

Understanding Psychosocial Mechanisms of the Influences of Acculturation on Physical Activity Participation among Ethnic Minorities in the United States

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Abstract

Culture has been studied as a factor that may account for physical activity disparities among different ethnicities in the U.S. Accordingly, acculturation has been one of the most prominent topics studied to explain mechanisms by which an individual or group may adopt a healthy or unhealthy lifestyle. Nevertheless, many studies lack the use of comprehensive theoretical frameworks, hence they are less informative for intervention design and implementation. This study was purposed to: 1) review important concepts of acculturation, and empirical findings regarding its association with physical activity participation, and 2) propose plausible syntheses of psychosocial theories of physical activity behavior and acculturative variables. The pros and cons of unidirectional and bidirectional models of acculturation were compared in terms of their theoretical plausibility as well as practicality. Acculturation has generally been found to be positively associated with leisure-time physical activity. Nevertheless, its impact on non-leisure-time physical activity is still inconclusive. Lastly, we proposed that acculturation may affect physical activity participation through intrapersonal, interpersonal, and sociocultural streams of influence, adopting the typology of Flay et al.'s (2009) theory of triadic influence.

Key words: Acculturation, ethnicity, physical activity, theory of triadic influence

Introduction

The benefits of regular physical activity are well documented (Kesaniemi et al., 2001; Physical Activity Guidelines Advisory Committee, 2008). The American Heart Association and American College of Sports Medicine recommend that adults who are healthy enough to do so participate in at least 30 minutes of moderate-intensity physical activity 5 days a week, 20 minutes of vigorous-intensity physical activity 3 days a week, or the equivalent combination of the two modes

of activity, to achieve a minimal level of desirable health benefits (Haskell et al., 2007).

Unfortunately, whether measured subjectively by self-report recall questionnaire or objectively by accelerometer, no more than 51%, and as few as 5%, respectively, of adults appear to be achieving this recommendation (Centers for Disease Control and Prevention [CDC], 2011; Troiano et al., 2008). Furthermore, in 2009, 24.2% of U.S. adults did not engage in any physical activity during the past month (CDC, 2011). As such, getting more people to be physically active and having fewer people remain inactive (i.e., reducing sedentarism) are important objectives in the Healthy People 2020 document (U.S.

Department of Health and Human Services, n.d.).

Moreover, physical activity disparities exist by ethnicity among U.S. adults, with the non-Hispanic white sub-population being the most active, though still far below recommended levels (Kruger, Kohl, & Miles, 2007). For example, between 1997 and 2008, the proportion of adults who were classified as inactive (i.e., currently not engaging in any bouts of light to vigorous physical activity lasting 10 or more minutes) was highest among Hispanics (50.6%), and lowest among non-Hispanic whites (34.0%). Even after controlling for social class (i.e., education, income, employment, and marital status) leisure-time physical inactivity disparities among ethnic minority groups appear to remain (Crespo, Smit, Andersen, Carter-Pokras, & Ainsworth, 2000; Marshall et al., 2007). These data suggest that culture may be at least partially accounting for the physical activity disparities observed across ethnic groups.

Interestingly, immigrants to the U.S. are initially found to be healthier than their U.S. born counterparts, but the longer their length of residence in the U.S., the more likely this advantage is to diminish (Singh & Siahpush, 2001, 2002). This may be because their health behaviors generally begin to resemble those of native-born populations the longer their length of residence (Koya & Egede, 2007; Singh & Siahpush, 2002), suggesting that acculturation may play a role in ethnic minorities' health behaviors, including leisure-time physical activity. Accordingly, acculturation has been one of the most prominent topics for researchers who study the role of culture in physical activity and health disparity (Crespo, 2000; Espinosa de los Monteros, Gallo, Elder, & Talavera, 2008; Murillo et al., 2014).

