



HHS Public Access

Author manuscript

J Couns Psychol. Author manuscript; available in PMC 2021 February 20.

Published in final edited form as:

J Couns Psychol. 2011 January ; 58(1): 27–41. doi:10.1037/a0021356.

Dimensions of Acculturation: Associations With Health Risk Behaviors Among College Students From Immigrant Families

Seth J. Schwartz,

University of Miami

Robert S. Weisskirch,

California State University–Monterey Bay

Byron L. Zamboanga,

Smith College

Linda G. Castillo,

Texas A&M University

Lindsay S. Ham,

University of Arkansas

Que-Lam Huynh,

San Diego State University

Irene J. K. Park,

University of Notre Dame

Roxanne Donovan,

Kennesaw State University

Su Yeong Kim,

University of Texas at Austin

Michael Vernon

University of Massachusetts–Amherst

Matthew J. Davis, Miguel A. Cano

Texas A&M University

Abstract

In the present study, we examined a bidimensional model of acculturation (which includes both heritage and U.S. practices, values, and identifications) in relation to hazardous alcohol use, illicit

Correspondence concerning this article should be addressed to Seth J. Schwartz, Department of Epidemiology and Public Health, Leonard M. Miller School of Medicine, University of Miami, 1425 N.W. 10th Avenue, Suite 321, Miami, FL 33136. SSchwartz@med.miami.edu.

Seth J. Schwartz, Department of Epidemiology and Public Health, Leonard M. Miller School of Medicine, University of Miami; Robert S. Weisskirch, Department of Human Development, California State University–Monterey Bay; Byron L. Zamboanga, Department of Psychology, Smith College; Linda G. Castillo, Matthew J. Davis, and Miguel A. Cano, Department of Counseling Psychology, Texas A&M University; Lindsay S. Ham, Department of Psychology, University of Arkansas; Que-Lam Huynh, Department of Psychology, San Diego State University; Irene J. K. Park, Department of Psychology, University of Notre Dame; Roxanne Donovan, Department of Psychology, Kennesaw State University; Su Yeong Kim, Department of Human Development and Family Sciences, University of Texas at Austin; Michael Vernon, Department of Psychology, University of Massachusetts–Amherst.

drug use, unsafe sexual behavior, and impaired driving. A sample of 3,251 first- and second-generation immigrant students from 30 U.S. colleges and universities completed measures of behavioral acculturation; cultural values (individualism, collectivism, and self-construal); ethnic and U.S. identity; and patterns of alcohol and drug use, engagement in potentially unsafe sexual activities, and driving while (or riding with a driver who was) intoxicated. Results indicate that heritage practices and collectivist values were generally protective against health risk behaviors, with collectivist values most strongly and consistently protective. Nonetheless, heritage identifications were positively associated with sexual risk taking for Hispanics. U.S. practices, values, and identifications were not consistently related to risk behavior participation. Results are discussed in terms of bidimensional approaches to acculturation, the immigrant paradox, and implications for counseling practice.

Keywords

acculturation; immigrants; ethnic identity; drug use; sexual risk taking

College students are among the highest risk subgroups of emerging adults in terms of health risk behaviors such as prescription drug misuse (Whitten, 2008), hazardous alcohol use (Dawson, Grant, Stinson, & Chou, 2005), driving while intoxicated (Chou et al., 2005), and casual sex (Grello, Welsh, & Harper, 2006). These health risk behaviors have become increasingly prevalent over the past decade, posing a significant public health problem among college students (Martens, Pedersen, LaBrie, Ferrier, & Cimini, 2007). Although past research has examined factors associated with health risk behaviors, as well as ways to prevent and manage these behaviors, most studies have focused on U.S.-born, primarily White students. However, the demographics of the United States are rapidly changing. Individuals from immigrant families comprise a growing proportion of the U.S. population (Portes & Rumbaut, 2001, 2006) as well as of the nation's college and university campuses. In addition to the high-risk behaviors typical of college students, the unique cultural needs of young people from immigrant families, coupled with the high risk taking rates among immigrants and their immediate descendants (Trejos-Castillo & Vazsonyi, 2009; Warner, Fishbein, & Krebs, 2010), underscore the research, counseling, and public health importance of identifying mechanisms that can protect these students from engaging in risky behaviors.

For many college students from immigrant families, acculturation is a central issue (Wang & Mallinckrodt, 2006). *Acculturation* may be defined as an individual's process of learning about and adopting the receiving society's (e.g., U.S.) cultural norms as well as the degree to which the person maintains his or her heritage culture (Kohatsu, 2005; Phinney, 2003). Acculturation issues are salient not only for individuals born outside the United States (referred to as *first-generation immigrants*) but also for U.S. born individuals raised in immigrant households (referred to as *second-generation immigrants*). Indeed, the heritage culture often predominates in the home (and often in the local community) for many individuals from immigrant families. As a result, second-generation immigrants are still likely to be socialized toward the practices, values, and identifications typical of their heritage cultures (Portes & Rumbaut, 2001).

Among first- and second-generation immigrant adolescents and emerging adults in the United States, extant research suggests that some dimensions of acculturation (e.g., language use, ethnic identification) may be linked with many of the health risk behaviors common on college campuses, including drug and alcohol use (Allen et al., 2008; Zamboanga, Raffaelli, & Horton, 2006) and unsafe sexual behavior (sexual activities that place one at risk for unwanted pregnancy or sexually transmitted disease/HIV contraction; Raffaelli, Zamboanga, & Carlo, 2005). Further, some studies indicate that highly acculturated (assimilated to U.S. culture) individuals from immigrant families are more likely to take risks compared with their less acculturated counterparts—and, by extension, that acculturation may be hazardous to one's health (e.g., Allen et al., 2008). This trend, in which greater acculturation is assumed to equal more risk, has been termed the *immigrant paradox* (Alegría et al., 2008, 2007).

However, the accuracy and validity of the immigrant paradox are unclear. The overwhelming majority of studies on health risk behavior have used unidimensional measures or proxies (e.g., nativity, language use, time spent in the United States) for acculturation. Such measurement approaches carry the assumption that as immigrants acquire U.S. cultural practices, they also discard the practices from their cultures of origin (Phinney, 2003). Research in cultural psychology has suggested that this assumption is likely inaccurate (e.g., Ryder, Alden, & Paulhus, 2000). Because unidimensional models of acculturation conflate acquiring U.S. culture with discarding the heritage culture, we do not know whether the deleterious effects of acculturation are due to acquiring U.S. orientations, loss of heritage-culture orientations, or both. Moreover, there is evidence that the association between acculturation and health outcomes may vary across race/ethnicity (Sue & Chu, 2003)—perhaps further undermining the notion of a single, simplistic definition of acculturation.

