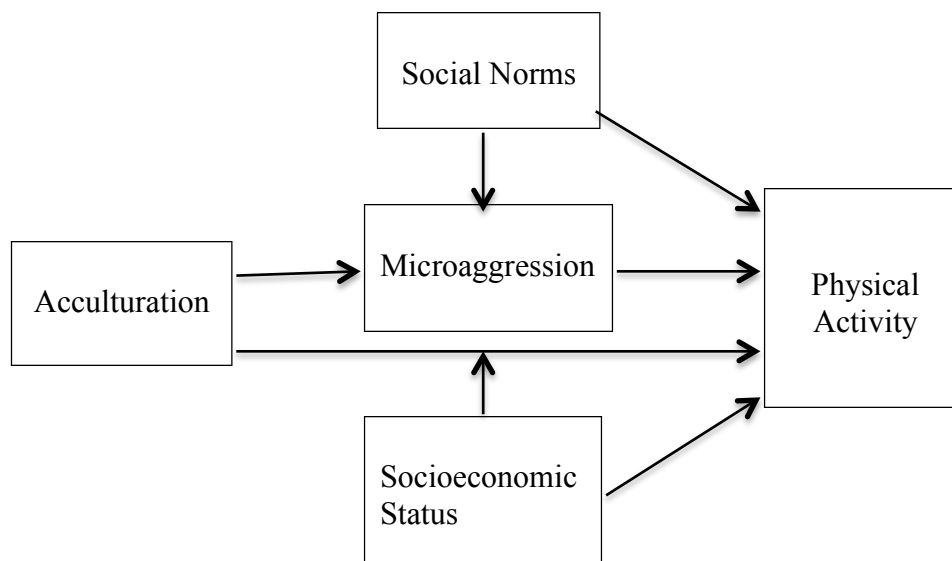
behavior (Pender, Murdaugh, & Parsons, 2006). In this study, perceived norms of fellow students and norms specific to Chinese culture may be shown to influence participation in PA.

Situational influences describe social and environmental factors that directly and indirectly influence health-promoting behaviors (Pender, Murdaugh, & Parsons, 2006). Individuals may perform more competently in environmental contexts where they feel comfortable, accepted, and safe. According to the HPM, situational influences, such as microaggression, may directly or indirectly influence health behaviors and may be key to promoting healthy lifestyle behaviors in diverse populations.

The HPM is the supporting framework for numerous research studies of PA among adolescents in the US (Frenn & Malin, 2003; Garcia, Pender, Antonakos, & Ronis, 1998; Robbins, Pender, Ronis, Kazanis, & Pis, 2004; Wu, Pender & Yang, 2002), Taiwan (Wu & Pender, 2002; Wu & Pender, 2005; Wu, Pender, & Nouredine, 2003), Thailand (Teerarungsikul et al., 2009), and Iran (Mohamadian et al., 2011; Taymoori, Lubans & Berry, 2010); US college students (Brannagan, 2011; Maglione & Hayman, 2009); adults in the US (Walker, Pullen, Hertzog, Boeckner, & Hageman, 2006; Walker et al., 2009; Yang et al., 2007), Thailand (Kraithaworn, Sirapo-ngam, Piaseu, Nityassuddhi, & Gretebeck, 2011), and Korea (Shin, Hur, Pender, Jang, & Kim, 2006; Shin, Younhee, Park, Cho, & Heitkemper, 2008; Shin, Yun, Pender, & Jang, 2005); and adults with spinal cord injuries (Keegan, Chan, Ditchman, & Chiu, 2012). However, there is a paucity of literature exploring the relationship between HPM constructs and PA among female Chinese American college students. This study explored the direct and indirect relationships between the specified personal factors (socioeconomic status,

acculturation), social norms, and situational influence (microaggression) and engagement in PA among female Chinese American college students. (See Figure 2).

Figure 2. Variables tested



Variables

Physical Activity

Physical activity is defined as the body movement produced by the contraction of skeletal muscle that increases energy expenditure above basal metabolic rate (Caspersen, Powell, & Christenson, 1985). Moderate to vigorous PA (MVPA) is defined in the literature as a PA that makes your heart beat faster, and makes you breathe faster (Borracino et al., 2009; Nelson, Gortmaker, Subramanian, & Wechsler, 2007). National guidelines recommend that individuals participate in moderate-intensity PA for at least 30 minutes on five or more days each week to obtain health benefits.

Personal Factors

Numerous variables are known to be associated with PA and inactivity. Age and SES, are two personal factors in the HPM, that have been shown to influence levels of PA. For this study, income will be the proxy measure for SES.

Socioeconomic status. Socioeconomic status is often a reflection of a combination of income, education, and occupation. Chinese Americans may differ in SES dependent on how long they have lived in the US and their immigration status. Engagement in PA is known to be associated with income and education levels. Chen (2009) examined the relationship between household income and maternal education level and health behaviors of 65 Chinese American children aged 8 to 10 years. Study results showed that children from high-income households were more physically active than children from lower income households ($R^2 = .07, p = .03$). Children of parents with more years of education ($M = 13.7, SD = 5.1$) were more physically active than children of parents with fewer years of education ($R^2 = .16, p = .001$). Although education level was defined differently, similar results were seen in a study of 517 older adult Chinese Americans (Parikh, Fahs, Shelley, & Yerneni, 2009). Adults with a higher level of education (high school or above) were more likely to engage in moderate or a great deal of PA than adults with less than a high school education ($OR = 3.49, 95\% CI .16 - .69, p < .001$). In contrast to Chen's study, Parikh and colleagues (2009) found that older Chinese adults with household incomes greater than \$40,000 were less likely to engage in moderate or a great deal of PA than adults with household incomes of less than \$10,000 ($OR = .34, 95\% CI .14 - .83, p < .05$). Of note is that 33% of the mothers in Chen's study and 86% of the participants in Parikh's study reported incomes of less than \$40,000.

Income and education, as noted above represent personal factors in the HPM that influence health-promoting behaviors. College students from higher SES households may have more leisure time available to be physically active than students who are working in addition to taking classes.

Acculturation. Although Chinese began immigrating to the US in the 1800s, over 40% of Chinese immigrants residing in the US in 2010 arrived in 2000 or after (McCabe, 2012). Chinese immigration has been driven primarily by economic opportunities available in the US. Compared to other immigrant populations, more Chinese (25%) obtain permanent residence in the US through an employer rather than family sponsorship or through asylum grants (21%). Sixty-one percent of Chinese Americans are foreign born, yet less than 1% of all illegal US immigrants are from China. In 2010, more female than male Chinese immigrants resided in the US (55% and 45% respectively), and 65% of Chinese immigrants were between 18 and 64 years, and 25% were under 17 years. While fewer (12%) Chinese Americans live below the poverty line compared to the total population (14%), more Chinese Americans live in overcrowded housing (6%) compared to the total population (3%) (Asian American Justice Center, 2011). Although the number of Chinese Americans with a high school degree (82%) is close to the total population (85%), a higher percentage of Chinese Americans have a Bachelor's degree or higher (50% versus 28%). All of these factors influence immigrants' acculturation to the US and their engagement in health promoting behaviors.

Acculturation is the process of change in which members of one cultural group adopt the beliefs and behaviors of another cultural group through continual interactions

(Suinn, Ahuna, & Khoo, 1992). This is a multidimensional and multidirectional process whereby individuals may participate in the mainstream culture while retaining some of their heritage culture (Wang, Kim, Anderson, Chen, & Yan, 2012). Immigrating into U.S. culture at distinctive times may result in differing values, beliefs, and health practices among the various generations of Chinese Americans. For many Chinese immigrants acculturation to the US involves a change in dietary habits and PA. The majority of acculturation studies have used proxies for acculturation, such as country of birth, language use, length of residence in the US, and generational status (Afable-Munsuz, Ponce, Rodriguez & Perez-Stable, 2010; Allen et al., 2007; Choi, Hwang & Yi, 2011; Hofstettler et al., 2008; Jonnalagadda & Diwan, 2005; Juang & Nguyen, 2009; Kandula & Lauderdale, 2005; Li & Wen, 2013; Ng, McMahan, Mouttapa, Tanjasiri, & Beam, 2009; Novotny, et al., 2012; Parikh, Fahs, Shelley, & Yerneni, 2009; Shelley et al., 2004; Taylor et al., 2007; Unger, Reynolds, Shakib, Spruijt-Metz, & Johnson, 2004; Unger, Trinidad, Weiss, & Rohrbach, 2004; Willergodt & Thompson, 2006; Wong, Dixon, Gilbride, Kwan, & Stein, 2013). More recent studies have measured acculturation among the Asian population using the Suinn-Lew Asian Self Identify Acculturation scale, a unidimensional measure (Ayres, Atkins & Mahat, 2010; Ayres & Mahat, 2012; Chen, 2009; Myers et al., 2009; Pedersen, Hsu, Neighbors, Lee, & Larimer, 2013) and the General Ethnicity Questionnaire (GEQ), a bidimensional measure of acculturation (Tsai, 2001; Tsai, Mortensen, Wong, & Hess, 2002; Tsai, Ying, & Lee, 2000; Ying & Han, 2008).

The influence of acculturation on Chinese American health behaviors, such as health screenings and diabetes management, has been extensively studied over the past

decade. Research has shown that acculturation of Chinese American college students is associated with adoption of positive health practices (Ayres, Atkins & Mahat, 2010; Ayres & Mahat, 2012), and unhealthy behaviors, such as smoking (Constantine et al., 2010; Unger, Trinidad, Weiss, & Rohrbach, 2004; Weiss & Garbanati, 2006), and alcohol use (Pedersen, Hsu, Neighbors, Lee, & Larimer, 2013), and risk for higher BMI (Ng, McMahan, Mouttapa, Tanjasiri, & Beam, 2009; Wang, Quan, Kanaya, & Fernandez, 2011). Yet relatively few studies have addressed PA among Chinese Americans.

Research by Chen (2009) explored the effects of maternal acculturation on the PA levels of their children. The study of sixty-five 8-10 year old Chinese American children and their mothers showed that a high level of maternal acculturation, defined as having a strong Western identity, was significantly related to a low level of sedentary activity ($R^2 = .09, p = .04$) and low BMI ($R^2 = .07, p = .034$) in the children. In contrast, Unger and colleagues' (2004) study of 619 6th and 7th grade students found that more acculturated students participated in significantly less PA than less acculturated students (Beta = $-.089, p < .001$).

The biannual California Health Interview Survey (CHIS) is the data source used for many large sample research studies on PA among non-institutionalized adult residents of California (Afable-Munsuz, Ponce, Rodriguez & Perez-Stable, 2010; Allen et al., 2007; Li & Wen, 2013; Maxwell, Crespi, Alano, Sudan, & Bastani, 2012). Afable-Munsuz and colleagues (2010) analyzed data from the 2005 CHIS to assess the relationship between acculturation and PA among 1,313 Chinese adults aged 18 years and older. Responses on four PA questions indicated the percentage of Chinese American adults who engaged in leisure-time PA increased with each subsequent

generation (1st generation - 20.4%; 2nd generation - 30.2%; 3rd generation - 32.2%; chi square $p < .05$). However, non-leisure time physical activity decreased from first to second generation and then increased to the highest level with the third generation (1st generation - 16.7%; 2nd generation - 15.7%; 3rd generation - 32.1%). Of note is that the largest percentage of first generation Chinese were 50 years and older (37.1%), while the majority of the second and third generation were between 18 and 29 years (43.5% and 38.0% respectively).

Parikh and colleagues (2009) found similar results in their secondary analysis of the New York City Chinese Health Survey (NYC CHS) data of 2,537 Chinese Americans aged 55 years and older. Acculturation, measured as the percentage of life spent in the US, was found to be a positive predictor of moderate-intensity PA at the 95% CI (OR = 1.02, $p < .05$). However, only one question on the NYC CHS addressed PA levels. In contrast, a study of 395 Chinese Americans, aged 18-64 years, by Taylor and colleagues (2007), found that participants residing in the US for 10 or more years were less active than participants residing in the US for less than 10 years (41% and 27% respectively, $p = .01$). The mixed results of these studies may be due to the large age ranges of study participants, SES, the limited number of questions assessing PA, and the type of PA measured. These limitations support the need for this study to focus on Chinese American college students using a comprehensive measure of PA.

Two studies by Ayers and colleagues (2010, 2012) explored the relationship between acculturation and positive health practices among Asian American college students, aged 18-21 years. Positive health practices were defined as a combination of exercise, nutrition, relaxation, avoidance of substance use, and the promotion of health.

Regression analysis showed a significant positive association between acculturation and positive health practices among 151 students in 2010 ($r = .229, p < .01$) and 163 students in 2012 ($r = .169, p < .05$). This study supports the theorized relationship between acculturation and PA among Asian American college students. However, exercise was just one part of positive health practices, only 52% of the participants were Chinese, and disaggregated data analysis was not reported.

Overall, these studies show a mixed relationship between acculturation and engagement in PA among Chinese Americans. The college student's personal level of acculturation may impact their health-promoting behaviors. This supports the need for examining the relationship between acculturation and PA among a cohort of female Chinese American college students.

