

Increasing Asian International College Students' Physical Activity Behavior: A Review of the Youth Physical Activity Promotion Model

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Abstract

Asian students attending American colleges and universities report relatively low levels of physical activity participation, which may hinder their ability to realize their full human potential (i.e., cognitively, physically, socially). This paper reviewed the possible reasons underlying their generally inactive lifestyle, addressed the importance of promoting physical activity among Asian international students, and summarized key factors associated with their physical activity involvement on the basis of Welk's (1999) Youth Physical Activity Promotion (YPAP) model. Understanding the individual and contextual factors that influence the physical activity behavior of this fast growing segment of the student population within the American higher education system is an important step in order to ultimately design and implement efficacious physical activity programs for them.

Keywords: Culture, Exercise, Higher education, International students, Physical activity

In recent years, there has been an increase in the number of international students that have come to the United States for the purpose of pursuing higher education, and Asian international students represent the largest proportion of them. For example, the most recent data show that there were 461,903 Asian students studying in the United States in 2011, representing 63.86% of the total international student population (Institute of International Education [IIE], 2011). The largest number of students are from China, India, and South Korea.

Studying and living in a culture different from one's own is challenging, especially for students who do so on their own. Because they are far from their family, friends, and familiar surroundings, their social support networks are disrupted. Common problems include loneliness, lack of support, few meaningful relationships with host nationals, culture shock, discrimination and racism, language difficulties, unfamiliar modes of teaching and learning, a changing sense of identity, unrealistic family and self-expectations, financial problems, crises at home, and adverse experiences in the host country (Zhao, Kuh, & Carini, 2005). International students also report being irritable, disoriented, depressed, anxious, neurotic,

paranoid, and intolerant of ambiguity. Furthermore, they will often avoid social interactions (Dipeolu, Kang, & Cooper, 2007), which limits their opportunities for social and language skill development.

Among students from different ethnic backgrounds, Asian students have some elevated health risks. For example, the prevalence of having depressive symptoms is nearly twice as high among Chinese international students compared to American students (i.e., 47.5% vs. 25%, respectively; Cheung, 2011). Many reasons might contribute to this including, as alluded to earlier, their disrupted social support and emotional support networks (Dipeolu et al., 2007). International students also report higher academic stress and less time to relax and socialize compared to American students (Zhao et al., 2005). Moreover, lower perceived English proficiency tends to be isolating, as people want to avoid potentially embarrassing or discriminating situations (Klomegh, 2006).

Physical activity among international students

Physical activity has many physiological and psychological benefits. For example, regular involvement can lower the risk of overweight/obesity, cardiovascular disease, chronic diseases, and certain types of cancer (American College of Sports Medicine [ACSM], 2006; Myers et al., 2004). It also can help reduce stress, depressive and anxiety symptom, and can increase one's self-esteem (Callaghan, 2004; Dubbert, 2002; Dunn, Trivedi, Kampert, Clark, & Chambliss, 2002).

Although the importance of physical activity has been well documented, physical activity participation drops precipitously between 15-21 years of age (Caspersen, Pereira, & Curran, 2000). At the same time, the percentage of adolescents between 12 and 19 years of age who are overweight or obese has more than tripled, from 5% to 17%, between 1976 and 2002 (Center for Disease Control and Prevention, [CDC], 2006). On college and university campuses, the situation is even worse, with 28.8% of female college students and 39.4% of male college students being classified as overweight or obese (American College Health Association, [ACHA], 2009).

Particularly with regard to international students' physical activity involvement, participation rates tend to be low. For instance, multiethnic studies have found that students from Asian and African countries have the lowest levels of physical activity participation, whereas Caucasian students are the most physically active (Kenya, Brodsky, Divale, Allegrante, & Fullilove, 2003; Suminski, Petosa, Utter, & Zhang, 2002). Suminski and colleagues (Suminski et al., 2002) compared physical activity patterns among 874 Asian, 332 African, 1,101 White, and 529 Hispanic American college students between 18 and 25 years of age. On the basis of self-report, 46.7% of the sample did not engage in vigorous physical activity and 16.7% were physically inactive. Among women, ethnic-specific rates of physical inactivity were Asian, 28.1%; African, 23.5%; White, 17.4%; and Hispanic, 20.3%. For men the rates of

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inactivity were Asian 11.7%; African, 7.7%; White, 12.0%; and Hispanic, 13.8%. Moreover, on the basis of the stages of change construct from the transtheoretical model, both Asian men and women had the highest rates of being in the precontemplation and contemplation stages (i.e., inactive stages of change).