Conceptualizing and Measuring Acculturation

Acculturation is a multi-faceted change in individuals or ethnic groups resulting from first-hand contact

between two or more cultural systems. According to the International Organization for Migration (IOM), "acculturation refers to the progressive adoption of new cultural ideas, language, values, norms, behaviors, and institutions by person and/or groups" (as cited in Sam, 2006, p. 11). Therefore, individuals who undergo acculturative changes experience shifts in their preference for not only behavioral patterns such as language, lifestyle, interpersonal contact, and ethnic identity (Berry, 2003), but also value systems regarding family dynamics, gender roles, need for achievement, and collectivism and individualism (Marín & Gamba, 2003). Also, acculturation is associated with mental health problems such as anxiety and depression, which can be attributed to acculturative stress (Revollo, Qureshi, Collazos, Valero, & Casas, 2011).

Even though the IOM's definition of acculturation implies acculturation is bipolar in nature, there has been ongoing discourse about the dimensionality of acculturation. In the bipolar model of acculturation individuals are assumed to lose their original culture as they adopt a new culture. However, Berry (1970; 2003; 2006) asserted that an individual's acquisition of a new culture may not necessarily result in the total loss of the heritage culture. Rather Berry suggested that acculturation is a bidimensional construct consisting of a cultural preference and contact preference axis which render four acculturation strategies of individuals: assimilation (i.e., losing original cultural identity and pursuing a new cultural contact), integration (i.e., pursuing a new cultural contact, but still maintaining original cultural identity), separation (i.e., losing original cultural identity and avoiding a new cultural contact), and marginalization (i.e., maintaining original cultural identity and avoiding a new cultural contact). In addition, individuals' selection of these four acculturation strategies are affected by the larger society's acculturation strategy where the sociocultural environment encourages, forces, or hinders one's cultural shift and contact. Despite the theoretical plausibility of Berry's bidimensional acculturation model, many studies

continue to rely on the bipolar assumption of acculturation (e.g., Diaz, Marshak, Montgomery, Rea, & Backman, 2009; Guinn & Vincent, 2008; Hosper, Nierkens, van Valkengoed, & Stronks, 2008). This may reflect the statistical parsimony of the bipolar model and/or methodological challenges associated with clearly demarking the four hypothesized acculturation strategies.

Numerous measures of acculturation have been developed and validated along with varying conceptualization of acculturation. Domains that these acculturation scales measure are summarized in Table 1. Most of these measures were designed to assess individual acculturative variations with regard to Anglo American culture (Zane & Mak, 2003). Nevertheless, Zane and Mak identified the lack of consensus among many of the measures of acculturation and the domains and patterns of acculturation. Specifically, acculturation measures selectively include language use, preference, and proficiency; preference and practice in social affiliations; cultural identity; and/or other proxy indicators such as generation status and length of residence in the U.S. In addition, and as noted above,

the acculturation measures also vary in their assumptions regarding dimensionality (e.g., whether original heritage cultural is lost as the new host culture is increasingly accepted).

Acculturation and Health Behavior with an Emphasis on Physical Activity Behavior Depending on the health behavior being studied (e.g., alcohol consumption, diet, physical activity, smoking, sun-safe behaviors), acculturation has been reported to either be a protective or risk factor for immigrants' health. For example, among Hispanics, acculturation was positively associated with not only unhealthy behaviors such as poor diet (Abraido-Lanza, Chao, & Florez, 2005; Hubert, Snider, & Winkleby, 2005), smoking and alcohol consumption (Abraido-Lanza et al., 2005; Masel, Rudkin, & Peek, 2006), but also with healthy behaviors such as sun-screen use (Andreeva et al., 2009), and leisure-time physical activity (Abraido-Lanza et al., 2005; Berrigan, Dodd, Troiano, Reeve, & Ballard-Barbash, 2006).

The relationship between acculturation and health behaviors, however, cannot be generalized to other ethnic groups because it can also depend on the ethnic group's culture of origin. For example, the more

Table 1. Summary of selected acculturation measures

Acculturation Scales	Domains							
	Language	Social Affiliation	Daily living habits	Cultural traditions	Communication style	Cultural identity	Generation	Cultural values
Behavioral Acculturation Scale ^a			✓	✓	✓			
Value Acculturation Scale ^a					✓			✓
Short Acculturation Scale ^b	✓	✓	✓			✓	✓	
Acculturation Rating Scale for Mexican Americans-II ^c	✓	✓	✓			✓	✓	
Acculturation, Habits, and Interests Multicultural Scale for Adolescents ^d	✓	✓	✓	✓		✓		
Suinn-Lew Asian Self-Identity Acculturation Scale ^e	✓	✓	✓					

Adopted and modified from Zane, N., & Mak, W. (2003). Major approaches to the measurement of acculturation among ethnic minority populations: a content analysis and an alternative empirical strategy. In K. M. Chun, P. B. Organista & G. Marin (Eds.), *Acculturation: Advances in Theory, Measurement, and Applied Research*. Washington, DC: American Psychological Association.