Microaggression

Asian Americans are often considered the “model minority” and may appear less likely to experience discrimination. Yet, research shows Asian Americans experience microaggression; a form of subtle racial discrimination (Sue, 2010). Chester Pierce, a psychiatrist, first defined the term microaggression in the 1970s to describe Black-White relations. Sue, Bucceri, Lin, Nadal, and Torino (2007) further defined the term as brief, everyday intentional or non-intentional verbal, behavioral, or environmental insults to any marginalized group in society. Sue, Bucceri et al (2007) developed a taxonomy of three types of microaggression: microassaults, microinsults, and microinvalidation. Microassaults are often conscious hostile or overt racial incidents, such as referring to an Asian American as a “Chink”. Microinsults are often unconscious incidents perceived as offensive or insulting, such as stereotyping Asian American women as submissive or

assuming all Asian Americans are smart in math and science. Microinvalidation involves communications that make a person of color feel like a perpetual foreigner in their own country, such as complimenting a U.S. born Asian for speaking English well. Research has shown microinvalidation to be the most frequent form of microaggression experienced by Asian Americans (Nadal, 2011; Ong, Burrow, Fuller-Rowell, Ja, & Sue, 2013; Sue, Bucceri et al., 2007). According to the HPM, social environments perceived to be accepting may be more conducive to engagement in health-promoting behaviors. Chinese American students experiencing microaggression on a college campus may feel alienated. This may directly or indirectly impede their engagement in PA.

The majority of research on microaggression is found in the psychology, education, and counseling disciplines. Racial microaggression was originally studied in the African American population (Solorzano, Ceja, & Yosso Aymer, 2010; Burrow & Ong, 2010; Torres, Driscoll, & Burrow, 2010) and has only recently expanded to the Asian American population (Nadal, 2011; Sue, Bucceri et al., 2007; Sue, Capodilupo et al., 2007; Torres-Harding et al., 2012) including high school (Huynh, 2012; Huynh & Fuligni, 2010), and college students (Ong, Burrow, Fuller-Rowell, Ja, & Sue, 2013; Wang, Leu, & Shoda, 2011), and college students in a predominately White institution (Blume, Lovato, Thyken, & Denny, 2012; Harwood, Browne Hunt, Mendenhall, & Lewis, 2012).

Two qualitative studies were found that explored specific types of microaggression experienced by Asian American college students. Sue, Bucceri and colleagues' (2007) identified eight microaggression themes from their focus group interviews with 10 Asian Americans, eight of who were college students, nine female,

and four self-identified as Chinese American. The themes identified were: 1) alien in own land; 2) ascription of intelligence; 3) denial of racial reality; 4) exoticization of Asian American women; 5) invalidation of interethnic differences; 6) pathologizing cultural values/communication styles; 7) second class citizenship; and 8) invisibility. These themes have been used in subsequent studies of microaggression (Harwood, Browne Hunt, Mendenhall, & Lewis, 2012; Ong, Burrow, Fuller-Rowell, Ja, & Sue, 2013) and the development of racial microaggression instruments (Nadal, 2011; Torres-Harding et al., 2012)

A study by Harwood and colleagues (2012) explored types of microaggression experienced by students of color residing in residence halls on a predominately White university. Of the 81 students participating in focus groups, 20 students self-identified as Asian American. In addition to mapping microassaults, microinsults, and microinvalidation the authors focused on individual-level and environmental racial microaggressions. Four themes of microaggression experienced by the students were identified. The first theme, racial jokes and verbal comments, represents individual-level racial microaggression. The themes racial slurs written in shared spaces, and segregated spaces and unequal treatment, represent environmental racial microaggressions experienced by the students. The fourth theme, denial and minimization of racism was experienced when university staff dismissed reports by persons of color of problematic behavior.

As noted above, research shows Asian American college students experience microaggression, particularly microinvalidation. Although empirical literature demonstrates that microaggression is an important predictor of emotional well-being

(Blume, Lovato, Thyken, & Denny, 2012; Wang, Leu, & Shoda, 2011) and somatic symptoms (Ong, Burrow, Fuller-Rowell, Ja, & Sue, 2013), no studies examining the relationship between microaggression and physical activity were identified.

Microaggression may also serve as a mediator in the relationship between acculturation and physical activity. The literature review did not identify any studies testing microaggression as a mediator in this relationship, yet the HPM proposes that microaggression, a theorized situational factor, may serve as a mediator of the relationship between personal factors and health behaviors. Specifically, a proposition of the HPM is that personal factors influence health behaviors directly and indirectly through their effect on situational factors. Clearly, research is needed to disentangle the relationships among acculturation, and the effects of microaggression on health promoting behaviors, such as PA, in the college setting.

Social Norms

Theorists posit that expectations of significant others (social norms) influence health behaviors (Pender, Murdaugh, & Parsons, 2006). Individuals can either adopt or reject the expected behavior standards. Social norms have been shown to influence both healthy and unhealthy behaviors in college students. A major focus of research on the influence of social norms on college student behavior has been on at-risk behaviors, such as tobacco use (Martens et al., 2006; Romero & Pulvers, 2013), alcohol use (Carcioppolo & Jensen, 2012; Cho, 2006; Martens et al., 2006), substance use (Martens et al., 2006), and sexual activity (Martens et al., 2006; Scholly et al., 2005; Adams & Rust, 2006). Research on human papillomavirus vaccination rates among female college students has shown the positive association between social norms and healthy college student

behavior (Allen et al., 2009; Marchand, Glenn, & Bastani, 2012). The majority of research on the relationship between social norms and PA in the Asian American population has been qualitative (Im, Stuijbergen, & Walker, 2010; Im et al., 2012; Taylor et al., 2008), focused on middle age and older adults (Im Stuijbergen & Walker, 2010; Im et al., 2012; Taylor et al., 2008; Taylor et al., 2012), and reports on Asian Americans as a homogenous group. Unfortunately, there is a dearth of research on the association between social norms and female Chinese American health behaviors, especially PA.

The concept of filial piety is an integral part of Chinese culture. It consists of loving, respecting, being obedient to, and caring both emotionally and financially for one's parents. Chinese children show love, honor, and respect of parents through their academic motivation and achievement (Chen & Ho, 2012). Research by Tsai, Chen and Tsai (2008) showed a changing perception of practicing filial piety among 40 university students (37 female) in Taiwan. Participants continue to believe in caring for their parents although the way they show filial piety may depend on the amount of time they have available. Similarly, the drive for academic achievement and the time they are expected to spend caring for family may be potential conflicts for Chinese American students engagement in PA.

Similar concepts were evident in focus group discussions with 17 female Asian Americans, aged 40-60 years, exploring attitudes toward PA (Im et al., 2012). Over one-third (35.3%) of the study participants were Chinese American. Study participants reported that traditionally, intellectual pursuits are highly commended. PA was not encouraged during their childhood; rather the main focus was on their academic performance. Exercise is considered part of everyday household chores in the Chinese

culture, so they do not see a need to go to a gym. Family is highly valued in the Chinese culture. As such, the highest priority for women is caring for their children. Participating in PA is their lowest priority. Rather than pursuing leisure activities Chinese women spend any free time they have on family group activities.

Focus groups conducted by Taylor and colleagues (2008) explored PA among 46 Chinese immigrants aged 18 years and older. Although specific questions on social norms were not asked, participants reported that they felt it was inappropriate for older people to engage in PA, especially vigorous PA. Although Chinese American college students may share some beliefs regarding PA with other age groups, they may have their own unique beliefs.

In summary, these findings support the importance of exploring the role of social norms in engagement in PA among female Chinese American college students. A college student's perception of the beliefs and expectations of their parents and peers in regard to engaging in health-promoting behaviors may influence their actual behavior. It may be expected that social norms will influence PA levels. However, the direction of the relationship between social norms and PA among Chinese American college students is unclear when taking into consideration cultural and peer norms.

Microaggression may also serve as a mediator in the relationships between acculturation and PA and between social norms and PA. The literature review did not identify any studies testing microaggression as a mediator of the theorized relationships between personal factors, interpersonal factors, and health behaviors. Specifically, the HPM postulates direct and indirect relationships between theory concepts. Personal factors are proposed to influence health behaviors directly and indirectly through their

effect on situational factors. Similarly, interpersonal factors are proposed to influence health behaviors directly and indirectly through their effects on situational factors. Thus, the HPM proposes that microaggression, as a situational factor, may function as a mediator in the proposed study. Clearly there is a need to disentangle the complex theorized relationships among HPM concepts, and an examination of the role of microaggression as a mediator will add to our knowledge of the influence of microaggression on the relationship between acculturation and social norms and PA.

Literature discussed above is indicative of the complexity of factors influencing participation in physical activity. Although Chinese are frequently included in research studies, relatively few US studies address the physical activity level of Chinese American college students. For these reasons, additional research exploring factors influencing the PA behaviors of female Chinese American college students is crucial for the development of culturally effective interventions.

Theoretical Rationale

According to the HPM individuals have unique characteristics and experiences that affect their health promoting behavior. Internal cues, such as acculturation status, and external cues, such as experiencing microaggression, synergistically provide powerful stimuli for health behaviors. The HPM posits that interrelated variables directly and indirectly influence engagement in health-promoting behaviors, such as PA (Pender, Murdaugh, & Parsons, 2006). The following hypotheses were tested based on the proposed theoretical propositions of the HPM.

Among female Chinese American college students:

1. There is a positive relationship between acculturation and engagement in physical activity.
2. There is a negative relationship between microaggression and engagement in physical activity.
3. There is a negative relationship between social norms and engagement in physical activity.
4. There is a positive relationship between socioeconomic status and engagement in physical activity.
5. When microaggression is controlled for, the magnitude and significance of the relationship between acculturation and engagement in physical activity will diminish.
6. When microaggression is controlled for, the magnitude and significance of the relationship between social norms and engagement in physical activity will diminish.
7. Socioeconomic status will moderate the relationship between acculturation and engagement in physical activity.
8. When the effects of social norms and socioeconomic status are controlled for, microaggression will be significantly related to engagement in physical activity.
9. When the effects of microaggression and socioeconomic status are controlled for, social norms will be significantly related to engagement in physical activity.
10. When the effects of microaggression and social norms are controlled for, socioeconomic status will be significantly related to engagement in physical activity.

Diagrams of Hypotheses to be tested

Hypothesis 1



Hypothesis 2



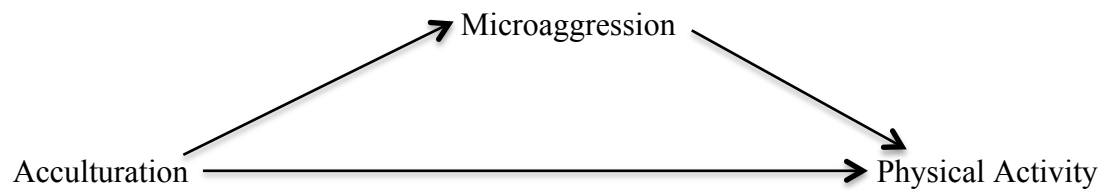
Hypothesis 3



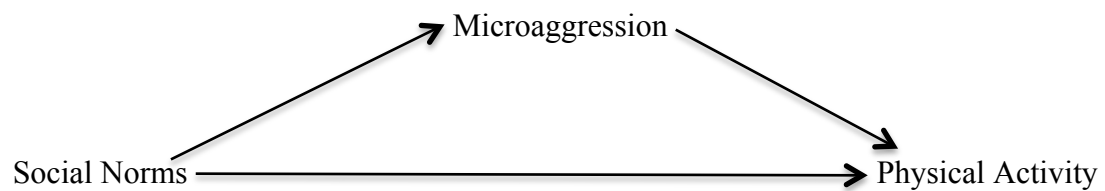
Hypothesis 4



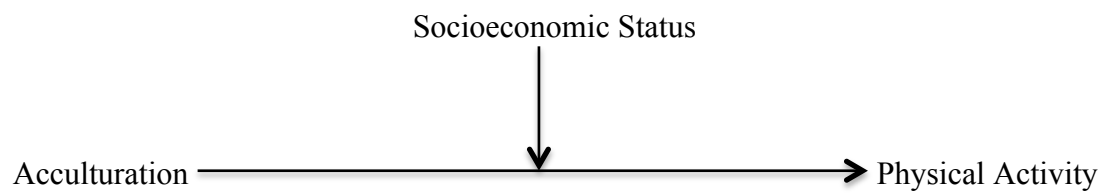
Hypothesis 5



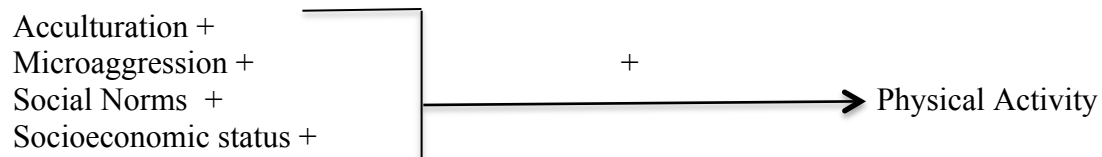
Hypothesis 6



Hypothesis 7



Hypothesis 8-10



Chapter 3

The proposed study examined the relationship between acculturation, microaggression, social norms, and socioeconomic status (SES) and participation in physical activity among female Chinese American college students. The setting, participants, instruments, and equipment from the study will be presented. Data collection and analysis will also be discussed.