As a result, acculturation scholars have introduced bidimensional acculturation models in which receiving-culture acquisition and heritage-culture retention are framed and measured as separate and independent dimensions (Berry, 1997; Berry & Kim, 1988). Heritage-cultural orientation may be reflective of an *ingroup* orientation—that is, how oriented one is to “our” practices, values, and identifications—whereas U.S. cultural orientation may be reflective of an *outgroup* orientation—that is, how oriented one is to “their” practices, values, and orientations (cf. Roysircar-Sodowsky & Maestas, 2000). However, few studies have examined bidimensional models of acculturation in relation to health risk behaviors (Schwartz, Unger, Zamboanga, & Szapocznik, 2010). The present study represents an attempt in this direction.

Although cultural variables may be viewed as distal determinants of behavior (Bronfenbrenner, 1979), research has found that acculturation orientations are associated with pro- or anti-risk attitudes and beliefs and with perceived approval or disapproval of risk behaviors from parents and other significant figures (Le, Goebert, & Wallen, 2009; Saint-Jean, 2010; Unger, in press). These variables, in turn, are often directly related to risky behavior (Romano & Netland, 2008). This prior work suggests that adaptation to U.S. cultural practices, values, and identifications may promote less cautious, and more risk-prone, attitudes and beliefs. However, because this previous research has relied primarily on unidimensional models of acculturation, demonstrating a link between bidimensional

models of acculturation and risk behaviors would represent an important advance in the literature, particularly if multiple racial/ethnic groups were included within a single study.

Domains of Acculturation

Recent theorizing suggests that acculturation is multidimensional not only in terms of the independence of heritage and receiving cultural orientations but also in terms of the domains that it encompasses (Chirkov, 2009; Kim & Abreu, 2001; Rudmin, 2009; Schwartz et al., 2010). At a broad level, Kim and Abreu (2001) have contended that acculturation consists of behavioral, cognitive, and affective domains. Chirkov (2009), Rudmin (2009), and Schwartz et al. (2010) have expanded on this framework by suggesting that behavioral acculturation may include cultural *practices* (e.g., language use, media preferences, and food preferences), cognitive acculturation may include cultural *values* (e.g., prioritizing one's own needs vs. the needs of one's family and community), and affective acculturation may include cultural *identifications* (the extent to which one feels a sense of solidarity with, and attachment to, the United States and/or one's country of origin). Although there are likely other domains of acculturation that could be examined (cf. Zane & Mak, 2003), most studies on cultural orientations and adaptation have focused on practices, values, and/or identifications (for reviews, see Phinney & Ong, 2007; Sam, 2006; Triandis, 1995).

A review of research on cognitive acculturation indicates that individualism–collectivism and self-construal have been among the most commonly investigated cultural values—especially across racial/ethnic groups (e.g., Guo, Schwartz, & McCabe, 2008; Oyserman, Coon, & Kimmelmeier, 2002). *Individualism* refers to prioritizing one's needs and desires over those of the groups to which one belongs (e.g., family, religion, nation), and *collectivism* refers to prioritizing the needs of others, such as one's family, over one's own needs (Triandis, 1972). Self-construal encompasses constructs similar to individualism–collectivism (Singelis, 1994), namely an individual's self-perception of independence (i.e., considering oneself to be separate from others) and interdependence (i.e., considering oneself to be connected to others). Together, these variables may serve as indicators of cognitive acculturation.

Because the United States has been repeatedly rated as one of the most individualistic (and least collectivistic) countries in the world (Hofstede, 2001), other countries (even other Western countries) are likely to be more collectivist in comparison. Not surprisingly, Schwartz, Zamboanga, Rodriguez, and Wang (2007) found that, across racial/ethnic groups and across many countries of familial origin, individualism clustered with U.S. cultural practices, and that collectivism clustered with heritage-cultural practices and with ethnic identity. Individualism and independence might therefore be considered as dimensions of U.S. cultural values, whereas collectivism and interdependence might be considered as dimensions of heritage-cultural values.

A separate literature has developed on ethnic identity, which serves as an index of heritage-culture identifications. *Ethnic identity* has been conceptualized as a subjective domain of acculturation, and it refers to the extent to which one is attached to one's racial/ethnic group and views that group positively (Phinney & Ong, 2007). Much less work, however, has

examined receiving-culture (e.g., U.S.) identifications (see Kiang, Yip, & Fuligni, 2008; Phinney, Cantu, & Kurtz, 1997). The casting of ethnic and U.S. identity as separate indicators of cultural identifications parallels the bidimensional model of acculturation, in which heritage-culture retention and U.S. culture retention are considered separately.

Acculturation and Health Risk Behavior

Although much of the work on acculturation and health risk behaviors has relied on indices of cultural practices, cultural values and identifications have received some attention as well. For example, Le and Kato (2006) found that individualism was associated with higher likelihood of sexual risk taking, whereas the reverse was true of collectivism, in Asian immigrant adolescents. Nasim, Corona, Belgrave, Utsey, and Fallah (2007) found that, among African Americans, collectivist attitudes protected against marijuana use. Johnson (2007) found that, across 64 countries on six continents, national-level individualism ratings (provided by Hofstede, 2001) were significantly associated with per capita alcohol, marijuana, and ecstasy use.

With regard to ethnic identity, the evidence is somewhat more mixed. Some research has found ethnic identity to be protective against drug and alcohol use (e.g., Marsiglia, Kulis, Hecht, & Sills, 2004) and unsafe sexual behavior (e.g., Espinosa-Hernández & Lefkowitz, 2009); other studies (e.g., Raffaelli et al., 2005; Zamboanga et al., 2006; Zamboanga, Schwartz, Jarvis, & Van Tyne, 2009) have identified ethnic identity as a risk; and others have found no relationship (Schwartz, Mason, et al., 2009). No literature could be located in which U.S. identification was investigated as a predictor of health risk behavior.

Given the somewhat disparate results regarding the associations of cultural practices, values, and identifications with health risk behaviors, all three of these domains merit inclusion in acculturation research—with each level operationalized according to a bidimensional model (i.e., separate scales for heritage and U.S. orientations; Castillo & Caver, 2009). As such, it is possible for both heritage and U.S. orientations to predict engagement in a given health risk behavior variable. Furthermore, it is essential to obtain clear results as to which acculturation dimension(s)—heritage-culture retention, U.S. culture acquisition, or both—are responsible for the increase in likelihood of risk taking. For example, should first- and second-generation immigrants be discouraged from adopting U.S. cultural practices, individualistic values, and a U.S.-based sense of identity? Should immigrants and their immediate descendants be encouraged to preserve their heritage cultural practices, values, and identifications? Answering these questions is critical in ascertaining which aspects of acculturation serve as risk factors and which aspects are protective—and by extension, whether acculturation is potentially hazardous to one's health. For counselors and other practitioners working with immigrant college students, such knowledge could help to guide culturally informed prevention strategies, program development, and interventions.