Asian female international students tend to be especially inactive. For example, Yoh, Yang, and Gordon (2008) found that Asian female college students averaged only 1.3 hours of physical activity per week, which was substantially less than the amount reported by female college students from North America, Europe, South America, and Africa who average 3.3, 2.3, 2.2, and 2.1 hours per week, respectfully. In other words, the Asian women were only obtaining 52% of the recommended amount of moderate-to-vigorous physical activity necessary to obtain substantial health benefits (i.e., > 2.5 hours per week; Haskell et al., 2007) and they were clearly the least active group overall. There is no doubt that Asian female students are in urgent need of physical activity intervention, particularly given the disastrous effects that physical inactivity has on one's long-term health, well-being, and overall functioning.

Several reasons may explain Asian students' low rates of physical activity participation. American and Asian cultures differ considerably in terms of sociocultural or natural environmental factors, and these factors may influence youth's moral, social, cognitive, and motor development (Yan & McCullagh, 2004), which may, in turn, result in Asian students being less physically active. Traditionally, in Asian countries, low priority is given to physical activity because of a focus on education of the mind over the physical development of the body (Cardinal et al., 2009). They also tend to devote most of their time to academic-type work (e.g., reading, studying) leaving little time for social or recreational activities such as physical activity. However, when students transition to a new culture, the situation may change as adaptations to the new culture begin to be made. For example, Davis and Kattzman (1998) found that Chinese students residing in the United States reported significantly higher exercise participation levels than did those residing in Hong Kong, which supports the notion that Western cultures may emphasize exercise participation more so than do Eastern cultures.

People in Asian countries also have strong gender-role related perceptions, which may impact physical activity participation (Taymoori, Rhodes, & Berry, 2010). For example, the majority of Asians believe that sport and physical activity participation are predominantly masculine in nature. Such perceptions in Asian countries have resulted in Asian women exhibiting low levels of physical activity during childhood and adolescence (Suminski et al., 2002).

Moreover, with industrialization (e.g., automation and computerization at work, efficient and sedentary forms of transportation), people in Asian countries, especially those in cities, tend to adopt increasingly sedentary lifestyles. For example, Fu and Fung (2004) reported that 80% of Chinese people (N = 2,196; 39.0 ± 10.7 years) living in Beijing, Shanghai, and Hong Kong were sedentary (i.e., participating in < 90 minutes per week of leisure-time physical activity). Overall, people in Asian countries have low participation rates in regular physical activity, and along with the increasing trend of higher fat and higher calorie diets, their overweight/obesity rates have significantly increased in recent years

(Mohammadpour-Ahranjani, Rashidi, Karandish, Eshraghian, & Kalantari, 2004).

The low physical activity participation rates may also be attributed to the limited number of schools in Asia that have comprehensive physical education programs (Yan, Berger, Tobar, & Cardinal, in press), and physical activity programs in educational settings there having relatively low priority status in comparison to other subjects, such as mathematics, literacy, and English (Callaghan, Eves, Norman, Chang, & Lung, 2002). In addition, people in Asia may not be as aware of the benefits of exercise compared to those in America (Lewis, Szabo, Weiner, McCall, & Piterman, 1997). Likewise, some Asian countries have poorly developed exercise facility infrastructures (Keating et al., 2006). Given such changing social mores and fewer parental and adult role models, the youth of Asia are at increased risk for sedentary living and the associated health risks already identified.

Acculturation and higher education

As an entry point for international students, colleges and universities become an important social institution for not only earning a degree, but for also experiencing and possibly adopting unique Western culture lifestyles and traditions. This process is referred to as acculturation, which is defined as the differences and changes in values and behaviors that individuals make as they gradually adopt the cultural values of the dominant society (Graves, 1967).