Methodology

Setting

Study participants were recruited at San Francisco State University (SFSU). SFSU is a large urban campus of over 30,000 students (61% female). The diverse student population reflects local demographics with Asian Americans comprising 30.1% of all students. Over 50% of the Asian students, and 11.6% of all SFSU students, self-identify as Chinese American.

Sample

A key informant from the Chinese American student community at SFSU actively recruited study participants through personal contact with Asian American studies classes. Students were informed of the research project and the opportunity to participate. Flyers were posted in every SFSU campus building. Snowball sampling was also used to encourage participants to recruit other students interested in the study. Eligible candidates: 1) self-identified as Chinese American; 2) were female; 3) able to read and understand English; 4) reported no restrictions on their PA; and 5) were at least 18 years old.

Power analysis was used to determine the sample size. A medium effect size

$r = .4$ was based on the previously discussed empirical literature on factors influencing participation in physical activity, including the study by Chen (2009) reporting R^2 ranging from .09 (acculturation) to .16 for the relationship between socioeconomic status and PA. A minimum sample size of 136 was calculated to obtain a power of .80 and an alpha of .05 with 10 predictor variables (Polit & Beck, 2008).

Of the 272 students who completed the online surveys, the responses of 39 students were excluded from the analysis due to delimitations of the study. The responses of thirty students were excluded from the analysis due to incomplete responses on the PA questions. The final sample of 203 participants achieved sufficient statistical power for this study.

Instruments

Five measures were used in the proposed research study including: 1) Demographic Questionnaire; 2) the General Ethnicity Questionnaire (GEQ); 3) the Racial and Ethnic Microaggressions Scale (REMS); 4) the Exercise Social Norms scale; 5) and the International Physical Activity Questionnaire Short Form (IPAQ-S). Although these instruments have been used in research studies with Asian Americans, including Chinese, there are no instruments for use exclusively with Chinese Americans.

Demographic Questionnaire. Demographic information was collected for descriptive statistics including: age; ethnicity; grade (freshman, sophomore, junior, senior, graduate student); degree major; and living situation (on campus, off campus with parents, off campus – not with parents). Socioeconomic status (SES) was determined by family income and parental education, and was included in the modeling. Family income quintiles were rated as: 1) less than \$20,000 per year; 2) \$20,000 - \$49,999 per

year; 3) \$50,000 - \$99,999 per year; 4) \$100,000 - \$200,000 per year; and 5) more than \$200,000 per year. Parental education was rated as: 1) neither parent attended college; 2) one parent attended college; or 3) both parents attended college.

General Ethnicity Questionnaire (GEQ). The General Ethnicity Questionnaire (GEQ) was developed by Tsai to address the need for a multidimensional measure of acculturation sampling a variety of cultural domains (Tsai, Ying, & Lee, 2000). The GEQ, based on four commonly used acculturation scales: the Cultural Life Styles Inventory, the Acculturation Rating Scale for Mexican Americans, the Suinn-Lew Asian Self-Identity Acculturation Scale, and the Behavioral Acculturation Scale, measures participants orientation to and engagement in Chinese and American cultural contexts. By changing the reference culture on the scale, the GEQ can easily be used with individuals from different cultures. Although the original scale contained 75 multiple-choice questions, psychometrics are reported on the 38-item abridged version currently available for use.

The abridged GEQ was initially tested in a sample of 353 Chinese American college students (179 female) at a large university in the San Francisco Bay Area. The students ranged in age from 17 to 32 years (Mean = 20.23 years, $SD = 1.77$). Participants were divided into three groups: 1) American born Chinese ($n=122$); 2) immigrants who arrived in the US at or before 12 years of age ($n=119$); and 3) immigrants who arrived in the US after 12 years of age ($n=112$). The majority of American born Chinese were 2nd generation (89.3%). The average length of time spent in the US was 12.64 years ($SD = 3.69$) for students immigrating before age 12 years, and 4.78 years ($SD = 2.13$) for students immigrating after age 12 years.

The GEQ tests both unidimensional and bidimensional models of acculturation through the use of two versions of the same instrument; one referencing Chinese culture and one referencing American cultures. Item responses to statements on cultural orientation and language proficiency are rated on a scale of 1 to 5. Specific cultural domains sampled were identified and factors reclassified using factor analyses with varimax rotation. The six factors identified for the GEQ-Chinese (GEQ-C) were: 1) Chinese language use and proficiency; 2) affiliation with Chinese people; 3) participation in Chinese activities; 4) pride in Chinese culture; 5) exposure to Chinese culture; and 6) preference for Chinese food. Six factors identified for the GEQ-American (GEQ-A) were: 1) English language use and proficiency; 2) affiliation with American people; 3) participation in American activities; 4) pride in American culture; 5) preference for media in English; and 6) preference for American food.

High internal consistency reliability ($\alpha = .92$) was reported for both the GEQ-C and GEQ-A. One-month test-retest reliability reported was .62 ($SD = .22$) and .57 ($SD = .16$) for the GEQ-C and GEQ-A respectively. Although test-retest reliability was low, the authors report it is consistent with other cultural orientation scales.

Validity of the GEQ was determined by calculating the correlation between cultural orientation scores on the GEQ-C and GEQ-A and standard indicators of acculturation. Average cultural orientation scores were correlated with age of arrival ($r_{GEQC} = .56, p < .001$; $r_{GEQA} = -.63, p < .001$), generational status ($r_{GEQC} = .50, p < .001$; $r_{GEQA} = .58, p < .001$), and length of residence in the US ($r_{GEQC} = -.60, p < .001$; $r_{GEQA} = .64, p < .001$) supporting content validity of the GEQ. Analyses of variance showed significant differences between Chinese American groups with Chinese language use and

proficiency $F(2,352) = 211.01, p < .0001$; affiliation with Chinese people, $F(2,352) = 12.71, p < .001$; participation in Chinese activities, $F(2,352) = 47.32, p < .001$; and exposure to Chinese culture, $F(2,352) = 9.45, p < .001$ supporting validity of the GEQ as a measure of acculturation. Similar significant differences were seen on the American cultural domains.

Two additional questions on the GEQ asked participants to rate the statements “Overall, I am Chinese” and “Overall, I am American” on a 5 point scale ranging from 1 (strongly disagree) to 5 (strongly agree). The authors reported test-retest reliabilities of .45 and .68 for the GEQ-C and GEQ-A respectively. Analysis of variance showed significant differences ($p < .001$) in cultural groups ratings of how Chinese and how American they were, supporting validity of these items.

Additional studies using the GEQ include Tsai and colleagues (2004) study of 30 Chinese American college students (53.3% female). The authors reported a coefficient alpha of .91 and .94 on the GEQ-C and GEQ-A respectively. In addition the use with Chinese Americans, the GEQ has also been used as a measure of acculturation in studies of Hmong Americans. In 2001, Tsai reported a coefficient alpha of .88 on the GEQ-H and .81 on the GEQ-A in her study of 46 Hmong college students (57.1% female) and in 2002, Tsai and colleagues reported coefficient alphas of .87 (GEQ-H) and .84 (GEQ-A) in their study of 49 Hmong college students (59% female) from a large university in Minnesota. More recently, Ying and Han (2008) assessed cultural orientation in a group of Southeast Asian American college students (67% female) in California, with similar psychometric results. Huynh and colleagues (2009) conducted a meta-analysis of the reliability of bidimensional acculturation scores. The authors reported that the GEQ

yielded marginally more reliable dominant culture scores and significantly more reliable scores than the other two instruments they reviewed. The studies above provide ongoing support for the reliability of the GEQ.

In summary, the GEQ has been used in a number of studies as a measure of acculturation among the Asian population and college students. The above studies provide psychometrics supportive of the GEQ as a valid and reliable instrument appropriate for measuring acculturation among the female Chinese American college students in this study.

Racial Ethnic Microaggression Scale (REMS). The Racial and Ethnic Microaggressions Scale (REMS) was developed in 2010 (Nadal, 2011) to address the need for an objective measure of daily microaggressions experienced by people of color. The REMS is a 45-item, self-report scale. It includes six subscales with 5 to 9 items each: 1) Assumptions of Inferiority; 2) Second-class Citizen and Assumptions of Criminality; 3) Microinvalidations; 4) Exoticization and Assumptions of Similarity; 5) Environmental Microaggressions ; and 6) Workplace and School Microaggressions. Participants rate each item as either 0 = “I did not experience this event” or 1 = “I experienced this event at least once in the past six months”. Items are summed for a total scale score in addition to individual subscale scores. Higher scores are indicative of higher incidences of racial discrimination.

The initial pool of scale items was formulated by a team of 13 researchers using the eight microaggression taxonomies identified by Sue, Bucci et al (2007), along with research on African Americans, Latina/os, Asian Americans, indigenous people, and students of color. After 15-20 items per category were developed, four research team

members revised grammar and wording, compiling a list of 140 items. Changes made upon recommendation from an independent auditor, a professor with expertise in microaggression literature, resulted in the REMS-1; a 131-item randomized list of racial microaggressions.

The REMS-1 was pilot tested in a study of 443 racially diverse adults aged 18-66 years (Mean = 24.83, $SD = 8.627$). The majority of participants resided in the northeast. Three-quarters of the participants were female and 34% self-identified as Asian American/Pacific Islander. The largest Asian subgroup was Filipino. Participants completed the REMS-1 by identifying the number of times a microaggression occurred in the previous six months. Item response options ranged from 1 = “I did not experience this event in the past six months”, to 5 = “I experienced this event 10 or more times in the past six months.”

Exploratory principal components analysis with varimax rotation was used resulting in a Kaiser-Meyer-Olkin coefficient of .894, indicating a high level of correlation between items. Bartlett’s test of sphericity suggested sufficient sampling adequacy ($\chi^2 = 8155.78, p < .001$). Seventy-nine items remained after removing items with factor loadings $< .45$ and $> .50$. Six components with eigenvalues over 1 were retained after a second principal components analysis of the 79 items. Percent variance accounted for by the six subscales ranged from 1.61% (Workplace and School Microaggressions) to 12.70% (Assumptions of Inferiority).

Nadal reported an internal consistency reliability of 0.928 ($M = 1.6702, SD = 0.543$) on the 45-item REMS. The coefficient alpha was $> .80$ for each subscale item.

High-internal consistency reliability was also seen with all major racial groups (Asian alpha coefficient = .909).

Content validity was established through the independent categorizing of answers, by five researchers, into themes and confirming the appropriateness of item responses in the intended domains. Nadal does not elaborate on the qualifications of the researchers.

Concurrent validity was established through participants' completion of the previously validated short version of the Racism and Life Experiences-Self-Administration Brief-Version (RaLES-B). The 9-item instrument is a self-report measure, used with Black Americans, of an individual's belief that racism affects them personally and their ethnic group. The REMS-45 positively correlated with the RaLES-B ($r = .464, N = 376, p < .001$) except for the Environmental Microaggressions subscale.

Construct validity was confirmed through participants' completion of the REMS Evaluation, three open-ended questions at the end of the REMS-1. Participants were asked to describe what they thought the questions were asking, and write three keywords or phrases that can label experiences on the REMS-1. Participant responses such as "[This study is about] the constant subtle and not-so-subtle ways we are treated differently because of our racial identity" provide evidence that the REMS is measuring the construct of interest (microaggression).

Less variance was found than expected in the scoring and researchers subsequently recoded responses into dichotomous variables; 0 if the participant did not experience an event, and 1 if the participant did experience the event at least once in the past six months. The resultant REMS-Checklist alpha coefficient was .912 with subscale alpha coefficients ranging from .783 (Exoticization/Assumptions of Similarity) to .873

(Assumptions of Inferiority). Only subscale 5 was not significantly correlated to any other subscale. Confirmatory factor analysis showed an increase in RaLES-B correlation scores ($r = .489$, $N = 376$, $p < .001$) with subscale 5 still not significantly correlated to the other subscales.

Additional psychometrics obtained in a second study by Nadal of an ethnically diverse sample of 218 participants aged 17 to 54 years showed a mean of 2.56 ($SD = 4.427$). Similar to study 1, 76% of participants were female. Asian American/Pacific Islanders represented only 12% of participants in study 2. However, Chinese were one of the larger ethnic groups (4.2%).

Item response options differed slightly from study 1, with options ranging from 0 = “I did not experience this event in the past six months” to 5 = “I experienced this event 5 or more times in the past six months.” Responses were once again recoded to dichotomous variables. Participants completion of the Daily Life Experiences-Frequency (DLE-F) scale, a 20-item subscale of the RaLES-S, supported concurrent validity ($r = .698$, $N = 253$, $p < .001$).

Confirmatory factor analysis supported the 6-factor model with a chi-square = 1400, ($df = 930$, $p < .001$), a comparative fit index of .815, a standardized root-mean-square residual score of .071, and a root-mean-square error of approximation score of .05. Nadal reported a Cronbach’s alpha of .882 ($M = .0556$, $SD = 0.18$) for the REMS-Checklist and $> .70$ for all subscales and racial groups.

Development of the REMS provides a tool for empirical support of the occurrence of microaggressions and their impact on an individual’s physical and mental health. Although this instrument was recently developed, these studies provide psychometrics

supporting the REMS as a valid measure of racial microaggressions. This study will contribute to the limited psychometrics available on the REMS.

Exercise Norms scale. Pender's Exercise Norms Scale initially developed for use with adolescents consisted of one yes/no question: "Do any of your family members or friends expect you to be physically active?" The only statistical analysis was test-retest reliability ($r = .76$).