^a Szapocznik, Scopetta, Fernandez, & de los Angeles Aranalde (1978) ^b Marín, Sabogal, VanOss Marín, Otero-Sabogal, & Pérez-Stable (1987) ^c Cuellar, Arnold, & Maldonado (1985) ^d Unger et al (2002) ^e Suinn, Rickard-Figueroa, Lew, & Vigil (1987)

acculturated Bosnian refugees in the U.S. were, the more likely they were to perceive smoking as a risk factor of heart and lung disease (Helweg-Larsen & Stancioff, 2008), which is opposite to what was found for Hispanics (Abraido-Lanza et al., 2005). In a similar

vein, Ma et al. (2004) found that the more acculturated Asian adult males were, the less likely they were to smoke.

Though not yet conclusive, the overall body of empirical evidence suggests that acculturation may be

Table 2. Summary of empirical studies testing the acculturation-physical activity relationship

Sample	Measure of acculturation	Mediators tested	Association with PA		Reference
			LTPA	NLTPA	
Hispanic adolescents in Texas	Language use at home		+		(Springer et al., 2009)
Older Chinese in New York	Language use and years in the U.S.		0		(Parikh et al., 2009)
Hispanic adolescents	Language use at home		+		(Liu, Probst, Harun, Bennett, & Torres, 2009)
	Generation		+		
Hispanic adults	Language use and years in the U.S.		+		(Neighbors, Marquez, & Marcus, 2008)
Low-income Mexican American females in border communities	ARSMA-II		+		(Monteros, Gallo, Elder, & Talavera, 2008)
Mexican American females in border communities	Language preference		+		(Guinn & Vincent, 2008)
Hispanic pregnant women	Language preference		+		(Gollenberg, Pekow, Markenson, Tucker, & Chasan-Taber, 2008)
Hispanic adults	Language preference		+		(DuBard & Gizlice, 2008)
Middle age Korean immigrant women in Central Texas	SL-ASIA		0		(Yang et al., 2007)
Hispanic women in San Diego	ARSMA-II	Perceived neighborhood safety (ns)	+		(Pichon et al., 2007)
Hispanic pregnant women	Language preference		+		(Chasan-Taber et al., 2007)
Multi-ethnic minorities in Massachusetts	Language preference		+	Occupational: - (men), +(women)	(Wolin et al., 2006)
Hispanic women in Southwestern U.S.	Language preference		+		(Slattery et al., 2006)
Hispanic older adults	Country of origin, contact with Anglo-Americans, Language proficiency		0		(Masel et al., 2006)
Hispanics adults in central Illinois	Short Acculturation Scale		0	Occupational: -	(Marquez & McAuley, 2006)
Hispanic adults	Language preference		+	Transportational, occupational: -	(Berrigan et al., 2006)
Asian American adults	Years in the U.S., country of origin, language preference		+	Overall NLTPA: - (men), 0(women)	(Kandula & Lauderdale, 2005)
Older Indian American immigrants	Length of residence, ethnic identity		+		(Jonnalagadda & Diwan, 2005)

+ positive association; - inverse association; 0 no significant association

Acronyms: PA = physical activity, LTPA = leisure-time physical activity, NLTPA = non-leisure-time physical activity, ns = non-significant

a protective factor for leisure-time physical activity (see Table 2). That is, among the 24 empirical studies that have examined the relationship between acculturation and leisure-time physical activity, 18 found acculturation to the mainstream U.S. culture to be positively associated with leisure-time physical activity participation, 5 reported null associations, and 1 found an inverse association. Among the five studies with no significant association, three were conducted among older adult samples only (Dergance, Mouton, Lichtenstein, & Hazuda, 2005; Masel et al., 2006; Parikh, Fahs, Shelley, & Yerneni, 2009), and one study focused on middle age Korean immigrant women only (Yang et al., 2007). In sum, age, gender, and ethnicity may all be factors moderating the effects of acculturation on leisure-time physical activity. Future studies should pay more attention to these factors.