It is also essential to examine the associations of acculturation with health outcomes separately by racial/ethnic group. For example, Sue and Chu (2003) found that behavioral acculturation was negatively associated with adjustment problems for Asian immigrants but was positively associated with adjustment problems for Hispanic immigrants. Effects of

acculturation on health outcomes for White and Black immigrants have been less well studied—but examining effects of acculturation on health outcomes across race/ethnicity might mask contrasting patterns that emerge in specific racial/ethnic groups. As a result, in the present study, we examine effects of acculturative processes both across and within racial/ethnic groups.

The Present Study

Our purpose in the present study was to examine associations of an expanded model of acculturation in relation to a diverse array of health risk behaviors. Specifically, we examined the associations of heritage and U.S. cultural practices, values, and identifications with health risk behaviors among a large sample of first- and second-generation immigrant college students from various racial/ethnic backgrounds and regions of the country. We focused on four types of health risk behaviors—hazardous alcohol use, illicit drug use, unsafe sexual behavior, and impaired driving—that are well-known to be associated with the leading behaviorally based causes of illness, unintentional injury, and death in the United States (Mokdad, Marks, Stroup, & Gerberding, 2004). These findings would be helpful to counselors in identifying students who may be at risk for engaging in health-compromising behaviors so that such behaviors can be prevented.

On the basis of a bidimensional approach to acculturation (Phinney, 2003; Ryder et al., 2000), we hypothesized that both heritage and U.S. orientations would be protective against health risk behaviors. It is also important to identify the extent to which similar versus different patterns of results emerge across practices, values, and identifications (cf. Alegría et al., 2008). For example, are heritage-cultural practices, values, and identifications all protective against health risk behaviors? Given the lack of prior integrative work across these three domains, we did not advance a priori hypotheses for this objective.

Method

Sample

The present sample consisted of 3,251 undergraduate students (72% women; mean age = 20.22 years, $SD = 3.31$; 97% between 18 and 29 years of age) from 30 colleges and universities around the United States. These data were collected online between September 2007 and October 2009 as part of a national collaborative: the Multi-Site University Study of Identity and Culture (MUSIC). Given our focus on acculturation, the data analytic sample was restricted to participants who reported that both of their parents were born outside the United States. The present sample represents a combination of three different data collections: Fall 2007 ($n = 600$), Fall 2008 ($n = 1,366$), and Spring–Fall 2009 ($n = 1,285$). Of the participants, 41% were first-generation immigrants, and 59% were second-generation immigrants. Individuals who indicated that they were in the United States only for educational purposes (i.e., international students) were not included in the present sample. In terms of race/ethnicity, 9% of participants were non-Hispanic White, 12% were non-Hispanic Black, 37% were Hispanic, 39% were Asian, and 3% were Middle Eastern. Forty-three participants did not provide data on their race/ethnicity.

Although all participants had two foreign-born parents, respondents from each racial/ethnic group, except White participants, were primarily U.S. born. Of the White participants from immigrant families, 65% were born outside the United States, compared with 38% of Black, 38% of Hispanic, 39% of Asian, and 33% of Middle Eastern participants from immigrant families. White participants and parents were primarily from the United Kingdom, Poland, the former Soviet Union, and the former Yugoslav republics; Black participants and parents were primarily from Haiti, Jamaica, and various African countries; Hispanic participants and parents were primarily from Mexico, Cuba, Colombia, and Peru; Asian participants and parents were primarily from China, Taiwan, Korea, India, and Vietnam; and Middle Eastern participants and parents were primarily from Iran, Lebanon, and Saudi Arabia.

Given our focus on sexual risk behaviors as well as other types of risks, we assessed sexual orientation as a covariate. Participants were asked to describe their sexual orientation on a 5-point scale ranging from 1 (*completely heterosexual*) to 5 (*completely homosexual*). This item was included in the 2008 and 2009 data collections but not in the 2007 data collection. Using this scale, 89.3% of participants from the 2008 and 2009 data collections characterized themselves as completely heterosexual, 6.5% as mostly heterosexual, 1.5% as bisexual, 0.5% as mostly homosexual, and 1.3% as completely homosexual.

Sites were selected so as to provide diversity in terms of geographic location, setting (urban, suburban, or college town), and type of institution. Six sites were located in the Northeast, seven in the Southeast, six in the Midwest, three in the Southwest, and eight in the West. Fifteen of the sites were major public universities, eight were smaller/commuter state universities, four were major private universities, and three were private colleges. The study was approved by the Institutional Review Boards at each participating institution.

Procedures

At each site, participants were directed to the study website using printed or e-mailed announcements. Respondents received credit toward their course grades in exchange for their participation. Completion time for the entire survey ranged from 1 to 2 hr.

Participants completed the assessment battery as a confidential online survey. Students were asked to provide their e-mail addresses and student numbers for crediting purposes, but this information was not linked with participants' responses. Students also provided the name of the college or university they attended. This information was used only to control for multilevel nesting and was not used to identify specific participants or schools.

Measures

Cultural practices.—Stephenson's (2000) Multigroup Acculturation Scale was used to assess heritage and U.S. cultural practices. This measure consists of two subscales: Heritage-Culture Practices (17 items; $\alpha = .89$),¹ which includes use of one's heritage language and association with heritage-culture friends and romantic partners, and U.S. Culture Practices (15 items; $\alpha = .83$), which includes use of English and association with U.S. friends and

¹All alpha coefficients are from the current sample.

romantic partners. Sample items include “I listen to music of my ethnic group (Heritage-Culture Practices) and “I speak English at home” (U.S. Culture Practices). Stephenson found that the factor structure of scores generated by the instrument supported the separation of heritage and U.S. cultural subscales.

Cultural values.—In the present study, we used measures of individualism–collectivism and self-construal to index cultural values. Individualism and collectivism are both subdivided into horizontal and vertical variants, such that three sets of cultural values were used in the present analyses: horizontal individualism–collectivism, vertical individualism–collectivism, and self-construal. *Horizontal individualism* refers to competing against (or otherwise feeling separate from) friends and coworkers. *Vertical individualism* refers to feeling separate from, and not required to defer to, parents or authority figures. *Horizontal collectivism* refers to feeling connected to, and responsible for the welfare of, one’s friends and coworkers. *Vertical collectivism* refers to having respect for hierarchical relationships, such as parent–child, teacher–student, or boss–employee.

Horizontal and vertical individualism and collectivism were assessed using corresponding four-item scales developed by Triandis and Gelfand (1998). Internal consistency coefficients for the present sample were as follows: horizontal individualism, $\alpha = .78$; vertical individualism, $\alpha = .77$; horizontal collectivism, $\alpha = .74$; and vertical collectivism, $\alpha = .74$. Sample items include “I’d rather depend on myself than on others” (horizontal individualism); “Winning is everything” (vertical individualism); “I feel good when I collaborate with others” (horizontal collectivism); and “It is my duty to take care of my family, even when I have to sacrifice what I want” (vertical collectivism). Triandis and Gelfand have reported results of analyses demonstrating the factorial and construct validity of these subscales.