Acculturation occurs when groups of individuals having different cultures come into continuous first-hand contact with people from different cultural backgrounds, resulting in subsequent changes in the original culture patterns of either or both groups (Redfield, Linton, & Herskovits, 1936). The process of acculturation may encompass physical and psychological changes including adaptations to diet, climate, housing, communication styles, social interaction, norms, and values of the new society (Berry, 1997).

The acculturation process can be divided into several steps. Upon arrival to a new country and as the individual begins experiencing and interacting with others in the new environment, adaptations begin to occur. Over time these adaptations may result in the individual becoming disassociated with the values of the original culture (Casas & Casas, 1994). The next level in the acculturation process happens when an individual's preferences shift from the original culture to that of the host culture. The final step of the acculturation process refers to a permanent change in one's beliefs, values, and perceptions of the world. For international students new to the United States, most will be experiencing acculturation at the first level.

How acculturation influences international students' health behaviors depends on the dynamic balance between two conflicting forces. One is the positive health influence associated with a high level of acculturation and integration. The other is the negative health influence arising from the adoption of unhealthy behaviors such as the high fat, salt, and sugary diet that is so prevalent in the U.S. For example, Asian students from China, Japan, and Korea enrolled in American colleges and universities tend to have diets that are superior to their American counterparts when they first arrive in the United

States (Pan, Dixon, Himgurg, & Huffman, 1999). However, with increased length of residence, these same students tend to adopt some of the poor nutritional practices of American students (e.g., skipping meals and eating foods high in fat and sugar).

Regarding physical activity, the relationship between acculturation into American society and physical activity is not entirely clear. One study examined the years in the United States and levels of leisure-time physical activity among an Asian population and found a positive relationship (Kandula & Lauderdale, 2005). Another study found similar results among Korean adults using a multi-dimensional measure of acculturation (Lee, Sobal, & Frongillo, 2000). Lee, Cardinal, and Onsiri (2012) also found direct effects of acculturation on intention and physical activity among Korean adults in the U.S. In contrast, Huang and colleagues (Huang, Rodriguez, Burchfiel, Chyou, & Yano, 1996) found a negative association between United States nativity and levels of total physical activity among Japanese men in Hawaii. In sum, while the literature is not entirely clear, it does appear that the length of time in the United States and/or acculturation to the United States is positively associated with leisure-time physical activity involvement and negatively associated with non-leisure time physical activity (Afable-Munsuz, Ponce, Rodriguez, & Perez-Stable, 2010).

Promoting physical activity to international students can also help reduce acculturative stress. Acculturative stress is defined as a stress reaction in response to life events that are rooted in the experiences of acculturation (Berry, 2005), the psychological difficulties in adapting to a new culture (Smart & Smart, 1995), or psychosocial stressors resulting from unfamiliarity with new customs and social norms (Lin & Yi, 1997). Acculturative stress can lead to psychological responses such as depression (Hovey, 2000). For Asian international students the sources of acculturative stress often include academic pressures, language difficulties, feelings of inferiority, difficulties adjusting to new food or cultural values, lack of support, perceived discrimination, and homesickness (Yeh et al., 2003). Since physical activity has been reported to reduce stress related symptoms and increase the energy level of individuals (Dunn et al., 2002) especially among college and university students (Nguyen-Michel, Unger, Hamilton, & Spruijt-Metz, 2006), promoting physical activity among Asian international students has the potential to reduce or mitigate their acculturative stress.

Higher Education's role in promoting international students' health

College or university life may be a turning point for the health behaviors of students, be they domestic or international (Li, Cardinal, & Settersten, 2009). However, most of the health promotion research among international students focuses on their awareness and usage of counseling services (Hyun, Quinn, Madon, & Lustig, 2007; Russell, Thomson, & Rosenthal; 2008). Unfortunately, university counselors or course advisers are not always the first choice for international students seeking advice about their health behaviors. Cheung (2011), for example, reported that the majority of Asian international students do not elect to use psychological counseling and

mental health services to deal with emotional and personal distress. This may be because Asian cultures tend to value emotional self-control (Kim, Li, & Ng, 2005) and, as a result, Asian students may believe that they should use their inner resources (e.g., willpower) to resolve their stress or emotional disturbance, instead of turning to professionals for assistance (e.g., counseling services, counselors). Moreover, the potential role of physical activity participation in helping international students cope with the demands of their academic studies or adjust to the American higher education system have yet to be examined.