The scale was modified (Garcia et al., 1995) to ask: "How much do you think the following people expect you to exercise (be active to the point that you sweat, breathe fast, or your heart beats fast)?" The scale assessed the norm expectation of five significant people: 1) family members; 2) my closest friend; 3) 5 or 6 friends I spend most of my time with; 4) the teacher I am closest to; and 5) my doctor. Participants rated each item as: "not at all"; "sort of"; or "a lot". The items are summed for a total Exercise Norms Scale score. Higher scores are equated with higher expectations for exercise behavior. The 5-item scale was used in a study of exercise behavior among 286 5th, 6th, and 8th grade students (51% female). Psychometrics were not reported.

The 5-item scale was used again in a study of 132 students exploring exercise behavior transitioning from elementary to junior high school (Garcia, Pender, Antonakos, & Ronis, 1998). Prior to this cross-sectional study, the exercise social norm scale was tested with a group of adolescents, showing a test-retest reliability of .76. Internal consistency reliability was not calculated due to the nature of the scale. Although the scale continued to be used (Wu & Pender, 2002; Wu & Pender, 2005) no further statistical analysis was reported.

The Exercise Social Norms scale continues to be used to assess norms of health behavior, even though published psychometric data is lacking. Expectations of significant others can be influential on individual health behavior. Therefore, it is crucial to add to our knowledge of factors (such as social norms) influencing PA among female Chinese American college students.

International Physical Activity Questionnaire. The International Physical Activity Questionnaire (IPAQ) was developed in 1998 by a group of 14 international PA researchers (Marshall & Bauman, 2001). The IPAQ was designed to provide a measure of adult health-related PA levels that would facilitate global PA surveillance. The short form (7 questions) assesses time spent in moderate- and vigorous-intensity PA, walking, and sitting. The long form (31 questions) assesses occupational activity, transportation activity, household activity, leisure-time PA, and sedentary activity. Respondents indicate the frequency and duration of activity in each category.

Initial pilot testing was conducted in 1999, in 12 countries, including two sites in the US. Prior to pilot testing the IPAQ was translated into each language and back-translated to ensure consistent interpretation of the questions. The instrument was subsequently revised and extensive reliability and validity testing was conducted in 14 centers in 12 countries in 2000.

Psychometrics from the 2000 study of 1880 adults (Craig et al., 2003) showed good reliability. Test-retest reliability Spearman coefficients ranged from 0.96 (US) to 0.46 (most around .8) on the IPAQ-Long Form, and 0.88 (US) to .32 on the IPAQ-Short Form (75% > 0.65).

The IPAQ short and long versions were compared to establish concurrent validity. Reasonable agreement was reported (pooled $p = 0.67$, 95% CI 0.64-0.70). Criterion validity was established using objective data from CSA accelerometers worn for seven days by 744 study participants completing the long form (pooled $p = 0.33$, 95% CI 0.26-0.39), and 781 participants completing the short form (pooled $p = 0.30$, 95% CI 0.23-0.36).

Dinger, Behrens, and Han (2006) reported additional psychometrics on the IPAQ short form from their study of 123, primarily White, college students, mean age 20.6 ($SD = 1.5$). The majority of participants were female (74%). Significant correlation was seen between the IPAQ and accelerometer for both vigorous-intensity (pooled $p: 0.30-0.47$, $p < .001$), and moderate-intensity PA (pooled $p: 0.19-0.23$, $p < 0.05$), confirming criterion validity. Correlation with time spent walking was low. The authors propose participants may have included walking as moderate-exercise and underreported walking. Test-retest reliability was established through two administrations of the IPAQ two-weeks apart ($t = 3.9$, $df = 110$, $p < .01$). Moderate to high reliability of the IPAQ questions was reported with intra-class correlations ranging from 0.71 (moderate-intensity) to 0.89 (vigorous-intensity).

The IPAQ long and short form have been used extensively in the US and other countries. Additional psychometrics reported are from studies involving translating and testing the IPAQ in other countries, including China. Overall, studies above support use of the IPAQ short form as a valid instrument to measure PA levels among the English speaking Chinese American college students in this study.

Data Collection

Prior to data collection the proposed study was submitted to the Institutional Review Board at Rutgers, The State University of New Jersey and San Francisco State University for their approval. Data collection took place on the SFSU campus. Participation was voluntary and students were able to withdraw from the study at any time without penalty. For privacy protection, all information remained confidential and unidentifiable.

At the start of the online surveys, participants read a cover letter explaining the purpose of the study. Students were assured that participation was voluntary and their grade in a given course was in no way dependent upon their participation in the study. They were informed that all information would remain confidential, and there would be no penalty for not participating or withdrawing at any time. Contact information for the primary investigator (PI) was provided and if they did not have any questions they were asked to sign the consent form. Informed consent was implied by the participant continuing on to the demographic and four other surveys. Surveys were completed via Qualtrics, a SFSU supported online survey tool. At completion of the surveys participants were thanked for their participation and given a \$15 Amazon gift card for participating in the study.

Data Analysis

Correlational and regression analysis was used to test the previously stated hypotheses. The PI set up a statistical database using Statistical Package for the Social Sciences (SPSS) version 22.0. Data from survey responses were imported from Qualtrics directly into SPSS. Data was inspected for missing data, inconsistencies and outliers. Descriptive analysis of the demographic data was conducted to determine sample

characteristics, including range, mean and standard deviations. Tests for skewness and kurtosis were conducted along with histograms and scatterplots to assess the normality of distribution. Physical activity was coded as to 1) low level; 2) moderate level; and 3) high level of PA.

To test hypotheses one through four, correlational analysis was conducted using Pearson Product Moment Correlation and chi square test for nominal level variables. A two-tailed test of significance set at .05 level was used. The correlation matrix was examined to determine if there were any demographic variables that were significantly correlated with the dependent variable and needed to be controlled in subsequent analyses. In addition, the correlation matrix was examined to determine if acculturation, socioeconomic status, microaggression, and social norms are significantly related to PA.

To test hypotheses five and six, Baron and Kenny's (1986) 3-step regression analysis procedure was used. According to Baron and Kenny, a mediating variable is a variable that accounts for the relationship between the predictor and outcome. A variable functions as a mediator when variations in the independent variable significantly account for variations in the mediator (path a), variations in the mediating variable significantly account for variations in the dependent variable (path b), and when paths a and b are controlled, a previously significant relationship between the independent and dependent variables becomes insignificant. In the first regression, the mediating variable (microaggression) is regressed on the independent variable (acculturation). In the 2nd regression, the dependent variable (PA) is regressed on the independent variable (acculturation), and in the 3rd regression, the dependent variable is regressed on mediating (microaggression) and independent variables (acculturation). In the event that significant

relationships among study variables exist, a series of regressions will be conducted to test the mediation model. To test hypothesis five, the first regression equation will test the relationship between acculturation and microaggression; that is acculturation will be entered in the regression equation as the predictor, and microaggression will serve as the dependent variable. The second regression will test the effect of the independent variable (acculturation) on PA. Acculturation and microaggression scores will be entered into the regression simultaneously as predictors in the third regression. In this regression, complete or partial mediation will be determined. Complete mediation occurs if, after controlling for the effects of mediating variable on the dependent variable, the effect of the independent variable and the dependent variable becomes zero, or in partial mediation the effect of the independent variable on the dependent variable diminishes and the intervening variable remains significant (Baron & Kenny, 1986). This procedure will be repeated for testing hypothesis six.

To test hypotheses seven through nine, multiple linear regression was conducted. Acculturation, socioeconomic status, microaggression, and social norms were entered simultaneously in the regression equation to determine the independent effects of each on PA and the total variance accounted for (i.e., R^2) by these variables in PA.

All research data was de-identified and the PI maintained the data on a password-protected file. The data was saved on a flash drive is stored in a locked cabinet that only the PI has access to. All data will be destroyed 5 years after completion of the study.

Chapter 4

Data Analysis

The purpose of this study was to determine the relationship between acculturation, microaggression, social norms, and socioeconomic status and engagement in physical activity among female Chinese American college students. Data were collected from 272 females attending college in the San Francisco Bay area who self-identified as Chinese American. Participants completed five online surveys including: 1) Demographic survey; 2) General Ethnicity Questionnaire: Chinese (GEQ-C) and American (GEQ-A); 3) Racial and Ethnic Microaggressions Scale (REMS); 4) Exercise Social Norms; and 5) International Physical Activity Questionnaire – Short Form (IPAQ-SF). Data analyses will be presented in this chapter.

Statistical Description of Variables

All online survey data were imported from Qualtrics to SPSS Version 22.0. A codebook was created with the original data set and maintained throughout the analysis. All syntax and outputs were saved and maintained in a computer file throughout the analysis. Data was first examined for missing data and outliers. Outliers (aged 26-32 years) and cases that did not complete the IPAQ short form were eliminated from the analysis. Marginal mean values were used for imputation of missing data for work status (2 cases), income (4 cases), and generation (2 cases) (Tabachnick & Fidell, 2013). Skewness and kurtosis, and histograms with a normal distribution overlay, were assessed to determine the normality of distribution (Tabachnick & Fidell, 2013). The significance of skewness and kurtosis were evaluated by dividing the distribution by the standard error of the distribution to calculate the *z*-scores (Field, 2013). Values close to zero indicate a

normal distribution and values greater than 1.96 are considered significant at $p < .05$ (Field, 2013). (See Table 1). Academic year, income, number of household residents, and GEQ-C were only mildly skewed and therefore not transformed. Although REMS was moderately skewed (z-score = 6.46) it was not transformed, as transformed data may be more difficult to interpret (Tabachnick & Fidell, 2013). PA calculated as MET-minutes/week was not normally distributed (z-score = 14.58); therefore the categorical level of PA was used for data analyses. A sample of 203 female Chinese American college students was used for the data analyses and hypotheses testing.

Table 1.

Variable Distributions (N=203)

Variable	Skewness	Kurtosis	Z-score
Age	.172	-.936	1.00
Academic Year	-.468	-.971	-2.74
Major	.158	-.495	-0.92
Living Situation	-.267	-1.064	-1.56
Work Status	.218	-.872	-1.27
Income	.505	-.825	-2.95
Number Household Residents	-.388	.789	-2.27
Education Level	.125	-1.701	-0.73
Generation	.006	-.118	.035
GEQ-Chinese	-.547	2.003	-3.20
GEQ-American	.173	1.078	1.01
REMS	1.105	1.401	6.46
Exercise Social Norms	.122	-3.02	.713
PA Continuous	2.493	9.700	14.58
PA Category	-.355	-1.237	-2.08

Note. Standard Error of Skewness = .171; Standard Error of Kurtosis = .340

Sample Demographics

The sample included 203 female participants self-identifying as Chinese American ranging in age from 18 to 25 years (mean 21.32, $SD = 3.18$). The participants

were primarily undergraduate students (76.8%), representing all four years. The majority of participants were 2nd generation Chinese (64.0%), living off campus with parents or relatives (44.8%). Study participants came from homes representing a range of socioeconomic status and nearly half of the participants (41.9%) reported neither parent had attended college. (See Table 2.)

Table 2.

Demographics and Descriptive Data (N=203)

Variable	Mean (SD) or Frequency (%)	Range
Age (years)	21.32 (3.18)	18-25
Academic Year		
Freshman	11.8%	
Sophomore	16.3%	
Junior	15.3%	
Senior	33.5%	
Graduate	23.2%	
Living Situation		
On campus	19.2%	
Off campus with parents	44.8%	
Off campus not with parents	36.0%	
Work Status (N=201)		
Not employed	43.8%	
Part-Time	51.7%	
Full-time	3.4%	
Parents Income (N=199)		
< \$20,000	28.6%	
\$20,000-\$49,999	25.6%	
\$50,000-\$99,999	21.2%	
\$100,000-\$200,000	12.3%	
> \$200,000	10.3%	
Number of people in Household	3.97 (1.19)	1-7
Parents Level of Education		
Neither attended college	41.9%	
One parent attended college	22.7%	
Both parents attended college	35.5%	
Generation		
First	24.6%	

Second	64.0%
Third	6.4%
Fourth	3.9%

Descriptive Statistics of Study Variables

Dependent Variable

Physical Activity. The International Physical Activity Short Form (IPAQ-SF) was used to determine levels of PA among the study participants. The IPAQ-SF measures four types of PA (vigorous-, moderate-intensity, walking, sitting) in which participants engaged over the previous seven days. PA was computed both as a continuous variable and a categorical variable. The continuous PA variable for each level was computed by multiplying the defined Metabolic Equivalency Tasks (MET) score of an activity (vigorous = 8.0, moderate = 4.0, walking = 3.3) by the number of days and duration of minutes performed in that level (IPAQ, 2005). The continuous variable is reported as MET-minutes/week with a minimum of 600 MET-minutes/week of PA required to meet the recommended level of activity necessary for health benefits. Due to the non-normal distribution of energy expenditure typically seen in many populations, PA is reported as median rather than mean MET-minutes/week (IPAQ, 2005). Of the 203 study participants, the median was 2252 MET-minutes/week. When PA was calculated as a continuous variable, only 14% of the female Chinese American college students participating in the study did not meet the recommended guidelines. The categorical computation (See Table 3) showed 21.7% of the study participants did not meet the recommended guidelines, while 36.8% engaged in a moderate level of PA, and 41.4% of participants engaged in high levels of PA. Although a higher percentage of the participants met PA guidelines when PA was depicted as a continuous variable, many of

the participants met the 600 MET-minutes/week by engaging in PA less than the recommended number of days per week needed for health benefits. Therefore, PA as a categorical measure was used for data analyses.