Self-construal was measured using the 24-item Self-Construal Scale (Singelis, 1994). Twelve items measure independence ($\alpha = .74$), and 12 items measure interdependence ($\alpha = .77$). Sample items include “I prefer to be direct and forthright in dealing with people I have just met” (independence) and “My happiness depends on the happiness of those around me” (interdependence). An in-depth psychometric analysis of the Self-Construal Scale (see Guo et al., 2008) supported the factor structure proposed by Singelis (1994).

Cultural identifications.—Versions of the Multi-Group Ethnic Identity Measure (MEIM; Phinney, 1992) were used to assess both heritage and U.S. cultural identifications. To assess heritage-culture identifications, we used the original version of the MEIM, which consists of 12 items ($\alpha = .90$) that assess the extent to which one (a) has considered the subjective meaning of one’s race/ethnicity and (b) feels positively about one’s racial/ethnic group. Sample items include “I think a lot about how my life will be affected by my ethnic group membership” and “I am happy that I am a member of the ethnic group I belong to.” Although the MEIM was originally designed to yield separate subscales for ethnic identity exploration and affirmation, Phinney and Ong (2007) have reviewed studies supporting the single-factor structure of scores generated by this instrument.

Because few validated measures of U.S. identity exist in the literature, we adapted the MEIM so that “the U.S.” was inserted into each item in place of “my ethnic group.” Participants were therefore asked to respond to the same MEIM items, this time referring to the United States. The scores on this measure were highly internally consistent ($\alpha = .90$). As an index of construct validity, U.S. identity scores were moderately and significantly correlated ($r = .56, p < .001$) with scores on U.S. cultural practices.

Health risk behaviors.—We asked participants about hazardous alcohol use during the past year as well as about engagement in a number of health-compromising behaviors during the 30 days prior to assessment. To assess hazardous alcohol use, we utilized the Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, De La Puente, & Grant, 1993). This measure assesses respondents’ level of hazardous alcohol use and negative consequences during the year prior to assessment. Sample items include “How many drinks containing alcohol do you have on a typical day when you are drinking?” and “Have you or someone else been injured as a result of your drinking?” AUDIT scores were derived by summing participants’ responses across the 10 AUDIT items. Prior studies have provided some evidence for validity and reliability, as well as utility, of the AUDIT in college student samples (e.g., Kokotailo et al., 2004; Zamboanga et al., 2007). In the present sample, the Cronbach’s alpha coefficient for scores on the AUDIT was .79.

In terms of other health risk behaviors, we adapted items from the Youth Risk Behavior Surveillance Survey (Centers for Disease Control and Prevention, 2008) and added new items to refer to additional behaviors not covered in that survey. We asked about use of illicit drugs, including marijuana, hard drugs (e.g., cocaine, ecstasy, methamphetamines), inhalants, injecting drugs, and misuse of prescription drugs (any use not specifically prescribed by a doctor). We also asked about unsafe sexual behaviors that would place one at risk for unwanted pregnancy or sexually transmitted disease/HIV contraction, including oral sex, anal sex, casual sex (i.e., sexual relations with someone whom the participant knew for less than a week), unprotected sex, and sex while drunk or high. Additionally, we asked about driving while drunk or high, and about riding with a driver who was drunk or high. For each of these behaviors, we asked participants how many times they had engaged in the behavior during the 30 days prior to assessment. The response scale consisted of five choices: 0 (*never*), 1 (*once/twice*), 2 (*3–5 times*), 3 (*6–10 times*), and 4 (*more than 10 times*). We have used this measure successfully with college students in prior research (e.g., Ravert et al., 2009; Schwartz, Zamboanga, et al., 2009).

To create subscales for the health risk behaviors, we examined the interrelationships among the health risk behaviors using Spearman rank-order correlations (see Table 1), and we constructed subscales based on these correlations. All of the drug use behaviors were intercorrelated at .30 or higher, and as a result, we summed the responses to these items to create an Illicit Drug Use subscale. Rank-order correlations among the sexual behavior items ranged from .23 to .62 ($M = .35$), and these items were summed to create a Sexual Risk Behavior subscale. Driving while drunk or high and riding with a drunk driver were correlated at $\rho = .50$ and were summed to create an Impaired Driving subscale. We used the rank-order correlations in Table 1 to compute Spearman–Brown reliability coefficients for

these subscales. These coefficients were .84 for Illicit Drug Use, .73 for Sexual Risk Behavior, and .67 for Impaired Driving.

Results

Results are presented in four steps. First, we describe the sample in terms of rates of health risk behavior engagement. Second, we computed a correlation matrix among the acculturation-related variables to examine the proposition that heritage-culture practices, values, and identifications would be significantly interrelated (and likewise for U.S. culture practices, values, and identifications). Third, we created composite omnibus variables for heritage and U.S. orientations using exploratory factor analysis. Finally, to test our primary study hypothesis, and to explore the specific dimensions and domains of acculturation that might be responsible for the immigrant paradox, we regressed the health risk behavior subscales on the omnibus heritage and U.S. orientations variables—and we conducted follow-up analyses to explore the specific domain(s) of acculturation that were responsible for the omnibus effects. In these regression analyses, separate variables were used for heritage and U.S. cultural orientations—rather than pitting heritage and U.S. orientations against one another as end-points of a single variable—to ensure that we were utilizing a bidimensional (and not unidimensional) model of acculturation.

Rates of Health Risk Behavior Engagement

To examine rates of engagement in health risk behaviors by gender, race/ethnicity, and immigrant generation, we dichotomized each health risk behavior variable to indicate whether each participant had or had not engaged in each behavior during the 30 days prior to assessment. For each behavior, a response of 0 was recoded as “No,” and responses between 1 and 4 were coded as “Yes.” This dichotomization was conducted for descriptive purposes only and not to test any of the study hypotheses. We dichotomized hazardous alcohol use using a cutoff of 6 on a scale of 0–40, as recommended by Kokotailo et al. (2004) for use with college student samples. The cutoff of 8 used for general-population samples has been found to provide inadequate specificity for college students. Within our sample of individuals from immigrant families, we cross-tabulated these rates against gender, race/ethnicity, and immigrant generation (see Table 2). For race/ethnicity, we used the five largest racial/ethnic groups in the sample (White, Black, Hispanic, Asian, and Middle Eastern). Significant differences in health risk behavior participation emerged across gender and race/ethnicity (see Table 1). Gender differences emerged for all of the behaviors except oral and casual sex. Men reported higher rates of all behaviors for which significant gender differences emerged. Racial/ethnic differences, with White participants scoring highest, emerged for hazardous alcohol use and for all of the sexual risk behaviors except casual sex but not for any of the illicit drug use or impaired driving behaviors. No significant differences emerged across immigrant generation.