To improve upon this situation and ultimately assist in the design and delivery of future physical activity interventions within this growing segment of the student population, consideration needs to be given to exploring the factors that influence their physical activity during their transition into American colleges and universities. Welk's (1999) Youth Physical Activity Promotion Model (YPAP) (Figure 1) appears to hold much promise for achieving this, as it considers not only the intrapersonal level factors, but also the interpersonal and environmental level factors. In the balance of this article, the physical activity behavior of Asian international students within the American higher education system is reviewed through the lens of the YPAP model.

Factors that influence physical activity participation-YPAP model

Welk's (1999) YPAP model integrates existing theoretical frameworks, such as the expectancy-value model (Eccles & Harold, 1991), social cognitive theory (Bandura, 1986), and the social ecological model (Sallis & Owen, 1997), in an effort to explain youth physical activity behavior. Incorporated within the model are the predisposing, reinforcing, and enabling concepts from the PRECEDE-PROCEED health promotion-planning model (Green & Kreuter, 1991; Green, Kreuter, Deeds, & Partridge, 1980). The PRECEDE-PROCEED model proposes that in order to design interventions to change health behavior, several steps need to be followed, including social diagnosis, epidemiological diagnosis, behavior and environmental diagnosis, and educational and organizational diagnosis. In the educational and organizational diagnosis, factors that influence the specific health behavior should be identified. These factors include the predisposing, enabling, and reinforcing factors previously mentioned.

Predisposing factors have two subcategories, *Am I able?* and *Is it worth it?* (simplified as able and worth, respectively, in the following) which include attitudes, beliefs, personal preferences, and self-efficacy toward the desired behavior change. *Reinforcing* factors are those things that reward or encourage the desired behavior change. *Enabling* factors are psychological/emotional or physical influences that facilitate motivation to change behavior, such as accessibility, knowledge, and skills. Within the YPAP model, the predisposing, enabling, and reinforcing factors reflect the general principles of a social-ecological model of physical activity for adolescents and youth. These factors address multiple dimensions of intrapersonal, sociocultural, and environmental influences. Collectively, the model hypothesizes that individual, social environmental, and physical environmental factors can best explain individual behavior.