Table 3.

IPAQ Categorical Computations

PA Category	PA Requirements
Low	<ul style="list-style-type: none"> • Does not meet requirements of Moderate or High PA
Moderate	<ul style="list-style-type: none"> • 3 or more days of vigorous-intensity of at least 20 minutes per day OR • 5 or more days of moderate-intensity activity and/or walking of at least 30 minute/day OR • 5 or more days of any combination of walking, moderate-intensity or vigorous-intensity activities achieving a minimum Total PA of at least 600 MET-minutes/week
High	<ul style="list-style-type: none"> • Vigorous-intensity activity on at least 3 days achieving a minimum total PA of at least 1500 MET-minutes/week OR • 7 or more days of any combination of walking, moderate-intensity or vigorous-intensity activities achieving a minimum Total PA of at least 3000 MET-min/week

Independent Variables

Acculturation. Acculturation was operationalized as the mean score on the 38-item GEQ-C and 38-item GEQ-A, which referenced Chinese and American cultures, respectively (Tsai, Ying, & Lee, 2000). Consistent with scoring directions, item #5 (I am embarrassed/ashamed of the Chinese culture) of the GEQ-C and item #5 (I am embarrassed/ashamed of the American culture) of the GEQ-A were reverse coded. Scores for the GEQ-C and the GEQ-A versions were then summed and a mean score computed. Scores on the GEQ-C ranged from 2.08 to 4.45 with a mean of 3.54 (*SD* .313); with higher scores indicating a stronger Chinese orientation. Scores on the GEQ-A

ranged from 1.86 to 3.66 with a mean of 2.95 (*SD* .275); with higher scores indicating a stronger American orientation.

An acceptable level of reliability is seen with a coefficient alpha of .70, although .80 is preferable (Nunnally & Bernstein, 1994). The internal consistency reliability was .69 for the GEQ-C, and .70 for the GEQ-A, indicating an adequate level of reliability for this sample.

Microaggression. Microaggression was operationalized as the total score on the 45-item REMS (Nadal, 2011). The seven items in the REMS Subscale 5 were reverse coded according to scoring directions. Responses were then summed for a total REMS score. Possible scores range from 45 to 90 with higher scores indicating more experiences of microaggression. One hundred percent of the female Chinese American college students in the current study reported experience with microaggressions during the previous six months. Scores ranged from 48 to 83 with a mean score of 58.39 (*SD* 5.94). The highest percentage of participants recorded a score of 54 (12.8%). The Cronbach's alpha of .82 demonstrates good internal consistency reliability for this sample.

Exercise Social Norms. Exercise social norms were operationalized as the total score on the 5-item Exercise Social Norms Scale (Pender, Murdaugh, & Parsons, 2006). Responses on the Exercise Social Norms scale were summed for a total score. A higher exercise social norms score indicates higher expectations from significant others to be physically active. Scores ranged from 5 to 15 with a mean score of 9.88 (*SD* 2.124). The highest percentage of participants recorded a score of 10 (22.7%). Due to the single item measurements on the social norms scale Cronbach's alpha was not calculated. For

example, parents' expectation of the study participant being physically active is not expected to be positively associated with the teachers' expectation of the participant being physically active.

Table 4.

Psychometric Properties of the Study Instruments (N=203)

Factor	α	Mean	SD	Range
1. GEQ-C	.69	3.54	.31	2.08-4.45
2. GEQ-A	.70	2.95	.27	1.86-3.66
3. REMS	.82	58.39	5.94	48-83
4. Exercise Social Norms	-	9.88	2.12	5-15

Note. Exercise Social Norms internal consistency reliability was not calculated due to the nature of the scale.

Socioeconomic Status. Socioeconomic status (SES) is often reported as a reflection of a combination of income, education, and occupation (Chen, 2009, Parikh et al., 2009). Per capita income (dividing the total household income by the number of household members) is considered a more appropriate measure of SES than annual income because the impact of a particular income is significantly dependent on the number of people residing in the household. Although household income and number of residents in the household were obtained on the demographic survey, income was measured in quintiles as college students are more likely to identify an income range than report an exact income. Therefore, a per capita income was not calculated and household income was used as a proxy for SES in this study. While slightly more than half of the study participants (55.3%) reported a family income of less than \$50,000, over three-quarters of the study participants (76.9%) reported a family income of less than \$100,000. (See Table 2).

Demographic Variables

Prior to analyses, the study participants' reported majors were coded first, according to the school the degree program is located in at the participating university, and second in ascending order according to their status as an impacted major at the participating university. Majors were coded as: 1 = Other (undeclared and undecided, 1.5%); 2 = Ethnic Studies (1%); 3 = Liberal and Creative Arts (9.9%); 4 = Education (3.0%); 5 = Business (23.2%); 6 = Science and Engineering (18.7%); and 7 = Health and Social Sciences (42.9%). Generational status was recoded to "1" = immigrant status (1st generation, 24.6%) and "2" = non-immigrant (2nd through 4th generation, 75.4%). Correlational analysis was conducted to determine if any demographic variables were significantly correlated with the dependent variable (PA) and needed to be controlled for in subsequent analysis. Only work status ($r = .16, p = .020$) was significantly correlated with PA and consequently controlled for in the multiple linear regression analyses.

Hypothesis Testing

Pearson Product Moment Correlation, with a two-tailed test of significance level of .05, was used for testing Hypotheses 1 through 4 (Tabachnick & Fidell, 2013). Hypotheses 5 and 6 were tested using Barry and Kenny's (1986) mediation model and Hypotheses 7 was tested using Barry and Kenny's moderator model. Multiple linear regression was conducted to test Hypotheses 8 through 10.

Hypothesis 1

Hypothesis 1 posits that there is a positive relationship between acculturation and female Chinese American college students' engagement in physical activity. No

significant correlation was found between GEQ-C and PA ($r = .07, p = .303$) or the GEQ-A and PA ($r = .09, p = .208$). Hypothesis 1 was not supported.

Hypothesis 2

Hypothesis 2 posits that there is a negative relationship between microaggression and female Chinese American college students' engagement in PA. Correlational analysis showed a positive rather than negative direction and no significant relationship was found between microaggression and PA ($r = .04, p = .609$). Hypothesis 2 was not supported.

Hypothesis 3

Hypothesis 3 posits that there is a negative relationship between exercise social norms and female Chinese American college students' engagement in PA. Correlational analysis revealed a statistically significant positive relationship between exercise social norms and PA ($r = .28, p = .000$), supporting Hypothesis 3.

Hypothesis 4

Hypothesis 4 posits that there is a positive relationship between socioeconomic status and female Chinese American college students' engagement in PA. A significant correlation was found between household income and PA ($r = .14, p = .047$), supporting hypothesis 4.

Hypothesis 5 and Hypothesis 6

Baron and Kenny's (1986) three-step regression analysis procedure was used to test hypothesis 5 and 6, determining whether microaggression mediated the relationship between acculturation and participants' engagement in PA, and between exercise social norms and participants' engagement in PA. In order to establish mediation three

conditions must be met (Baron & Kenny, 1986): 1) the independent variable (acculturation or exercise social norms) must be significantly correlated with the mediator (microaggression); 2) the independent variable (acculturation or exercise social norms) must be significantly correlated with the dependent variable (PA); and 3) the mediator (microaggression) must affect the dependent variable (PA).

Acculturation. Hypothesis 5 posits that when microaggression is controlled for, the magnitude and significance of the relationship between acculturation and female Chinese American college students' engagement in physical activity will diminish. To meet the conditions of a mediator, a significant correlation must exist between acculturation and microaggression, acculturation and PA, and microaggression and PA. No significant correlation was seen between acculturation and microaggression ($r_{GEQ-C} = -.05, p = .48$; $r_{GEQ-A} = -.02, p = .82$), acculturation and PA ($r_{GEQ-C} = .07, p = .30$; $r_{GEQ-A} = .09, p = .21$), and microaggression and PA ($r = .04, p = .61$); therefore a mediation model could not be tested. Hypothesis 5 was not supported.

Exercise Social Norms. Hypothesis 6 posits that when microaggression is controlled for, the magnitude and significance of the relationship between social norms and female Chinese American college students' engagement in physical activity will diminish. To test a mediation model for Hypothesis 6, a significant correlation is needed between social norms and microaggression, social norms and PA, and microaggression and PA. Although, a statistically significant correlation was found between social norms and microaggression ($r = .22, p = .002$) and social norms and PA ($r = .28, p = .000$), a statistically significant correlation was not found between microaggression and PA ($r =$

.04, $p = .61$). Therefore, a mediation model could not be tested. Hypothesis 6 was not supported.

Hypothesis 7

A moderator variable functions exclusively as an independent variable and affects the direction and/or strength of the relationship between an independent and a dependent variable (Barry & Kenny, 1986). Barry and Kenny's analysis procedure was used to test hypothesis 7 and determine if SES moderates the relationship between acculturation and PA. A statistically significant correlation was seen between SES and PA ($r = .14, p = .05$), SES and GEQ-C ($r = .24, p = .001$) and GEQ-A ($r = .18, p = .01$). It is recommended, but not required, that the moderator variable (SES) be uncorrelated with the independent variable (acculturation) and the dependent variable (PA), therefore the moderator model was tested.

Two hierarchical multiple regression analysis was conducted to determine if SES moderated the relationship between a) Chinese acculturation and PA, and b) American acculturation and PA. For the first test of moderation, two variables (GEQ-C and SES) were entered into the model simultaneously in the first step. These variables accounted for a 2% variance in PA ($R^2 = .021, F(2, 200) = 2.16, p = .12$). An interaction variable between GEQ-C and SES was then created (Baron & Kenny, 1986) and added to the regression model alone in the second step. The interaction variable was not significantly related to PA and contributed no additional variance in PA, $\Delta R^2 = .002, \Delta F(1, 199) = .401, p = .527$. Therefore, SES did not moderate the relationship between Chinese acculturation and PA. A second hierarchical regression analysis was conducted to determine if SES moderated the relationship between American acculturation and PA. In

the first step, SES and GEQ-A were entered simultaneously. Together, these two variables accounted for 2% of the variance in PA ($R^2 = .023$, $F(1, 199) = 1.57$, $p = .09$). The amount of variance accounted for did not change by adding the interaction variable (SES and GEQ-A) to the model in the second step, $\Delta R^2 = .001$, $\Delta F(1, 199) = .180$, $p = .672$. (See Table 5), and the interaction variable was not significantly related to PA. Therefore, SES did not moderate the relationship between American acculturation and PA. Hypothesis 7 was not supported.

Table 5.

Moderating Effect of SES between Acculturation and Physical Activity

SES x GEQ-C	Standard β	ΔR^2	Sig.
Model 1			
SES, GEQ-C		.021	.118
Model 2			
SES x GEQ-C	-.564	.019	.527
SES x GEQ-A	Standard β	ΔR^2	Sig.
Model 1			
SES, GEQ-A		.024	.091
Model 2			
SES x GEQ-A	-.327	.001	.067

Hypothesis 8 through Hypothesis 10

Hypothesis 8 posits that when the effects of social norms and SES are controlled for, microaggression will be significantly related to female Chinese American college students' engagement in physical activity. In regression analysis the independent variable must be related to the dependent variable. Microaggression was not significantly related to PA; therefore regression analysis was not conducted for Hypothesis 8 and microaggression was not added to the model when testing Hypotheses 9 and 10.

To test Hypothesis 9, SES was entered in the first step. Since work status was also significantly related to PA in correlation analysis ($r = .16, p = .020$), this variable was also entered into the regression model in the first step. Social norms was added to the regression model in the second step. As shown in Table 6, social norms is an independent predictor of PA. Hypothesis 9 was supported. To test Hypothesis 10, social norms and work status were entered in the first step and SES was added to the regression model in the second step. As shown in Table 7, SES is an independent predictor of PA, supporting Hypothesis 10.

Table 6.

Regression Analysis Hypothesis 9

	Standard β	R^2	Sig.
Model 1		.052	
SES	.161		.021
Work Status	.182		.009
Model 2		.106	
SES	.146		.031
Work Status	.166		.014
Social Norms	.261		.000

Table 7.

Regression Analysis Hypothesis 10

	Standard β	R^2	Sig.
Model 1		.099	
Social Norms	.269		.000
Work Status	.148		.029
Model 2		.120	
Social Norms	.261		.000
Work Status	.166		.014
SES	.146		.031

Ancillary Findings

A Pearson correlation matrix revealed a significant relationship between participants' experiences with microaggression and expectations of significant others for participants to be physically active ($r = .22, p = .020$). (See Table 8).

Table 8.