Correlations Among Cultural Variables

Next, we computed correlations among the cultural variables (see Table 3). We used the sandwich estimator (Kauermann & Carroll, 2001) to adjust the standard errors for the nesting of participants within data collection sites. This adjustment was done using the

TYPE = COMPLEX command in Mplus (Muthén & Muthén, 2007). The sandwich estimator is appropriate when the goal is to account for nesting but not to predict any of the Level 2 (between-site) variability. For both U.S. and heritage cultural variables, practices and identifications were closely related (U.S., $r = .56, p < .001$; heritage, $r = .47, p < .001$). Relationships between cultural values and other dimensions of cultural orientation were somewhat weaker.

Health Risk Behaviors by Heritage and U.S. Cultural Orientations

We then regressed the health risk behavior subscales on heritage and U.S. cultural practices, values, and identifications. This involved three steps: creating factor scores, conducting omnibus hypothesis tests, and conducting follow-up analyses to explore the omnibus effects.

Creating factor scores.—First, because we had multiple indicators for collectivist cultural values and for individualist cultural values, we created factor scores so that a single variable would be used for collectivist cultural values (and likewise for individualist cultural values). For each set of cultural values indicators, we conducted an exploratory factor analysis. Kaiser–Mayer–Olkin (K-M-O) measures of factorability indicated that both the individualist values indicators ($K-M-O = .57, p < .001$) and the collectivist values indicators ($K-M-O = .67, p < .001$) were appropriate to enter into a factor analysis. Each set of cultural values indicators produced a single factor (individualist values: eigenvalue = 1.67, 55.62% of variability explained, factor loadings ranged from .57 to .82; collectivist values: eigenvalue = 1.93, 64.48% of variability explained, factor loadings ranged from .78 to .82), and these factors were then saved to the data set and used in subsequent analyses.

As noted in the introduction, a secondary objective of the present study was to ascertain whether collectivism takes similar forms, and functions similarly, across racial/ethnic groups. As part of this objective, we conducted multigroup invariance tests, using confirmatory factor analysis models to ascertain whether the internal structure of collectivist values was similar across race/ethnicity. In these invariance tests, we compared (a) a model in which factor loadings were free to vary across race/ethnicity against (b) a model in which factor models were constrained equal across race/ethnicity. As suggested by Vandenberg and Lance (2000), model comparisons were conducted using the chi-square goodness of fit test, the comparative fit index (CFI), and the nonnormed fit index (NNFI). The null hypothesis of invariance would be rejected provided that at least two of the following criteria were met:

χ^2 significant at $p < .05$, $CFI < .99$, and $NNFI < .98$ (Cheung & Rensvold, 2002; Vandenberg & Lance, 2000). Invariance tests indicated that both the individualist values factor, $\chi^2(12) = 21.34, p < .05, CFI = .998, NNFI = .999$, and the collectivist values factor, $\chi^2(12) = 60.50, p < .001, CFI = .995, NNFI = .999$, were structurally consistent across race/ethnicity.

Next, to create omnibus variables for heritage and U.S. cultural orientations, we conducted two additional exploratory factor analyses. The first analysis included U.S. cultural practices, the individualist values composite, and U.S. identity. The second analysis included heritage cultural practices, the collectivist values composite, and ethnic identity. K-M-O measures of factorability suggested that indicators of both U.S. ($K-M-O = .63, p < .001$) and

heritage ($K-M-O = .59, p < .001$) cultural variables were sufficiently intercorrelated to be entered into a factor analysis. Both factor analyses yielded a single factor (U.S. orientation: eigenvalue = 1.87, 62.36% of variability explained, loadings between .70 and .84; heritage orientation: eigenvalue = 1.78, 59.21% of variability explained, loadings between .72 and .86). These factors were again saved to the data set.

Omnibus hypothesis tests.—We then used path analysis to regress the risk behavior subscales on heritage and U.S. orientations. Figure 1 displays the analytic model that we used. Sexual orientation was used as a covariate, given prior research indicating differences between heterosexual and nonheterosexual individuals in the prevalence of some of the sexual behaviors (e.g., anal and casual sex; Savin-Williams, in press). Because sexual orientation was not measured in the 2007 data collection, and because approximately 19% of participants were missing data on the health risk behaviors, we used multiple imputation (Schlomer, Bauman, & Card, 2010) so that all cases could be used in analysis. We created five imputed data sets and used Mplus Release 5.1 (Muthén & Muthén, 2007) to combine the results across the five imputed data sets (cf. Schafer & Graham, 2002). Less than 5% of data were missing on the cultural variables, but these data were also estimated using multiple imputation.

Hazardous alcohol use was parameterized as a continuous variable. For all of the other health risk behaviors, we used Poisson regression because responses to these items were heavily and positively skewed, with zero being the most common response. The sandwich estimator was used to control for nesting of participants within sites. In Poisson regression, the exponential (inverse natural logarithm) of the regression coefficient can be interpreted as an incidence rate ratio (IRR). The IRR is an index of effect size for Poisson regression and represents the multiplicative increase in the expected count associated with a 1 *SD* increase in the predictor variable. The null hypothesis is that the $IRR = 1$. Values less than 1 indicate a negative relationship between the predictor and the extent of engagement in the behavior, and values greater than 1 indicate a positive relationship.

We first estimated the omnibus model (see Figure 1) on the sample as a whole, collapsing across race/ethnicity. This analysis did not produce any significant associations between acculturation dimensions and health risk behavior subscales. However, as noted above, there is evidence that acculturation is associated with health outcomes in different ways for different racial/ethnic groups (Sue & Chu, 2003). As a result, we split the sample by race/ethnicity and reconducted the omnibus analysis separately within each racial/ethnic group. Because East Asians ($n = 950$) and South Asians ($n = 295$) represent very different cultural groups, we analyzed these groups separately. The Middle Eastern group ($n = 96$) was too small to include in these analyses.

A number of significant effects emerged within our sample of first- and second-immigrant generation individuals, and these were different for each racial/ethnic group. Results for hazardous alcohol use are described here in the text, and results for the other risk behaviors are shown in Table 4. Hazardous alcohol use was negatively related to heritage-cultural orientation for Black ($\beta = -.15, p < .05$), East Asian ($\beta = -.11, p < .005$), and South Asian ($\beta = -.25, p < .001$) participants; furthermore, it was positively related to U.S. cultural

orientation for East Asian ($\beta = .09, p < .005$) and South Asian ($\beta = .25, p < .001$) participants.