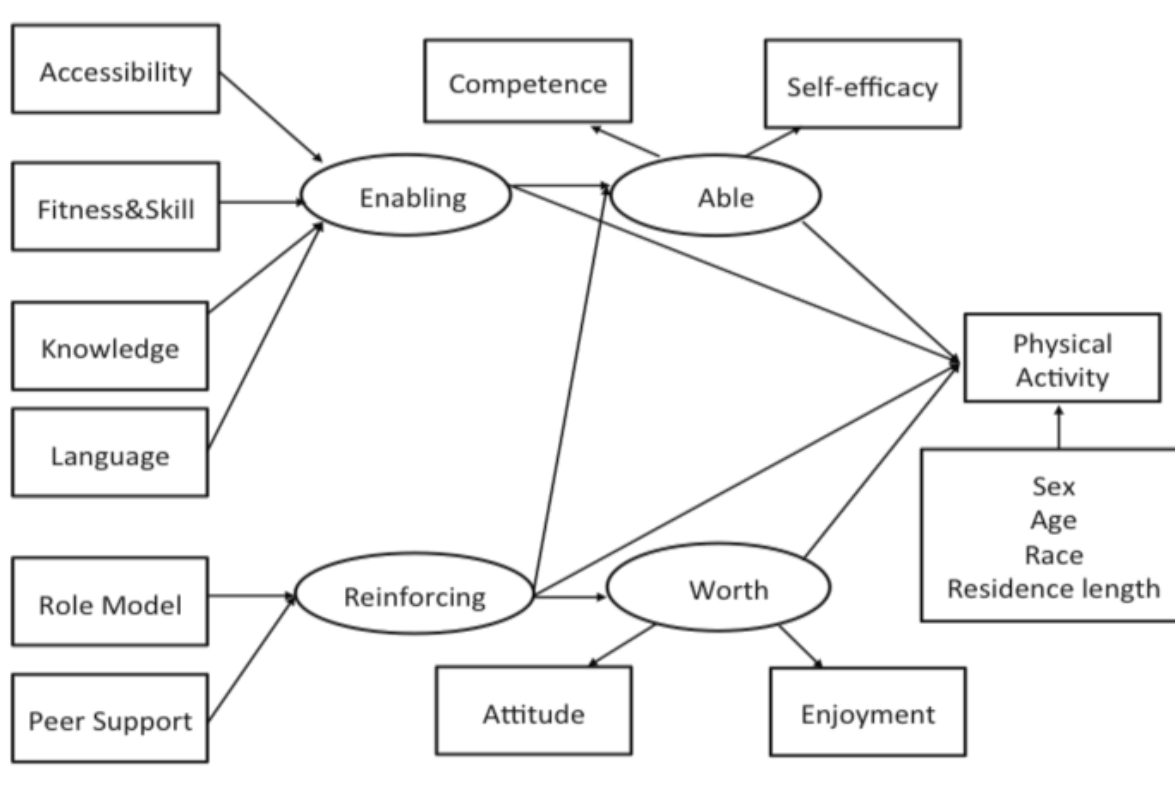


Figure 1: Proposed Youth Physical Activity Promotion model for Asian international college students

The YPAP model has been previously used to identify factors influencing physical activity among elementary, middle, and high school aged children and youth (Dollman & Lewis, 2009; Welk, 1999; Wenthe, 2006). There is limited empirical evidence of its application among adults. However, Welk (1999) posited that it could be applied to adults with some minor adjustments to its factorial structure. Because various constructs can be included within the primary domains of the model, the YPAP framework allows for related constructs from different theoretical approaches. Hence, with the appropriate theoretical adjustments, the utility of this model to explain the physical activity behavior of adults appears promising. In the following section evidence supporting the YPAP among adult samples, inclusive of college students, is considered.

Predisposing factors

Predisposing factors in the YPAP model include two parts, able and worth. Able encapsulates variables related to self-perceptions such as self-efficacy, perceived competence, self-worth, and perceived barriers. This construct reflects a person's perceived degree of control over her/his personal behavior. Self-perception has served as a central variable related to physical activity in different theories. For example, in Bandura's social cognitive theory (1986), perception of ability is a key factor for physical activity. Harter (1985) identified self-perception as an important predictor of an individual's task involvement in physical activity. In Eccles and Harold's (1991) expected-value

theory, expectation of success is a key determinant of choices within the physical domain.

Self-efficacy. Self-efficacy refers to a person's belief about her/his capabilities to produce a designated level of performance (Bandura, 1994). It is a key construct within several theories including social cognitive theory (Bandura, 1986), the transtheoretical model (Prochaska & DiClemente, 1982), and the theory of planned behavior (TPB; Ajzen, 1991). Self-efficacy is one of the most widely studied psychological correlates of physical activity for the general population (Pekmezi, Jennings, & Marcus, 2009). Previously reviewed literature and more recent investigations have shown a consistent positive association between self-efficacy and physical activity participation (Annesi, Faigenbaum, & Westcott, 2010; Lloyd & Little, 2010). Evidence also supports that self-efficacy is an important factor for college students (Cardinal & Kosma, 2004), including Asian students (Chang, 2004), to participate in physical activity. Yan and colleagues also reported that Chinese college students in general have lower self-efficacy compared to the American college students, which may at least partially explain why Chinese students have relatively lower physically active participation levels (Yan et al., in press).