Intercorrelations Between PA Level and Independent Variables (N=203)

Factor	1	2	3	4	5	6
1. PA Level	-					
2. SES (Income)	.14*	-				
3. GEQ-C	.07	.23**	-			
4. GEQ-A	.09	.18*	.22**	-		
5. REMS	.04	-.03	-.05	-.02	-	
6. Exercise Social Norms	.28**	.05	.08	.12	.22**	-

** Pearson Correlation is significant at the 0.01 level (2-tailed)

* Pearson Correlation is significant at the 0.05 level (2-tailed)

Pearson correlation matrix did not reveal a significant relationship between PA and GEQ-C subscales. However, a significant relationship was found between PA and two GEQ-A subscales: Subscale 2 (Affiliation with American people), $r = .16, p = .021$; and Subscale 4 (Pride in American culture), $r = .15, p = .037$. Pearson correlation also revealed a statistically significant relationship between generation and GEQ-A Subscale 2 (Affiliation with American people) suggesting that study participants who score high on Subscale 2 are American-born Chinese Americans.

REMS subscale reliabilities differed substantially from the original study psychometrics therefore a factor analysis of the REMS was conducted to explore the factor structure when used with the study sample. Following steps reported in the original development and validation (Nadal, 2011), factor analysis of the REMS using principal components analysis with orthogonal rotation was conducted with the original

sample of 272 female Chinese American college students. Due to poor internal consistency reliability of three of the six subscales principal axis factoring using oblique rotation was conducted. A final four-factor instrument comprised of 26 items was developed consisting of: 1) Assumptions of Inferiority ($\alpha = .80$); 2) Second-class Citizen and Avoidance ($\alpha = .70$); 3) Microinvalidations ($\alpha = .76$); and 4) Exoticization and Assumptions of Similarity ($\alpha = .78$). Pearson correlation with the revised REMS and revised REMS subscales did not show any significant relationship between microaggression experiences and PA ($r = .036, p = .614$) in the current sample ($n=203$).

Although the relationship was not significant, an inverse association was seen between PA and age and between PA and academic year. (See Table 9). A statistically significant inverse correlation was also shown between REMS and generation ($r = -.18, p = .010$).

Table 9

Correlations Between Study Variables and Demographics

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. PA	-													
2. Age	-.02	-												
3. Acad. Year	-.05	.75**	-											
4. Major	-.00	.23**	.34**	-										
5. Living Sit.	.13	.23**	.24**	.09	-									
6. Work Status	.16*	.16*	.13	-.02	.19**	-								
7. Education	.14	-.01	.10	-.02	-.03	-.10	-							
8. # Household	.01	-.16*	-.13	.00	-.24**	.01	.06	-						
9. Generation	.10	.11	.16*	.07	.07	-.07	.05	.06	-					
10. Income	.14*	-.06	.04	-.02	-.11	-.12	.49**	.20**	.19**	-				
11. Norms	.28**	.06	.01	.03	.15*	.06	.04	.00	-.02	.05	-			
12. GEQ-C	.07	.09	.18*	.07	.17*	-.00	.22**	-.01	.31**	.23**	.08	-		
13. GEQ-A	.09	.03	.07	.03	-.01	-.17*	.11	-.07	.06	.18*	.12	.22**	-	
14. REMS	.04	-.05	-.10	-.02	.02	.07	.06	-.02	-.18**	-.03	.22**	-.05	-.02	-

** Pearson Correlation is significant at the 0.01 level (2-tailed)

* Pearson Correlation is significant at the 0.05 level (2-tailed)

Chapter 5

Discussion of Findings

The HPM (Pender, Murdaugh, & Parsons, 2006) posits that health-promoting behaviors, such as PA, are influenced by complex biopsychosocial factors. The purpose of this study was to determine the relationship between acculturation, microaggression, social norms, and socioeconomic status and engagement in physical activity among female Chinese American college students. Using the HPM framework, research findings for each hypothesized relationship will be discussed in this chapter along with ancillary findings.

Physical Activity

National guidelines recommend individuals participate in 30 minutes of moderate-intensity PA on a minimum of five days each week in order to obtain health benefits from PA (HHS, 2008). Participants' level of PA was categorized as: 1) low; 2) moderate; or 3) high. Moderate level PA requires: 1) three or more days of vigorous activity of at least 20 minutes per day; OR 2) five or more days of moderate-intensity activity or walking of at least 30 minutes per day; OR 3) five or more days of any combination of walking, moderate-intensity or vigorous-intensity activities achieving a minimum of at least 600 MET-min/week. High level PA requires: 1) vigorous-intensity activity on at least three days and accumulating at least 1500 MET-minutes/week; OR 2) seven or more days of any combination of walking, moderate-intensity or vigorous-intensity activities achieving a minimum of at least 3000 MET-minutes/week (IPAQ, 2005). Participants who did not meet the criteria for a moderate or high level of PA were considered inactive and placed in the low PA category. Although 36.8% of the study

participants engaged in moderate level of PA and 41.4% in a high level of PA, almost one-quarter of the study participant's (21.7%) did not meet the minimal PA guidelines. The percent of participants who engaged in a high level of PA is consistent with Miller and colleagues (2005) report that nearly half of the 903 college students in their study engaged in vigorous-intensity PA. However, these findings conflict with other reports of young adults' (American College Health Association, 2012) and Asian adults' aged 18 years and older (OMH, 2012) failure to meet national PA guidelines (49.4% and 52.5% respectively).

While this variability may be a result of the homogeneity of the current study sample (100% female Chinese American, aged 18-25 years), other factors implicit in this study may have influenced the level of PA in this sample. This study was conducted in an urban area with a physical environment conducive to being physically active year round. There is empirical evidence that neighborhood characteristics (built environment) such as accessibility to public transportation, and safe walking and bike paths, influence participation in PA (McCormack & Shiell, 2012; Sallis, Bowles, et al., 2009; Sallis, Saleans, et al., 2009; Sallis et al., 2012; Shigematsu et al., 2009). Public transportation is readily accessible to students attending the participating university. There are retail stores, movie theatres, restaurants, and parks within walking distance or accessible by public transportation making it easy for the students to be physically active. Well-maintained sidewalks and bike lanes are seen on campus and in the surrounding area. Although 88% of the study participants, as shown in Table 10, reported walking on at least one day the previous week, half the participants (50.6%) reported walking all seven days the previous week.

Of concern is that 65% of study participants reported engaging in vigorous-intensity PA over the previous 7 days, yet less than half (41.4%) of participants met the guidelines for vigorous-intensity PA. Similar results were seen with over half (58%) of participants reporting engaging in moderate-intensity PA, but only 36.8% of participants meeting the moderate-intensity PA guidelines. These discrepancies are due to students not meeting the minimum number of days required each week or the minimum duration of PA required in the guidelines. These findings underscore the importance of promoting being physically active for at least 30 minutes on most days in order for individuals to gain health benefits.

Table 10.

Time Spent Being Physically Active

Level of PA	Participants	Number of Days	Number of Minutes
	n	Mean (SD)	Mean (SD)
Vigorous-Intensity	131 (65%)	3.03 (1.61)	80.63 (42.18)
Moderate-Intensity	117 (58%)	3.33 (1.90)	75.44 (53.63)
Walking	178 (88%)	5.62 (1.71)	57.85 (50.49)

Note. Number of days ranged from 1-7. Number of minutes ranged from 10-180

Acculturation and Physical Activity

The HPM proposes that sociocultural factors, such as acculturation, influence health-promoting behaviors, such as PA (Pender, Murdaugh, & Parsons, 2006). Previous research shows a mixed relationship between acculturation and PA. Children, aged 8 to 10 years, of mothers with a high level of acculturation (higher American identity) were more physically active than children of less acculturated mothers (higher Chinese identity), while more acculturated Chinese American children in 6th and 7th grade were found to be less physically active than less acculturated students (Unger et al., 2004a). It

was hypothesized that acculturation would be positively related to female Chinese American college students' engagement in PA.

Acculturation was measured in this study using the Chinese and American versions of the GEQ, a bidimensional measurement of acculturation (Tsai, Ying, & Lee, 2000). Bidimensional measurements support an individual being highly enculturated to both their native culture and host culture. The majority of study participants scored over the median on both the GEQ-C and GEQ-A indicating bicultural orientation (Tsai, Ying, & Lee, 2000). This may be reflective of the study's geographical location. Asians comprise one-third of the population in San Francisco and 65% of the Asians identify as Chinese. The students attending college in the San Francisco Bay area have the opportunity to participate in the American culture while continuing to embrace their Chinese heritage.

The Pearson correlation did not reveal the expected theorized relationship between acculturation and PA. Therefore, GEQ-C and GEQ-A subscale scores were computed according to the six subscales identified in Tsai, Ying and Lee's (2000) study of Chinese American college students. Analysis revealed participants who have a high score on the GEQ-A Subscale 2 (Affiliation with American people) were more physically active, $r = .16, p = .021$, as were participants who scored high on the GEQ-A Subscale 4 (Pride in American culture), $r = .15, p = .037$. The high affiliation with American people and pride in American culture may be reflective of the high percentage of American born Chinese Americans in the study sample. Research has shown that second-generation Chinese Americans have a higher affiliation with American people and higher American pride than first-generation Chinese Americans (Tsai, Ying, & Lee, 2000). The

correlation with being more physically active is consistent with Afaible-Munsuz and colleagues (2010) study reporting second-generation Chinese Americans being more physically active than first-generation Chinese Americans.

Microaggression and Physical Activity

The HPM posits that situational influences, such as microaggression, impact an individual's engagement in health-promoting behaviors (Pender, Murdaugh, & Parsons, 2006). Research has shown that microaggression is an important predictor of emotional well-being (Blume et al., 2012; Wang, Leu, & Shoda, 2011), and somatic symptoms (Ong et al., 2013). This suggests that students experiencing microaggressions may not feel physically or mentally motivated to be physically active. Therefore, it was hypothesized that female Chinese American college students' experiences with microaggression would have a negative effect on their engagement in physical activity.

Microaggression was measured as the mean score on the REMS (Nadal, 2011). No relationship was found between microaggression and PA ($r = .036, p = .609$). The REMS quantifies the types of microaggressions experienced, but the number of times each type of microaggression was experienced is not reported. All study participants reported experiencing at least three types of microaggressions within the previous six months, therefore Pearson correlation was also conducted to examine the relationship between the REMS subscales and PA. The REMS subscales did not show a significant correlation with levels of PA either.

Microaggressions are conscious and unconscious verbal, behavioral, or environmental insults to any marginalized group in society. The current study took place in a highly diverse setting with a large Chinese American population where female

Chinese American college students may feel a part of the majority, decreasing their perceptions of microaggression experiences. The 6-factor REMS was revised to determine if a revised scale would more accurately reflect microaggressions in this sample. Two factors were removed from the overall scale (Environmental Microaggressions; Workplace and School Microaggressions), resulting in a 4-factor scale. The revised scale reflects the local environment and the types of microaggressions experienced by female Chinese American college students in this study. A significant relationship between the revised REMS and PA was not found.

Although no studies were found testing microaggression as a mediator, the HPM proposes that microaggression, a theorized situational factor, may serve as a mediator of the relationship between personal factors, such as acculturation, and health behaviors. Therefore, it was hypothesized that microaggression might mediate the relationship between acculturation and PA. However, as there was no significant relationship between microaggression and PA seen in this study, the mediator role was not tested. The lack of a mediator effect may reflect the bicultural orientation of the study sample. Individuals with a high American orientation may perceive fewer microaggressions than individuals with a lower American orientation. As a result, with the majority of the sample reporting a high American orientation, the relationship between acculturation and PA was not influenced by microaggression.

An environment perceived to be accepting is more conducive to engagement in health-promoting behaviors. It may be that the high percentage of Chinese at the local universities and in the surrounding geographical area provide an environment where fewer incidences of racial microaggressions are perceived by female Chinese American

students than students attending a less diverse university. The lack of a relationship between microaggression and PA in this study may reflect a seemingly less discriminating environment at the participating university and in the surrounding area.

Social Norms and Physical Activity

Theorists posit that expectations of significant others (social norms) influence health-promoting behaviors (Pender, Murdaugh, & Parsons, 2006). Individuals can either adopt or reject expected behavior standards. Qualitative research has shown that PA is not encouraged during childhood (Im et al., 2012) and female Chinese adults are not expected to be physically active (Taylor et al., 2008). It was therefore hypothesized that social norms would have an inverse relationship to engagement in PA among female Chinese American college students.

However, a significant positive relationship was found between expectations of significant others to be physically active and levels of PA in the study sample ($r = .280$, $p = .000$). More than half of the participants reported all significant others (except teachers) “sort of” expected them to be physically active. The participants’ doctor had the highest expectation for the participants to be physically active (38%). Of note is that over half of the participants (52.2%) reported that the teacher closest to them did not expect them to be physically active. (See Table 11). This finding suggests that promotion of PA by university professors may be a useful strategy for increasing physical activity among college students.

It was theorized that the cultural norms for filial piety, academic achievement, and lack of encouragement to be physically active as a child, would result in a negative relationship between social norms and PA levels among female Chinese American

college students. Family expectations are the primary influence on behavior during the childhood years. Peer influence increases and family influence decreases as children progress through childhood to adulthood. Although a statistically significant relationship was found between expectations of parents and PA ($r = .18, p = .010$), stronger correlations were found between expectations of the closest friend ($r = .26, p = .000$) and expectations of the 5-6 friends spending the most time with ($r = .31, p = .000$). These findings reflect the increasing influence of peer expectations of being physically active in the study sample.