Of the 12 significant effects that emerged across racial/ethnic groups, eight were protective effects of heritage-cultural orientations, and another was a protective effect of U.S. cultural orientation (against illicit drug use for Black participants). Only three positive associations of U.S. cultural orientation with risk behavior emerged—a positive association with unsafe sexual behavior for East Asian participants, and positive associations with hazardous alcohol use for East and South Asian participants. Heritage-cultural orientation was protective against illicit drug use for Hispanic and East Asian participants, against sexual risk taking for Hispanic participants, and against impaired driving for White and Black participants.

Follow-up analyses examining specific domains of acculturation.—For omnibus effects that emerged as significant, we conducted follow-up analyses by deconstructing the omnibus variable into its component parts (practices, values, and identifications) and regressing the health risk behavior in question on the three domains of heritage or U.S. cultural orientation (whichever was the significant predictor at the omnibus level). The cultural practices and identifications variables were standardized prior to analysis so that the IRR for each predictor would represent the multiplicative increase in the expected count for each 1 *SD* increase in that predictor. Because the cultural values variables were factor scores, they were already standardized. Sexual orientation was retained as a control variable in these follow-up models.

For White participants from immigrant families, exploring the effects of heritage-cultural orientation on impaired driving indicated that both heritage-cultural practices ($IRR = 0.48, 95\% \text{ CI } [0.35, 0.65], p < .001$) and collectivist values ($IRR = 0.56, 95\% \text{ CI } [0.37, 0.85], p < .005$) were negatively associated with impaired driving. For immigrant-descent Black participants, U.S. identity was negatively related to illicit drug use ($IRR = 0.79, 95\% \text{ CI } [0.63, 0.99], p < .04$), heritage practices were negatively related to impaired driving ($IRR = 0.84, 95\% \text{ CI } [0.72, 0.98], p < .03$), and ethnic identity was negatively related to hazardous alcohol use ($\beta = -.11, p < .04$). For Hispanic participants from immigrant families, both heritage-culture practices ($IRR = 0.87, 95\% \text{ CI } [0.82, 0.93], p < .001$) and collectivist values ($IRR = 0.88, 95\% \text{ CI } [0.82, 0.94], p < .001$) were inversely related to illicit drug use, whereas ethnic identity ($IRR = 1.06, 95\% \text{ CI } [1.01, 1.18], p < .02$) was positively related to illicit drug use. Also for Hispanic participants, collectivist values were negatively associated with sexual risk taking ($IRR = 0.91, 95\% \text{ CI } [0.87, 0.96], p < .001$), whereas ethnic identity was positively associated with sexual risk taking ($IRR = 1.06, 95\% \text{ CI } [1.01, 1.12], p < .02$). For immigrant-descent East Asian participants, collectivist values were protective against illicit drug use ($IRR = 0.85, 95\% \text{ CI } [0.73, 0.99], p < .04$), U.S. cultural practices were positively related to sexual risk taking ($IRR = 1.19, 95\% \text{ CI } [1.05, 1.34], p < .01$), and U.S. identity was positively related to hazardous alcohol use ($\beta = .09, p < .05$). For immigrant-descent South Asian participants, individualist values were positively related to hazardous alcohol use ($\beta = .16, p < .001$), and heritage-cultural identifications were negatively related to hazardous alcohol use ($\beta = -.27, p < .001$).

Discussion

We conducted the present study to ascertain the extent to which an expanded model of acculturation—defined as heritage and U.S. cultural practices, values, and identifications—would be associated with hazardous alcohol use, illicit drug use, unsafe sexual behavior, and impaired driving among a large and ethnically diverse sample of first- and second-generation immigrant college students from around the United States. These health risk behaviors, which are prevalent on college campuses, are linked with some of the leading behaviorally based causes of serious illness, injury, and death in the United States (cf. Mokdad et al., 2004).

It is important to note that both first- and second-generation immigrant students engaged in health risk behaviors at similar rates. This is consistent with some prior studies (e.g., Warner et al., 2010) but is inconsistent with others (e.g., Hussey et al., 2007). Indeed, one of the premises of the immigrant paradox is that second-generation immigrants—who were born in the United States and who are presumably more acculturated—tend to experience worse health outcomes compared with first-generation immigrants. This was not the case in our results, suggesting that the immigrant paradox appears differently (or does not appear at all) in college students—possibly because of their relatively high level of education.

As hypothesized, racial/ethnic differences emerged in the associations between acculturation and health risk behaviors. For all racial/ethnic groups, at least one dimension of heritage-culture retention was significantly and negatively related to at least one type of risk behavior. However, beyond this general similarity, the specific patterns of associations between acculturation and health risks differed across racial/ethnic groups, as suggested by Sue and Chu (2003). These differences generally took three interrelated forms—(a) the extent to which U.S. culture acquisition was significantly related to health risks (as well as the direction of this association), (b) the domain(s) of heritage-culture retention that were significantly related to health risks, and (c) the specific types of health risks that were related to indices of acculturation. Starting with the contributions of U.S. culture acquisition, four effects emerged: a negative association of U.S. identity with impaired driving for Black participants, a positive association of U.S. cultural practices with sexual risk taking for East Asian participants, a positive association of U.S. identity with hazardous alcohol use for East Asian participants, and a positive association of individualist values with hazardous alcohol use for South Asian participants. The relative paucity of associations found for U.S. culture acquisition, combined with the finding that at least one domain of heritage-culture retention was protective against health risks for all of the racial/ethnic groups included in the present sample, suggest that the immigrant paradox—the apparently positive association of acculturation with health risks—can be largely explained in terms of loss of the heritage culture. As a result, for the most part, adapting to the United States is not unhealthy—rather, discarding one’s heritage culture is what is more likely to be associated with health risk behaviors (cf. Abraído-Lanza, Armbrister, Flórez, & Aguirre, 2006).

U.S. Culture Acquisition and Health Risk Behaviors

Identifying with the United States appeared to be protective against impaired driving for Black participants. In research with Black participants, “acting White” has been associated

with negative psychosocial and behavioral outcomes (Neal-Barnett, Stadulis, Singer, Murray, & Demmings, 2010). However, the Black participants in the present sample were all from immigrant families and may not have faced the same stigma associated with identifying with mainstream U.S. culture. Moreover, given the increasing racial/ethnic diversity in the United States, identifying with the United States may not necessarily imply identifying with the White cultural mainstream (Alba & Nee, 2006). As a result, the concept of U.S. culture may be more difficult to pin down and define than it has been in previous generations. Given the phenomenon of segmented assimilation, in which newcomers and their immediate descendants gravitate toward the U.S. racial/ethnic group to which they are most similar, it is entirely possible that for Black immigrants and children of immigrants, identifying with the United States may imply identifying with African American—rather than White American—culture (Portes & Rumbaut, 2006).