Meanwhile, the association between acculturation and non-leisure-time physical activity (e.g., household, occupational, transportation) is an understudied area, but the limited available evidence suggests the pattern might be quite different between this and leisure-time physical activity. For example, Marquez and McAuley (2006) found the association between acculturation and leisure-time physical activity to be insignificant, but for non-leisure-time physical activity it was negative. Among the four studies identified in this review, acculturation was inversely associated with occupational physical activity in three studies, transportation physical activity in one study, and overall non-leisure-time physical activity in one study. Nevertheless, acculturation was positively associated with women's occupational physical activity in a multi-ethnic minorities study conducted in Massachusetts (Wolin, Colditz, Stoddard, Emmons, & Sorensen, 2006). Lastly, acculturation was not significantly associated with the odds of having a physically active occupation in a sample of Asian women (Kandula & Lauderdale, 2005). Such inconsistency among the study findings can be ascribed to diverse measures (i.e., domains) of physical activity and acculturation, and different ethnic origins and other

sociodemographic background of the study samples. However, information drawn from these studies are limited to descriptive association between acculturation and physical activity. Therefore future studies should apply psychosocial theories to understand mechanisms by which acculturation relates to physical activity.

Toward Theory-Based Investigations

Comprehensive theories provide insights about predicting future events, can help guide data analyses, and they serve as frameworks for the design and delivery of intervention programs. There have been numerous studies examining behavioral shifts concomitant with the acculturation process. There are also relatively well understood links between acculturation and health as a result of such behavioral shifts. Nevertheless, as Myers and Rodriguez (2002) noted, most studies have drawn conclusions on the basis of descriptive relationships between acculturation and health or health behaviors. Also, Abraido-Lanza, Armbrister, Florez, and Aguirre (2006) argued that the majority of acculturation studies employed proxy measures (e.g., country of birth, generation status, and length of residence in the U.S.) or composite scores of multi-faceted scales of acculturation, which limit the studies' ability to capture diverse nuances of acculturation (e.g., attitudinal change, adherence to specific American values, etc.) on health.

On the basis of Sallis, Owen, and Fotheringham's (2000) behavioral epidemiology framework, the sequence of studies necessary for ultimately designing evidence-based intervention programs are: 1) establishing links between behaviors and health; 2) developing methods for measuring the behavior; 3) identifying factors that influence the behavior; 4) evaluating interventions to change the behavior; and 5) translating research into practice. Specifically, the third step, identifying factors that influence behavior, should include not only identifying correlates of the behavior,

Table 3. Commonalities among intra- and interpersonal level health behavior models and theories

Sample	Measure of acculturation	Mediators tested	Association with PA		Reference
			LTPA	NLTPA	
Older Mexican Americans	English proficiency and preference, attitude toward Mexican culture, attitude toward traditional gender role	Psychosocial, lifestyle, chronic diseases	0		(Dergance et al., 2005)
Asian and Hispanic adolescents in urban areas	AHIMSA		-		(Unger et al., 2004)
Hispanic immigrant women in North Carolina	Language, length of residence, age at arrival in the U.S.		+ (including NLTPA)		(Evenson, Sarmiento, & Ayala, 2004)
Mexican American adults	Language		+		(Crespo, Smit, Carter-Pokras, & Andersen, 2001)
Korean American adults	Structural and cultural assimilation		+		(Lee, Sobal, & Frongillo, 2000)

Note: Predictors on the same row represent conceptually similar constructs

but also testing the pathways and interactions through which the identified factors influence the behavior. Therefore, as Myers and Rodriguez (2002) suggested, comprehensive models that consider demographic characteristics, preexisting risk factors, acculturation processes, and proximal mediators and moderators such as psychological factors and health behaviors should be tested, in addition to the relationship between acculturation and health behavior and health outcomes.