Table 11

Exercise Social Norms (N = 203)

	Mean (SD)	Percent of sample		
		Not At All	Sort Of	A Lot
1 Family members	2.10 (.65)	16.3	57.6	26.1
2 Closest friend	1.99 (.69)	24.1	52.7	23.2
3 5-6 friends I spend most of my time with	1.92 (.69)	28.1	51.7	20.2
4 Teacher closest to me	1.58 (.67)	52.2	37.9	9.9
5 My doctor	2.30 (.62)	8.9	52.7	38.4

Socioeconomic Status and Physical Activity

The HPM model posits that personal factors, such as SES, have both a direct and indirect influence on health-promoting behaviors (Pender, Murdaugh, & Parsons, 2006). As hypothesized, SES, operationalized as income, showed a significant positive relationship with PA among female Chinese American college students in this study ($r = .139, p = .047$). This is consistent with previous studies that reported children from higher income households were significantly more physically active than children from lower income households (Chen, 2009). Although the relationship was not significant, an inverse association was seen between SES and work status ($r = -.120, p = 0.88$). This

suggests that students from higher income households were less likely to be working full-time and consequently might have more time to be physically active.

SES was also hypothesized to moderate the relationship between acculturation and PA. However, the current model was not consistent with the hypothesis. The interaction of SES and acculturation did not predict engagement in PA among female Chinese American college students in this study. The lack of the hypothesized moderating effect may be due to the bicultural orientation of the study sample. Previous studies reporting high acculturation individuals as more physically active equate high acculturation with embracing the American culture while relinquishing the heritage culture.

Ancillary Findings

Study participants who worked full-time were found to be more physically active than students who did not work or worked part-time. Data did not demonstrate that the main form of PA for these participants was walking, which may have explained the correlation observed. Rather there was a range of participation in vigorous- and moderate-intensity PA, as well as walking. This finding suggests that students who are busier may be more inclined to fit PA into their schedule on a more routine basis thus achieving the PA guidelines.

Students who reported more experiences with microaggression (higher score on REMS) also reported higher expectations to be physically active (higher score on social norms). This was surprising, as experiences with microaggression were not significantly related to PA although participants scoring higher on the social norms scale were more physically active. Multiple regression was conducted to determine if social norms were

blunting the theorized relationship between microaggression and PA. However, the interaction model did not show significance and therefore social norms did not moderate the relationship between microaggression and PA. It may be that students who are sensitive to expectations of others may be more sensitive to microaggressions.

Assessment of the correlation matrix showed a negative, non-significant association between PA and age and PA and academic year. These findings are consistent with literature showing that PA decreases from the adolescent years to adulthood (Nelson et al., 2007; Toriano et al., 2008). Although the relationship was not significant, the continuing trend of decreasing PA is of concern and lends support to utilizing the college setting for promoting PA as a healthy lifestyle behavior.

The HPM posits that different factors may be significant for different groups at different developmental levels. Results of the model tested reflect the homogenous sample and geographical setting. A statistically significant relationship between social norms and PA, and SES and PA were found in this study, yet they were the only variables tested that independently contributed to the overall model. Socio-cultural factors and situational influences are theoretically related to health-promoting behaviors in the HPM. However, the high bicultural orientation of the study participants and the large Chinese population in the geographical area negate the usefulness of these variables when exploring engagement in PA among female Chinese American college students in the San Francisco Bay area. Although these factors may contribute to engagement in PA among Chinese American college students in other settings, such as a less ethnically diverse geographical area, other variables in the HPM may be worth exploring, such as self-efficacy, benefits of and barriers to PA, commitment to a plan of action and

competing demands. Alternatively, other theoretical frameworks used in PA research, such as the Theory of Planned Behavior, may be a more useful model to determine factors influencing engagement in PA among female Chinese American college students.

Chapter 6

Summary, Conclusions, Implications, and Recommendations

Summary

The purpose of this study was to examine the relationship between acculturation, microaggression, social norms, and socioeconomic status and engagement in PA among female Chinese American college students. The following hypotheses, derived from the Health Promotion Model (Pender, Murdaugh, and Parsons, 2006), were tested in a sample of 203 female college students who self-identified as Chinese American:

11. There is a positive relationship between acculturation and engagement in physical activity.
12. There is a negative relationship between microaggression and engagement in physical activity.
13. There is a negative relationship between social norms and engagement in physical activity.
14. There is a positive relationship between socioeconomic status and engagement in physical activity.
15. When microaggression is controlled for, the magnitude and significance of the relationship between acculturation and engagement in physical activity will diminish.
16. When microaggression is controlled for, the magnitude and significance of the relationship between social norms and engagement in physical activity will diminish.

17. Socioeconomic status moderates the relationship between acculturation and engagement in physical activity.
18. When the effects of social norms and socioeconomic status are controlled for, microaggression will be significantly related to engagement in physical activity.
19. When the effects of microaggression and socioeconomic status are controlled for, social norms will be significantly related to engagement in physical activity.
20. When the effects of microaggression and social norms are controlled for, socioeconomic status will be significantly related to engagement in physical activity.

The study sample consisted of 203 female college students who were at least 18 years old, self-identified as Chinese American, were able to read and understand English, and did not have any restrictions on physical activity. Participants were primarily second-generation (64%) undergraduate students (78.6%), ranging in age from 18 through 25 years (mean 21.32, *SD* 3.18), living off campus with their parents (76.8%). Participants were recruited through flyers posted around campus and snowball sampling, primarily through email and text.

Data were collected through completion of the following online surveys: 1) Demographic questionnaire developed by the PI; 2) General Ethnicity Questionnaire Chinese and American version (GEQ-C, GEQ-A) (Tsai, Ying, & Lee, 2000); 3) Racial and Ethnic Microaggressions Scale (REMS) (Nadal, 2011); 4) Exercise Social Norms Scale (Pender, Murdaugh, & Parsons, 2006); and 5) International Physical Activity Questionnaire - Short Form (IPAQ-SF) (Marshall & Bauman, 2001). Data was exported from Qualtrics to SPSS Version 22.0 for analyses.

Data analyses included: 1) descriptive statistics to determine sample characteristics; 2) Pearson Product Moment Correlation to test the relationship between study variables; and 3) regression analyses to test the mediating effect of microaggression, the moderating effect of SES, the independent effect of each independent variable on PA, and the total variance accounted for in the study model. The level of significance used for hypotheses testing was .05.

Hypotheses 1 through 4 were tested using Pearson Product Moment Correlation. Significant relationships were found between PA and social norms ($r = .28, p = .000$), and between PA and SES ($r = .14, p = .047$). Significant relationships were not found between PA and acculturation ($r_{\text{GEQ-C}} = .07, p = .303$; $r_{\text{GEQ-A}} = .09, p = .208$), or PA and microaggression ($r = .04, p = .609$). Because a significant relationship between microaggression and PA was not seen, the mediating effect of microaggression (hypotheses 5 and 6) was not tested. In testing hypothesis 7, regression analyses did not show a moderating effect of SES on the relationship between acculturation and PA. Regression analyses showed that 2% of the variance in PA was accounted for by SES and 10% of the variance was accounted for by social norms, equaling a total of 12% of the variance in PA accounted for by the study model.

In summary, using the current model, only social norms and SES were found to be significantly related to levels of PA among female Chinese American college students. The hypothesized relationships between microaggression and PA and acculturation and PA were not supported in this study.

Limitations

Correlation does not imply causation. This study is limited in that it is a cross-sectional correlation study. Findings are limited to variables that are related to PA at the time of the study, but do not necessarily cause an increase or decrease in PA or influence PA over time. The homogenous sample is a limitation in the current study. In addition to the sample being exclusively female Chinese American, the participating university is located in an urban area where PA is promoted at the individual, organizational, community, and public policy levels. This makes it difficult to generalize findings to less diverse universities in other areas of the country and young adults aged 18-25 years who do not attend college. Non-response bias is another limitation of this study as recruitment was limited to students on campus who saw the flyers on campus or heard of the study from friends. Students who are physically active may be more inclined to participate in a study of PA and their friends may also be more physically active than the overall female Chinese American students at the participating university.

Another important limitation is the measurement of PA utilized in this study. The study was advertised as a PA study, and participants' responses may reflect socially desirable reporting of their activity levels. Study participants may also overestimate their activity levels when compared to objective measures, such as accelerometers.

One additional limitation was the use of an incentive for completing the surveys. The survey response time was extremely short, when considering the survey length (145 questions), with many participants completing the survey in 5 minutes. Participants may have wanted to complete the survey solely for the incentive rather than for providing accurate data. Students who completed the survey online in front of the PI took longer to complete the survey than many remote respondents.

Conclusions

The findings of this study support the theorized relationship between SES and PA and social norms and PA among female Chinese American college students. However, this study did not support the relationship between acculturation and PA, or microaggression and PA. Expectations by significant others contributed most to this model and should be explored further. Meanwhile, ancillary findings revealed that female Chinese American college students are less physically active as they get older and progress through the college years. Although the association did not reach significance, it is consistent with other research, and supports the need for continuing to promote development of PA as a healthy lifestyle behavior during the college years.

Although the HPM is often used as the theoretical framework for research on factors influencing levels of PA, the variables in the HPM that were studied, contributed minimally to engagement in PA among female Chinese American students attending college in the San Francisco Bay area. Exploring other factors in the HPM, such as self-efficacy towards PA, benefits of and barriers to PA, and commitment to a plan of action may provide evidence of additional significant factors influencing engagement in PA among the study sample. In addition, there may be other factors, such as attitude towards PA, intention to be physically active, and competing demands that influence college students' level of PA.

Implications

The HPM posits that health behaviors, such as PA, are influenced by complex biopsychosocial factors. This study supports the influence of social norms on PA among female Chinese American college students. This indicates the need for university

professors to be more involved in promoting PA among college students. Findings from this study reveal that a high percentage of female Chinese American college students are physically active, although their PA may not meet the PA guidelines for obtaining health benefits. Physical activity was also seen to decline over the college years. It is important to understand factors influencing participation in PA and reasons for the decline in PA. The college setting is ideal for culturally effective intervention efforts promoting PA as a healthy lifestyle behavior.

Study findings also have implications for further research on microaggression. Qualitative research has provided knowledge of the types of microaggressions experienced, and quantitative research has shown the frequency of microaggressions experienced among various marginalized groups in society. Yet, little is known of how individuals cope with microaggression experiences. Understanding of coping strategies utilized by individuals experiencing racial microaggression is crucial for promoting physical and mental well being for students during the college years.

Recommendations

Based on the findings and limitations of this study, recommendations for further research, theory testing, and nursing practice include:

1. Replication of the study with a more diverse sample.

Future research should include gender comparisons in addition to inclusion of other Asian ethnic subgroups to decrease homogeneity and increase variance in the study sample.

2. Replication of the study in a more diverse setting.

Future research should include college students from other parts of the United States, and community colleges and 4-year public and private universities in urban and non-urban settings to increase generalizability of study findings.

3. Use of objective measures of physical activity.

Future research should include the use of accelerometers or pedometers to obtain an objective measure of physical activity among the study sample.

4. Research testing of additional theoretical concepts of the HPM

Future research should be conducted testing additional concepts of the HPM, such as self-efficacy, and benefits of and barriers to PA to determine factors accounting for more of the variance in PA.

5. Research utilizing alternate theoretical frameworks.

Future research should be conducted with the same sample utilizing alternate theoretical frameworks, such as the Theory of Planned Behavior, to determine if other theories contribute more to our understanding of PA among female Chinese American college students.

6. Qualitative studies.

Qualitative studies may increase our knowledge of specific social norms influencing engagement in PA among the current study sample.

Qualitative studies are crucial for understanding coping strategies utilized by college students experiencing microaggressions.

7. Research on data collection.

Future research should explore the relationship between study findings and length of time taken to complete surveys.

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Appendix A

Demographic Questionnaire

This section asks general questions about your background. Please fill in the blank or check the appropriate response.

1. Age: _____
2. Sex: _____ Male _____ Female
3. Ethnicity:
_____ Chinese American
_____ Other, please specify _____
4. Academic Year:
_____ First year
_____ Sophomore
_____ Junior
_____ Senior
_____ Graduate student
5. Major: _____
6. Living situation:
_____ On campus
_____ Off campus with parents/relatives
_____ Off campus not with parents/relatives
7. Work status:
_____ Not employed
_____ Employed part-time
_____ Employed full-time

8. Approximate annual family household income:

- _____ Less than \$20,000
- _____ \$20,000 to \$49,999
- _____ \$50,000 to \$99,999
- _____ \$100,000 to \$200,000
- _____ More than \$200,000

9. Parent's level of education:

- _____ Neither parent attended college
- _____ One parent attended college
- _____ Both parents attended college

10. Number of people living in family household: _____

11. What generation are you?

- _____ 1st = I was born abroad. If so, in what country? _____
- _____ 2nd = I was born in the US. Parents were born in _____
- _____ 3rd = I was born in the US, parents were born in US
- Grandparents were born in _____
- _____ 4th = I was born in the US, parents and grandparents were born in US
- Great grandparents were born in _____

12. If you are an immigrant – how old were you when you came to the US _____

Appendix B

General Ethnicity Questionnaire – Chinese Version (Abridged)

Please use the following scale to indicate how much you agree with the following statements. Circle your response.