Two of the four positive associations of U.S. cultural orientations with health risk behaviors emerged for East Asian participants. Specifically, U.S. cultural practices were positively associated with sexual risk taking, and U.S. identity was positively associated with hazardous alcohol use. The majority of the East Asian participants in our sample were recruited from universities in Texas, Minnesota, and California with fairly large Asian populations. However, in contrast to Hispanic participants, more than a third of whom resided at home with family members, only 12% of East Asian participants lived in their families' homes. Living on campus or in off-campus houses or apartments may permit more exposure to U.S. university life—and therefore may encourage adoption of U.S. cultural practices and identifications. It is possible that this adoption of U.S. cultural practices and identifications may include being influenced by “Americanized” peers and may create conflict with traditionally oriented parents or value structures. Both peer influences and conflicts with parents may increase the likelihood of illicit drug use for East Asian individuals from immigrant families (Le et al., 2009). The positive association of individualistic values with hazardous alcohol use for South Asian participants is difficult to explain and may warrant further in-depth research.

Domains of Heritage-Culture Retention as Related to Health Risk Behaviors

In terms of the domains of heritage-culture retention that are related to health risk behaviors, collectivist values were most consistently and inversely related to various risk behaviors across racial/ethnic groups. Specifically, within our sample of college students from immigrant families, collectivist values appeared to protect against impaired driving for White and Black participants, against illicit drug use for Hispanic participants, and against sexual risk taking for East Asian participants. Along with the similarity of factor structure for collectivism across racial/ethnic groups, this pattern of findings suggests that collectivism serves similar functions across race/ethnicity—supporting the transcultural conceptualization of collectivism and interdependence (Markus & Kitayama, 1991; Triandis, 1995).

The primacy of collectivist values in protecting against health risks across racial/ethnic groups is consistent with past research on Hispanic (Ramirez et al., 2004) and Asian (Le et al., 2009; Le & Kato, 2006) individuals from immigrant families. The present results suggest

that this pattern of results may generalize to White and Black individuals from immigrant families as well. It may be that for many first- and second-generation immigrants, collectivism and interdependence involve concern for friends and family members who might be embarrassed or distressed over the person's engagement in risky behaviors (cf. Nagayama Hall, Teten, & Sue, 2003). Relinquishing such collectivist values may create tensions within the family and may be associated with more hedonistic, self-focused behaviors that bring immediate pleasure but that may have negative long-term consequences.

Heritage-cultural practices were also somewhat consistently related to health risk behaviors across race/ethnicity. Specifically, heritage-cultural practices appeared to protect against impaired driving for White and Black participants, and against illicit drug use for Hispanic participants. Engaging with the heritage culture in terms of language, media, social relationships, and customs may be important in maintaining ties to one's heritage—which may then be protective against health risk behaviors by preventing or reducing pro-deviant attitudes (Mills & Caetano, 2010; Saint-Jean, 2010). However, no protective effects of heritage-cultural practices were found for East or South Asians. This may be explained by the tendency for Asian immigrants and their children to lose proficiency in (or otherwise stop using) their heritage languages (Portes & Rumbaut, 2001, 2006)—although they often retain the values from their or their families' countries of origin.

Only two associations were found involving heritage-cultural identifications—a positive relationship to sexual risk taking for Hispanics and a negative relationship to hazardous alcohol use for South Asians. The negative association for South Asians is consistent with literature suggesting protective effects of ethnic identity against alcohol problems among Asian Americans (Chae et al., 2008). The positive association for Hispanics is consistent with some prior research with Hispanic samples (e.g., Raffaelli et al., 2005). Because heritage-culture practices and identifications are strongly correlated, and because regression-based approaches estimate the contribution of a given predictor controlling for the other predictors in the model, only the unique variability in heritage identifications was allowed to predict health risk behaviors. It is possible that, for Hispanics, the aspects of Hispanic identifications that are not linked with Hispanic practices can be explained, in part by, a defensive ethnic identification. For example, Rumbaut (2008) has referred to *reactive ethnicity* as a defensive identification with the heritage culture that may accompany or follow discrimination or other forms of perceived rejection of oneself or of one's racial/ethnic group. Immigration-related debates in the United States, which center around Hispanic immigrants, may prompt such a defensive reaction among Hispanic individuals, but less so among other racial/ethnic groups. It should be noted that the majority of the Hispanic participants in the present sample were from California, Arizona, Texas, and Florida—all states in which immigration is a politically and socially divisive issue. Indeed, a national survey conducted in the early 2000s (Cornelius, 2002) indicated that many native-born individuals in the United States regarded Hispanic immigrants as a threat to national unity (see also Barker et al., 2001; Huntington, 2004). Defensiveness in the face of such a negative perception may represent the unique contribution of ethnic identity once heritage practices have been accounted for—and such defensiveness may be associated with a higher risk of unsafe sexual behavior among Hispanic individuals. More research is needed to understand the origins and functions of reactive ethnicity.

Types of Health Risks Associated With Acculturation

Interestingly, acculturation-related variables were related to different types of health risk behaviors for first- and second-generation immigrants from different racial/ethnic groups: hazardous alcohol use for Black, East Asian, and South Asian participants; illicit drug use for Black, Hispanic, and East Asian participants; sexual risk taking for Hispanic and East Asian participants; and impaired driving for White and Black participants. Although the reasons for these differences are not readily apparent, it does appear that the fewest associations between acculturation and risk behavior were found for White participants. As Schwartz et al. (2010) observed, the acculturation process may be qualitatively different for White individuals than for other ethnic groups. White first- and second-generation immigrants' phenotypic similarity to the dominant White population, as well as the similarity between U.S. culture and many other White-dominated cultural contexts, allows many of these immigrants to be favorably, rather than negatively, regarded by White Americans. Moreover, even those White immigrants with noticeable foreign accents (e.g., British, French, Australian) may be perceived as interesting (Steiner, 2009). In contrast, dark-skinned immigrants with foreign accents may be perceived quite differently (Schwartz et al., 2010).

Beyond this conclusion, additional research is necessary to determine why, for example, acculturation-related variables were not significantly related to unsafe sexual behavior for Black participants, to impaired driving for Hispanic and East Asian participants, or to anything other than hazardous alcohol use for South Asian participants. Qualitative or mixed-method research might help to identify ways in which cultural mechanisms are related to risk behaviors for specific racial/ethnic groups.

General Conclusions

Given that the links between cultural orientations and risk behaviors primarily involved protective associations of heritage practices and values, the present results suggest that the immigrant paradox (in which more acculturated young immigrants and children of immigrants are more likely to take risks compared with their less acculturated counterparts) can be explained in terms of losing the protective effects that accompany heritage practices and values. In the present findings, the only exception to this general pattern was that, for Hispanic participants, endorsing a Hispanic ethnic identity may increase risks for unsafe sexual behavior. Because U.S. practices, values, and identifications were less strongly and consistently related to engagement in health risk behaviors, the present findings do not support the simplistic, unidimensional conclusion that greater acculturation equals more risk. Rather, it appears that greater retention of heritage culture (especially the preservation of collectivist values) generally equals less risk. It is essential to operationalize acculturation as a bidimensional construct in which heritage-culture retention is considered separately from receiving-culture acquisition. Moreover, it is important to consider variations by race/ethnicity, specific domain of acculturation, and type of health risk behavior.