Since acculturation itself implies multidimensional changes encompassing a worldview of specific behaviors in an ethnic group and individuals (Berry, 2003), it's implication on leisure-time physical activity can be most comprehensively understood using psychosocial and ecological frameworks. At the psychosocial level, a number of well-tested models including the health belief model, social cognitive theory (Bandura, 1986), theory of planned behavior (Ajzen, 1991), and transtheoretical model (Prochaska & DiClemente, 1983) can provide plausible frameworks for testing mechanisms of acculturative change in leisure-time physical activity.

According to the health belief model, individuals are most likely to engage in health promoting behaviors when they perceive their health to be threatened, there are perceived benefits associated with choosing to perform healthy behaviors, barriers to engage in health

behaviors are reduced, self-efficacy is high, and cues to action are provided. The social cognitive theory hypothesizes that people are most likely to choose to engage in health promoting behaviors when the behavior is modeled by others, the benefits for doing so are recognizable (outcome expectancy), and self-efficacy is high, all of which helps motivate action. The theory of planned behavior identifies attitude, subjective norm, perceived behavioral control, and intention as the key predictors of health behaviors. Within the transtheoretical model the processes of change, stages of change, decisional balance, and self-efficacy are thought to be the main factors for successful health behavior change. In sum, despite various construct operationalization and different pathways among the constructs, a great deal of commonality exists among the different psychosocial theories (Table 3).

Applying the theory of triadic influence's (Flay, Snyder, & Petraitis, 2009) typology, health behavior can be most proximally predicted by behavioral intention (or goal or motivation), which is affected by an intrapersonal stream (converging on self-efficacy or perceived behavioral control), an interpersonal stream (converging on subjective norm), and a sociocultural stream (converging on attitude, outcome expectation, decisional balance, or perceived threat or benefit).

Mediation Models

Flay et al. (2009) explained that the ultimate and relatively stable causes of health behavior(s) are personal dispositions, social situation, and cultural environment. Through the intrapersonal stream, in turn, personal dispositions determine the level of perceived behavioral control mediated by self-perception and social competence. Second, through the interpersonal stream, social situation affects subjective norm mediated by interpersonal bonding and observation and perception about others' behaviors and beliefs. Third, through the sociocultural stream, cultural environment shapes one's attitude toward the behavior mediated by one's interactions with social institutions and exposure to pertinent information.

Recalling that acculturation accompanies value, norm, and behavioral changes, as well as changes in language preference and interpersonal relationships, research should test the effects of acculturation on health behaviors mediated through the intrapersonal, interpersonal, and sociocultural streams of influences. That is, acculturation may not only imply a shift in cultural exposure, but also changes in quality of self-perception, social competence, interpersonal relationships and influences. Researchers may thus hypothesize that acculturation affects perceptions about regular leisure-time physical activity participation through: 1) ability and control (i.e., acculturation → self-efficacy or perceived behavioral control; intrapersonal stream), 2) observation of or pressure from significant others regarding doing leisure-time physical activity on a regular basis (i.e., acculturation → subjective norm; interpersonal stream), and 3) cognitive and affective appraisal about pros and cons (i.e., acculturation → attitude, outcome expectation, decisional balance, or perceived threat or benefit sociocultural stream).

While not comprehensive in scope, several health behavior studies have investigated the role of acculturation on the relationships between the mediators that have been proposed. For example, Helweg-Larsen and

Stancioff (2008) found that acculturation was positively related to perception of smokers' health risk within a Bosnian refugee sample. Unger et al. (2000) found that attitude, perceived norms, and perceived control regarding experimental smoking behaviors are correlated with acculturation among Hispanic and Asian American adolescents. Using regression analysis, Diaz, Marshak, Montgomery, Rea, and Backman (2009) reported acculturation to be a negative predictor of intention for healthy diet, but not attitude, subjective norm, or perceived behavioral control within a sample of Latino adolescents in California. Meanwhile, Liou and Contento (2001) found that acculturation was inversely related to subjective norm regarding low-fat diet in a convenience sample of Chinese Americans. In an illicit drug use study, Carvajal, Photiades, Evans, and Nash (1997) reported that acculturation moderates the relationships between adolescents' intention and attitude, norm, and perceived behavioral control. Finally, Hosper, Nierkens, van Valkengoed, and Stronks (2008) found that acculturation was positively associated with Turkish women's exercise participation, and culturally negative beliefs about exercise decreased as they became more acculturated to the Netherlands' culture.