Perceived competence. Perceived competence is self-evaluative judgments about one's ability to accomplish certain tasks (Harter, 1985). People have an innate tendency to develop competencies to master their environments (Ryan & Deci, 2007). According to self-determination theory, to achieve

desired outcomes, both perceived competence and autonomous motivation are required (Ryan & Deci, 2001). Perceived competence has been found to predict physical activity participation among children in grades 6th through 8th (Gao, 2008), as well as among other youth (Halvari, Ulstad, Bagoien, & Skjesol, 2009; Skjesol & Halvari, 2005), and college students (Puente & Anshel, 2010; Ullrich-French, Smith, & Cox, 2011). The second subcomponent of predisposing factors is worth, which addresses the value (i.e., benefits and costs) placed on expected outcomes associated with physical activity. These include affective (enjoyment) and cognitive (belief and attitudes) variables. Most of the social-cognitive theories are based on an expectancy-value framework in which behavior is determined by expected outcomes and the value that is placed on them (Welk, 1999). For example, beliefs and attitudes have been identified as important predictors of behavioral intention in the theory of planned behavior (Ajzen, 1991).

Attitudes and beliefs. The relationship among attitudes, beliefs, and physical activity behavior are not entirely consistent. Some studies suggest a positive relationship between attitude and physical activity among college students (Kwan, Bray, & Ginis, 2009), whereas a review paper suggested that attitudes and normative beliefs were not associated with physical activity behavior among adults (Trost, Owen, Bauman, Sallis, & Brown, 2002). Dishman and Sallis (1994) suggested that past experiences and intentions were stronger predictors of physical activity than were attitudes and beliefs. Among Asian samples, one's attitude toward physical activity appears to affect one's actual physical activity behavior (Lee et al., 2012; Yan et al., in press).

Enjoyment. Enjoyment refers to the joy individuals get from engaging in activity (Harter, 1985). Exercise enjoyment is important because it is associated with exercise adherence, positive mood change, and increasing exercise motivation (Motl, Berger, & Leuschen, 2000). The degree to which a person enjoys sport or exercise appears to be primary reasons for both participation (enjoys activity) and dropping out (does not enjoy activity; Heck & Kimiecik, 1993). Enjoyment is associated with college students' physical activity participation (Dunn & Wang, 2003; Yoh, 2009). Asian students, in particular, express a stronger motivation to participate in physical activity for reasons related to enjoyment in comparison to their American counterparts (Chen, Yan, & Tan, 2006).

Enabling factors

Enabling factors include variables that allow individuals to be physically active. Conceptually, they include determinants from the biological and environmental domains (Welk, 1999). Biological factors include physical skills, fitness, and body fat percentage, among others. Environmental factors include access to equipment, parks, and programs, among others. For example, exercise facilities and satisfaction with community recreational facilities are associated with physical activity participation levels (MacDougall, Cooke, Owen, Willson, & Bauman, 1997). Dishman and Sallis (1994) identified enabling factors as especially relevant for women to participate in physical activity, including income/social status, barriers to exercise, mood disturbance, and perceived health and fitness.

Environmental factors may be especially important for college students. College students are often in a very unique

environment compared to other settings. For example, most college and universities have accessible recreation centers and other such facilities for their students (Strand, Egeberg, & Mozamdar, 2010). Individual awareness of the facilities and use of these resources may influence physical activity levels (Humpel, Owen, & Leslie, 2002). In support of this, Lesile (1999) found that awareness of campus exercise resources and gym membership on campus or off campus predicted college students' physical activity behavior. Among adults, the distance to and availability of active places for recreation has been shown to be positively related to physical activity behavior, and adults who live in more walkable communities are more physically active than adults who live in less walkable communities (Powell, Martin, & Chowdhury, 2003; Saelens, Sallis, & Frank, 2003).

Environmental resources may be extremely important for Asian students. For example, Li, Dibley, Sibbritt, and Yan (2006) examined environmental factors and physical activity among 1787 adolescents in China. They found that a lack of recreation facilities and unsafe neighborhoods were related to higher levels of physical inactivity. Yan and Cardinal (in press) also identified environmental resources as a major facilitator of physical activity participation for Chinese female international students in the American higher education system.