	1	2	3	4	5
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I was raised in way that was Chinese.					1 2 3 4 5
2. When I was growing up, I was exposed to Chinese culture.					1 2 3 4 5
3. Now, I am exposed to Chinese culture.					1 2 3 4 5
4. Compared to how much I negatively criticize other cultures, I criticize Chinese culture less.					1 2 3 4 5
5. I am embarrassed/ashamed of Chinese culture.					1 2 3 4 5
6. I am proud of Chinese culture.					1 2 3 4 5
7. Chinese culture has had a positive impact on my life.					1 2 3 4 5
8. I believe that my children should read, write, and speak Chinese.					1 2 3 4 5
9. I have a strong belief that my children should have Chinese names only.					1 2 3 4 5
10. I go to places where people are Chinese.					1 2 3 4 5
11. I am familiar with Chinese cultural practices and customs.					1 2 3 4 5
12. I relate to my partner or spouse in a way that is Chinese.					1 2 3 4 5
13. I admire people who are Chinese.					1 2 3 4 5
14. I would prefer to live in a Chinese community.					1 2 3 4 5
15. I listen to Chinese music.					1 2 3 4 5
16. I perform Chinese dance.					1 2 3 4 5
17. I engage in Chinese forms of recreation.					1 2 3 4 5
18. I celebrate Chinese holidays.					1 2 3 4 5
19. At home, I eat Chinese food.					1 2 3 4 5
20. At restaurants, I eat Chinese food.					1 2 3 4 5
21. When I was a child, my friends were Chinese.					1 2 3 4 5

- | | | | | | |
|---------------------------------------|---|---|---|---|---|
| 22. Now, my friends are Chinese. | 1 | 2 | 3 | 4 | 5 |
| 23. I wish to be accepted by Chinese. | 1 | 2 | 3 | 4 | 5 |
| 24. The people I date are Chinese. | 1 | 2 | 3 | 4 | 5 |
| 25. Overall, I am Chinese. | 1 | 2 | 3 | 4 | 5 |

Please use the following scale to answer the following questions. Circle your response.

- | | | | | |
|-----------|------|----------|----------|------------|
| 1 | 2 | 3 | 4 | 5 |
| Very much | Much | Somewhat | A little | Not at all |
-
- | | | | | | |
|---|---|---|---|---|---|
| 26. How much do you speak Chinese <i>at home</i> ? | 1 | 2 | 3 | 4 | 5 |
| 27. How much do you speak Chinese <i>at school</i> ? | 1 | 2 | 3 | 4 | 5 |
| 28. How much do you speak Chinese <i>at work</i> ? | 1 | 2 | 3 | 4 | 5 |
| 29. How much do you speak Chinese <i>at prayer</i> ? | 1 | 2 | 3 | 4 | 5 |
| 30. How much do you speak Chinese <i>with friends</i> ? | 1 | 2 | 3 | 4 | 5 |
| 31. How much do you view, read, or listen to Chinese <i>on TV</i> ? | 1 | 2 | 3 | 4 | 5 |
| 32. How much do you view, read, or listen to Chinese <i>in film</i> ? | 1 | 2 | 3 | 4 | 5 |
| 33. How much do you view, read, or listen to Chinese <i>on the radio</i> ? | 1 | 2 | 3 | 4 | 5 |
| 34. How much do you view, read, or listen to Chinese <i>in literature</i> ? | 1 | 2 | 3 | 4 | 5 |
| 35. How fluently do you <i>speak</i> Chinese? | 1 | 2 | 3 | 4 | 5 |
| 36. How fluently do you <i>read</i> Chinese? | 1 | 2 | 3 | 4 | 5 |
| 37. How fluently do you <i>write</i> Chinese? | 1 | 2 | 3 | 4 | 5 |
| 38. How fluently do you <i>understand</i> Chinese? | 1 | 2 | 3 | 4 | 5 |

Appendix C

General Ethnicity Questionnaire – American Version (Abridged)

Please use the following scale to indicate how much you agree with the following statements. Circle your response.

	1	2	3	4	5
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I was raised in way that was American.					1 2 3 4 5
2. When I was growing up, I was exposed to American culture.					1 2 3 4 5
3. Now, I am exposed to American culture.					1 2 3 4 5
4. Compared to how much I negatively criticize other cultures, I criticize American culture less.					1 2 3 4 5
5. I am embarrassed/ashamed of American culture.					1 2 3 4 5
6. I am proud of American culture.					1 2 3 4 5
7. American culture has had a positive impact on my life.					1 2 3 4 5
8. I believe that my children should read, write, and speak English.					1 2 3 4 5
9. I have a strong belief that my children should have American names only.					1 2 3 4 5
10. I go to places where people are American.					1 2 3 4 5
11. I am familiar with American cultural practices and customs.					1 2 3 4 5
12. I relate to my partner or spouse in a way that is American.					1 2 3 4 5
13. I admire people who are American.					1 2 3 4 5
14. I would prefer to live in an American community.					1 2 3 4 5
15. I listen to American music.					1 2 3 4 5
16. I perform American dance.					1 2 3 4 5
17. I engage in American forms of recreation.					1 2 3 4 5
18. I celebrate American holidays.					1 2 3 4 5
19. At home, I eat American food.					1 2 3 4 5
20. At restaurants, I eat American food.					1 2 3 4 5
21. When I was a child, my friends were American.					1 2 3 4 5

- | | | | | | |
|---|---|---|---|---|---|
| 22. Now, my friends are American. | 1 | 2 | 3 | 4 | 5 |
| 23. I wish to be accepted by Americans. | 1 | 2 | 3 | 4 | 5 |
| 24. The people I date are American. | 1 | 2 | 3 | 4 | 5 |
| 25. Overall, I am American. | 1 | 2 | 3 | 4 | 5 |

Please use the following scale to answer the following questions. Circle your response.

- | | | | | | |
|--|-----------|------|----------|----------|------------|
| | 1 | 2 | 3 | 4 | 5 |
| | Very much | Much | Somewhat | A little | Not at all |
-
- | | | | | | |
|---|---|---|---|---|---|
| 26. How much do you speak English <i>at home</i> ? | 1 | 2 | 3 | 4 | 5 |
| 27. How much do you speak English <i>at school</i> ? | 1 | 2 | 3 | 4 | 5 |
| 28. How much do you speak English <i>at work</i> ? | 1 | 2 | 3 | 4 | 5 |
| 29. How much do you speak English <i>at prayer</i> ? | 1 | 2 | 3 | 4 | 5 |
| 30. How much do you speak English <i>with friends</i> ? | 1 | 2 | 3 | 4 | 5 |
| 31. How much do you view, read, or listen to English <i>on TV</i> ? | 1 | 2 | 3 | 4 | 5 |
| 32. How much do you view, read, or listen to English <i>in film</i> ? | 1 | 2 | 3 | 4 | 5 |
| 33. How much do you view, read, or listen to English <i>on the radio</i> ? | 1 | 2 | 3 | 4 | 5 |
| 34. How much do you view, read, or listen to English <i>in literature</i> ? | 1 | 2 | 3 | 4 | 5 |
| 35. How fluently do you <i>speak</i> English? | 1 | 2 | 3 | 4 | 5 |
| 36. How fluently do you <i>read</i> English? | 1 | 2 | 3 | 4 | 5 |
| 37. How fluently do you <i>write</i> English? | 1 | 2 | 3 | 4 | 5 |
| 38. How fluently do you <i>understand</i> English? | 1 | 2 | 3 | 4 | 5 |

Appendix D

Racial and Ethnic Microaggression Scale (REMS)

Instructions: Think about your experiences with race. Please read each item and think of how many times this event has happened to you in the PAST SIX MONTHS.

0 = I did not experience this event.

1 = I experienced this event at least once in the past six months.

1. I was ignored at school or at work because of my race.
2. Someone's body language showed they were scared of me, because of my race.
3. Someone assumed that I spoke a language other than English.
4. I was told that I should not complain about race.
5. Someone assumed that I grew up in a particular neighborhood because of my race.
6. Someone avoided walking near me on the street because of my race.
7. Someone told me that she or he was colorblind.
8. Someone avoided sitting next to me in a public space (e.g., restaurants, movie theaters, subways, buses) because of my race.
9. Someone assumed that I would not be intelligent because of my race.
10. I was told that I complain about race too much.
11. I received substandard service in stores compared to customers of other racial groups.
12. I observed people of my race in prominent positions at my workplace or school.
13. Someone wanted to date me only because of my race.
14. I was told that people of all racial groups experience the same obstacles.
15. My opinion was overlooked in a group discussion because of my race.
16. Someone assumed that my work would be inferior to people of other racial groups.
17. Someone acted surprised at my scholastic or professional success because of my race.
18. I observed that people of my race were the CEOs of major corporations.
19. I observed people of my race portrayed positively on television.
20. Someone did not believe me when I told them I was born in the US.
21. Someone assumed that I would not be educated because of my race.
22. Someone told me that I was "articulate" after she/he assumed I wouldn't be.
23. Someone told me that all people in my racial group are all the same.
24. I observed people of my race portrayed positively in magazines.
25. An employer or co-worker was unfriendly or unwelcoming toward me because of my race.
26. I was told that people of color do not experience racism anymore.
27. Someone told me that they "don't see color."
28. I read popular books or magazines in which a majority of contributions featured people from my racial group.
29. Someone asked me to teach them words in my "native language."
30. Someone told me that they do not see race.

31. Someone clenched her/his purse or wallet upon seeing me because of my race.
32. Someone assumed that I would have a lower education because of my race.
33. Someone of a different racial group has stated that there is no difference between the two of us.
34. Someone assumed that I would physically hurt them because of my race.
35. Someone assumed that I ate foods associated with my race/culture every day.
36. Someone assumed that I held a lower paying job because of my race.
37. I observed people of my race portrayed positively in movies.
38. Someone assumed that I was poor because of my race.
39. Someone told me that people should not think about race anymore.
40. Someone avoided eye contact with me because of my race.
41. I observed that someone of my race is a government official in my state
42. Someone told me that all people in my racial group look alike.
43. Someone objectified one of my physical features because of my race.
44. An employer or co-worker treated me differently than White co-workers.
45. Someone assumed that I speak similar languages to other people in my race.

Appendix E

Pender's Exercise Social Norms Scale

How much do you think the following people expect you to exercise (be active to the point that you sweat, breathe fast, or your heart beats fast)? Circle your answer.

1. Family members	Not at all	Sort of	A lot
2. My closest friend	Not at all	Sort of	A lot
3. 5 or 6 friends I spend most of my time with	Not at all	Sort of	A lot
4. The teacher I am closest to	Not at all	Sort of	A lot
5. My doctor	Not at all	Sort of	A lot

Appendix F

International Physical Activity Questionnaire (IPAQ) Short Form

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the **last 7 days**. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

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

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

_____ **days per week**

☐

No vigorous physical activities

➔ *Skip to question 3*

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

_____ **hours per day**

_____ **minutes per day**

☐

Don't know/Not sure

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

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

_____ **days per week**

☐ No moderate physical activities ➡ *Skip to question 5*

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

_____ **hours per day**

_____ **minutes per day**

☐ Don't know/Not sure

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**

☐ No walking ➡ *Skip to question 7*

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

_____ **hours per day**

_____ **minutes per day**

☐ Don't know/Not sure

The last question is about the time you spent **sitting** on weekdays 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 spend **sitting** on a **week day**?

_____ **hours per day**

_____ **minutes per day**

☐

Don't know/Not sure

This is the end of the questionnaire, thank you for participating.

Appendix G

Dr Nadal,

I am a third year doctoral student in the PhD program at Rutgers University College of Nursing. As part of my dissertation research project I would like to explore the relationship between microaggression and engagement in physical activity among female Asian American college students. Although I am in the Rutgers University program, I recently moved from New Jersey to the San Francisco area so my sample will be students at San Francisco State University.

I am interested in using your Racial and Ethnic Microaggression Scale, with your permission, for my dissertation. I would, of course, share the results of my research with you.

I appreciate your consideration of my request. Please let me know if you have any questions regarding my dissertation and the use of your scale.

Thank you,

Elaine Musselman, RN, MSN/Ed, CNE
emussel@rutgers.edu
 908-672-4536

Elaine,

Sure, you have my permission to use the scale. I only ask that you keep us posted on your results. I'm cc'ing my research assistant Kristin who can give you a copy of the scale.

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Vitae

Elaine A. Musselman

Born Elaine Aziz on October 3, 1957 in North Syracuse, New York

Graduated Guilderland High School, Guilderland, New York 1975

Education:

1978	AAS	Hudson Valley Community College, Troy, NY	Nursing
2005	BSN	University of Phoenix, Online	Nursing
2006	MSN/Ed	University of Phoenix, Online	Nursing Education
2014	PhD	Rutgers University, Newark, NJ	Nursing

Professional Experience:

2005-2012	School Nurse Somerset County Educational Commission	Somerville, NJ
2005-2007	Adjunct Faculty, Nursing Department Pediatric Lecturer/Clinical Instructor Raritan Valley Community College	Branchburg, NJ
2007-2012	Tenure Track Instructor, Nursing Department Pediatric Lecturer/Clinical Instructor Raritan Valley Community College	Branchburg, NJ
2012-Present	Lecturer, School of Nursing Pediatric Coordinator/Clinical Instructor San Francisco State University	San Francisco, CA

Professional Organizations:

Sigma Theta Tau International
American Nurses Association
New Jersey State Nurses Association
National League for Nursing