Moderation Models

According to Schwartz and Bilsky (1987), values serve as guiding standards for choosing and evaluating behaviors, and the relative priorities of values characterize cultures. According to Hofstede (1980), power distance (i.e., acceptance of social inequity), individualism/collectivism, masculinity/femininity, and uncertainty avoidance (i.e., feeling comfortable with uncertainty and ambiguity) are four important dimensions of the individual-level cultural value system.

According to Marín and Gamba (2003), acculturative changes accompany shifts in cultural values. This value acculturation has been reported to be manifested as changes in familiarity (strong identification

and attachment with extended families), gender roles, need for achievement, and individualism/collectivism (Marín & Gamba, 2003). Among these, individualism/collectivism has received the most attention from researchers as a potential explanation for cross-cultural differences regarding the relative influences of intrapersonal, interpersonal, and sociocultural variables on leisure-time physical activity. For example, Nigg, Lippke, and Maddock (2009) found that the subjective norm-intention relationship was stronger in Japanese Hawaiians (i.e., thought to be a collectivistic group) compared to Anglo Hawaiians (i.e., thought to be an individualistic group). Also, Hagger and colleagues' (2007) found that perceived behavioral control was not significant, but subjective norm was, in predicting intention only among Hungarian college students, a group thought to be more collectivistic in nature compared to Western Europeans.

These studies imply that acculturation at an individual-level may also moderate the influences of intrapersonal, interpersonal, and sociocultural variables on leisure-time physical activity. For example, individualism/collectivism may moderate the relative importance of the three streams of influences in the theory of triadic influence. Individualism is characterized by independent self, personal goals, each individual's uniqueness, rationality, attitudes, and personal control, whereas collectivism emphasizes interdependent self with group, group goal, relatedness, social norms, and cooperation within the group (Hofstede, 1980; Triandis, 1995). Deriving from this line of thought, it can be hypothesized that individualism may attenuate the effect of perceived social pressure to participate in leisure-time physical activity, and magnify the effects of attitude and perceived ability and control on leisure-time physical activity intention, respectively. On the contrary, collectivism may be a factor that magnifies the effect of subjective norm, and diminishes the influences of attitude and perceived ability and control. In the physical activity domain, Terry and Hogg (1996) empirically demonstrated that perceived norm was more salient for

persons who strongly identified themselves with the group (i.e., collectivists), and perceived self-control was more important for those who had a lower sense of group affiliation (i.e., individualists).

Conclusion

Culture has been identified as a factor contributing to physical activity disparities across ethnic groups. In addition, empirical findings suggest that acculturation can play an important role as a determinant of ethnic minorities' leisure-time physical activity participation. Psychological acculturation implies behavioral and value change of an individual. Studies have found that acculturation as a whole is positively associated with leisure-time physical activity, even though variations by age, gender, and ethnicity can exist.

Comprehensive theories are crucial for understanding the mechanisms through which acculturation influences leisure-time physical activity participation, and planning and evaluating intervention programs to promote the leisure-time physical activity of ethnic minorities. Extracting commonalities from the health belief model, social cognitive theory, the theory of planned behavior, and the transtheoretical model, the effects of acculturation on leisure-time physical activity can be summarized into intrapersonal, interpersonal, and sociocultural streams, by adopting the typology of Flay and colleagues' (2009) theory of triadic influence. Mediation and moderation models were suggested as psychological mechanisms by which acculturation affects leisure-time physical activity. In the mediation model, acculturation was hypothesized to affect an individual's intention to partake in leisure-time physical activity through intrapersonal, interpersonal, and sociocultural streams. Meanwhile, the moderation model suggests that changes in cultural value orientation such as individualism/collectivism that accompany behavioral acculturation may differentiate the relative importance of the three streams of influence.

We suggest that intervention programs designed to promote ethnic minorities' leisure-time physical activity behavior should be based on empirical evidence and organized by comprehensive theoretical frameworks that put key pieces of information together. From that standpoint, the suggested mediation and moderation models can play a role in guiding empirical research, as well as intervention design and evaluation.

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