Community and campus safety may also be a factor influencing physical activity. For example, Yan, Ketcham, and Cardinal (2012) found an association between college students' perceptions of campus and community safety and their physical activity, with those perceiving higher levels of safety being more physically active compared to those who perceived the campus or community to be less safe.

Knowledge. Knowledge of physical activity has been found to be a predictor of physical activity for adolescents and youth (Biddle & Goudas, 1996; DiLorenzo, Stucky-Ropp, Vander Wal, & Gotham, 1998). However, it has rarely been reported as being related to physical activity for adults (Bungum & Vincent, 1997; Morrow, Krzewinski-Malone, Jackson, Bungum, & FitzGerald, 2004). Sallis and colleagues concluded that although knowledge of physical activity is necessary, it alone does not predict physical activity (Sallis & Dishman, 1994). It is not clear whether knowledge of physical activity influences the physical activity behavior of Asian college students.

Asian international students may have additional enabling factors influencing their physical activity behavior. For example, cultural issues, such as language barriers; being in an exercise group with people from different ethnic backgrounds (Eyler et al., 1998); and peer non-acceptance due to cultural beliefs (Eyler et al., 1998; Gregg, Kriska, Narayan, & Knowler, 1996) have all been found to be unique barriers to physical activity participation among individuals from diverse racial or ethnic backgrounds. Examining these culturally-based enabling factors remains a fertile research area.

In Welk's (1999) model, the enabling factors influence physical activity both directly and indirectly through the predisposing factors. For example, fitness level and skills influence physical activity directly. Youth who are more fit and skillful are more likely to seek out opportunities to be physically active. Indirectly, those who are more fit and skillful generally have higher perceived competence, which increases their likelihood of being physically active.

Reinforcing factors

The reinforcing factors in the YPAP model emphasize how the social environmental factors influence physical activity, with the role of significant others such as parents, peers, and coaches being highlighted. Significant others can serve as interpreters, supporters, and providers of experiences for youth.

As for college students, social support for physical activity is mainly from peers and parents. Leslie Owen, Salmon, Bauman, and Sallis (1999) examined a large sample of Australian college students and identified social support as an important factor for them to participate in physical activity. Those reporting low levels of social support from either family or friends were 23-55% more likely to be insufficiently active compared to those reporting high levels of social support.

In the U.S. Women's Determinants Study, social support was strongly associated with physical activity (Eyler, Owen, Salmon, Bauman, & Sallis 1999). Women with high levels of physical activity social support were approximately twice as likely as were women with low support to be active at least 30 minutes, 5 or more days of the week.

In general, research has shown that social support to participate in physical activity is important for both female and male college students (Leslie et al., 1999; Wallace & Buckworth, 2003). However, research also has shown that friends or peers are more powerful sources of social support for males, while social support from family is more important for females (Wallace, Buckworth, Kirby, & Sherman, 2000).

Social support may be especially important for Asian international students, as they have been socialized in a collectivistic versus individualistic culture. For example, Yan and McCullagh (2004) found that socialization was the main reason to participate in physical activity for both Chinese male and female college students in the U.S., whereas competition was reported as the primary motivation for American college students. In addition, as Asian international students in the U.S. are far away from their family, they may rely more on their peers rather than on their parents for social support for physical activity participation.

In the YPAP model, reinforcing factors influence physical activity both directly and indirectly. The direct effect results from parents or peers facilitating activities such as doing physical activity together with children or encouraging them to be physically active. The indirect effect is through shaping the predisposing factors. For example, adults' encouragement predicted vigorous activity indirectly through an enhanced perception of competence (Biddle & Goudas, 1996). As children mature, peer influences and internal standards of comparison are increasingly emphasized (Weiss, Smith, & Theeboom, 1996).

In all actuality, the relationship among the predisposing, enabling, and reinforcing factors may be more complex than what has been presented in the YPAP model. For instance, the enabling factors may moderate the relationship between reinforcing factors and physical activity. This was at least partially demonstrated by Graham, Schneider, and Dickerson (2011) who found that among adolescents with high levels of environmental resources, greater social support was associated with students participating in a greater number of sports in school. Additionally, perceived competence was associated

with social support from parents over two years among female adolescents (Davison, Downs, & Birch, 2006).

Demographic and personal factors

Sex. Research results on sex differences among college students are inconsistent. Some studies show that male college students participate in more vigorous activities than do their female counterparts (Huang et al., 2003; Leslie, Sparling, & Owen, 2001). However, others report no differences between male and female college students (Calfas, Sallis, Lovato, & Campbell, 1994; Matthews et al., 2001; Stock, Wille, & Krämer, 2001). In part this may at least partially depend on how physical activity is measured (Tudor-Locke, Henderson, Wilcox, Cooper, Durstine, & Ainsworth, 2003).

Age. Research suggests that older college students are more likely to be sedentary. Younger students report more days per week devoted to stretching and greater participation in vigorous intensity activities (Buckworth & Nigg, 2004). Students under 30 years old were also found to be more likely to engage in vigorous physical activities compared to those over 30 years old (Leslie et al., 1999).

Race. As previously eluded to, race is a factor related to physical activity participation. Being Asian, Black, Hispanic, or Native American is associated with lower levels of physical activity. This is especially noteworthy given the shared environment of college and university students. Suminski and colleagues (2002) reported that Asian college students were more likely to be in either the precontemplation or contemplation stages of physical activity behavior change (i.e., inactive) compared to white, African, and Hispanic students. In addition, Asian women were more physically inactive than Asian men, who reported 93 and 204 minutes of weekly physical activity, respectively. Needless to say, Asian students, especially Asian women, have a higher risk of being sedentary compared to students from other ethnic backgrounds.

Residence length in the U.S. There is an inconsistent relationship reported between residence length and physical activity among Asians in the United States. One population-based study examining years in the United States and leisure time physical activity among Asians as an aggregate group and found a positive association in stratified analyses of men and women. Other studies among Korean adults using a multi-dimensional measure of acculturation reported similar results (Kandula & Lauderdale, 2005; Lee et al. 2012; Lee et al., 2000). Afaible-Munsuz, Ponce, Rodriguez, and Perez-Stable (2010) reported that less acculturated Chinese adults in the U.S. were less likely to report leisure time physical activity participation. In contrast, Huang and colleagues (Huang et al., 2003) found a negative association between U.S. nativity and levels of total physical activity among Japanese men in Hawaii. At present it is unclear how length of residence influences Asian international students' physical activity levels.

Conclusion

Asian international students represent the largest international student group in the American higher education system. They also appear to be the least physically active group, which negatively affects their health and wellbeing.

Understanding their physical activity experiences in the U.S. and the factors that influence their physical activity behaviors are important steps to be accomplished prior to developing and implementing targeted physical activity intervention programs for them. Welk's (1999) YPAP model appears to be a viable conceptual framework for accomplishing this, as it has both theoretical and empirical support working in its favor. That said, and although the possible factors influencing physical activity behavior within the model have been reviewed, it is not clear which factors are most important nor how these factors influence physical activity simultaneously or in their entirety (i.e., direct vs. indirect effect). Therefore, these factors need to be evaluated within the whole model to begin to identify the pathways and compare their effects on the physical activity behavior of Asian international students. No matter what, the proposed model provides some empirical suggestions for health educators in colleges and universities who are interested in promoting physical activity among Asian international students. For example, as the predisposing factors (e.g., perceived competence, self-efficacy, positive attitude, enjoyment of physical activity) appear to have the most direct influence on physical activity participation, one or more of these psychological factors should be targeted in physical activity promotion interventions. In addition, colleges and universities should focus on providing both environmental and social support, such as accessibility and peer support, to facilitate Asian international students' physical activity participation. Finally, health educators should address factors that are uniquely important to Asian international students (e.g., language barriers, gender-role perceptions) in the design and delivery of intervention programs. This should afford the Asian international students the best opportunity to engage in more physical activity during their transitional time in the U.S.

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<http://chipcast.hosted.panopto.com/Panopto/Pages/Viewer/Default.aspx?id=7d148edf-40c3-4dae-a0b0-27cfe5252a5e>

to view the webinar.