Implications for Counseling College Students From Immigrant Families

The present results may have important implications for working with college students from immigrant families. Consistent with a bidimensional approach to acculturation, our results

suggest that, for the most part, adopting U.S. cultural practices and individualist values is not problematic as long as practices and values from the heritage culture are retained. More specifically, retaining heritage-cultural practices and collectivist values appears to be especially important in protecting against hazardous alcohol use, illicit drug use, unsafe sexual behavior, and impaired driving. Students from immigrant families might be encouraged to join groups on the basis of their cultural heritage or to otherwise associate with other people from their racial/ethnic group. Interventions that promote positive elements of both the heritage and receiving cultural streams (e.g., Kulis, Nieri, Yabiku, Stromwall, & Marsiglia, 2007)—adapted for use with college students—might be important to implement. Moreover, for Hispanic individuals who seek counseling for sexual risk issues, the issue of reactive ethnicity may need to be addressed.

Limitations and Suggestions for Further Research

The present findings should be considered in light of several important limitations. First, because the present study was cross-sectional, we cannot draw conclusions about the causal or directional order of the associations that we found. Although we would be most likely to conclude that specific permutations of U.S. and heritage practices, values, and orientations preceded engagement in risky behavior, it may be possible that engaging in such behavior led individuals to adopt specific kinds of cultural orientations—or that the relationship is reciprocal.

Second, we did not gather data on the specific mechanisms through which cultural variables might have influenced health risk behaviors. Our findings are in accord with past research suggesting that collectivistic attitudes may decrease the likelihood of these behaviors (Le & Kato, 2006; Ramirez et al., 2004). However, the theory of planned behavior (Romano & Netland, 2008) specifies pro-risk and anti-risk attitudes, beliefs, and intentions that have been directly linked with participation in health-compromising behaviors. It remains for these attitudes, beliefs, and intentions to be linked empirically with heritage-culture and U.S. culture practices, values, and identifications across various racial/ethnic groups. It is important to identify such mediators so that researchers, practitioners, and policy makers do not draw overly simplistic conclusions regarding the effects of acculturation on risky behavior, and so that these key mechanisms can be incorporated into interventions to prevent or reduce risk taking behavior.

Third, the use of a college student sample increases the relevance of our findings for college and university counselors, and the representation of a number of different institutions helps to increase the geographic and racial/ethnic diversity of the sample. However, the inclusion of only college students leaves out important segments of the emerging adult population. Noncollege emerging adults differ from college students on a number of important socioeconomic and psychosocial dimensions (Halperin, 2001). As a result, it is essential to include both college and noncollege emerging adults in future research on acculturation and health risk behavior.

Fourth, it is likely that lack of access to an automobile would have precluded driving while drunk or high, regardless of the person's cultural orientations. For example, compared with other students, those from lower income families or who reside in dormitories may be less

likely to have access to an automobile. Future research on impaired driving in college students should directly measure, and covary, automobile access as part of the analytic plan.

Fifth, the measures of U.S. practices and identifications do not specify exactly what it is that participants are asked to endorse. These are not necessarily problems with the measures themselves but rather with what is meant by the term *American*. In past waves of immigration, newcomers were expected to integrate themselves into the White American mainstream. The current wave of immigrants, however, may have more options regarding which cultural stream they will most identify with (Alba & Nee, 2006)—including African American, Chicano, and so forth. Moreover, different regions of the United States may be more or less individualistic or collectivistic than others (Vandello & Cohen, 1999)—so the cultural context into which individuals are integrating is not a constant across regions of the United States. Further, the meaning of the term American is inherently subjective. Some individuals may associate this term with abstract ideals, such as freedom and bravery, whereas others may associate it with physical traits, such as blond hair and blue eyes (Rodriguez, Schwartz, & Whitbourne, 2010). These issues should be kept in mind when interpreting results for U.S. practices and identifications.

Sixth, the use of pan-ethnic groups, such as Black, Hispanic, and Asian, may have collapsed across considerable heterogeneity within these groups. For example, within the Asian category, there are likely many differences between individuals from China, Sri Lanka, and India. However, 134 countries of familial origin were represented in our sample; 16% of participants reported that their parents were from different countries (i.e., it is not clear to which country these participants should be assigned); and only three countries (Cuba, Mexico, and Vietnam) had sufficient representation in the sample to estimate the Poisson regression model properly and reliably (cf. Shieh, 2001). The considerable diversity in our sample, although an advantage in many respects, did not permit us to compare our findings across specific countries of familial origin.

Finally, two specific concerns about our measurement strategy warrant mention. First, the use of online survey methodology allowed us to access participants from 30 different sites around the United States and to reduce errors associated with data entry and management. At the same time, however, we have no way of verifying the identity of the person completing the survey (i.e., is s/he really a student at the university that s/he claims to attend?). We were able to eliminate accidental duplicate surveys, which is a common problem in online survey research, by identifying identical records submitted within a short time of one another (cf. Worthington, Navarro, Savoy, & Hampton, 2008). Second, self-reports of health risk behaviors may underrepresent or overrepresent participants' actual amount of use. However, there is evidence that computerized administration of health risk behavior questions may result in more honest responding compared with face-to-face or paper-pencil administration (Turner et al., 1998).

Despite these limitations, the present findings have contributed to our understanding of acculturation by investigating the associations between an expanded model of acculturation and a set of health risk behaviors among a large and diverse sample of immigrant college students. The results suggest that both heritage and U.S. cultural practices and values (and

identifications, to a lesser extent) are important to promote among immigrant youths and children of immigrants—and that a balance between heritage and U.S. orientations may maximize protection against health-compromising behaviors. This suggests that the salad bowl metaphor, in which immigrants retain their cultural heritage in addition to acquiring U.S. cultural orientations, may be a healthier and more reasonable expectation than the melting pot metaphor, in which immigrants are expected not to keep their cultural heritage intact (cf. Portes & Rumbaut, 2006). It is hoped that the present results find their way into counseling and intervention efforts for immigrant college students who might be at risk for these types of health-compromising behaviors.

Acknowledgments

We wish to acknowledge collaborators from the Multi-Site University Study of Identity and Culture (MUSIC) who were instrumental in collecting the data for this study: Vicky Phares and Ariz Rojas, University of South Florida; Larry F. Forthun, University of Florida; Anthony D. Greene, University of North Carolina-Charlotte; Elissa Brown, St. John's University; Michelle K. Williams and V. Bede Agocha, University of Connecticut; Susan Krauss Whitbourne, University of Massachusetts-Amherst; Britton Brewer, Springfield College; Liliana Rodriguez, Williams College; Jacquelyn D. Wiersma and H. Harrington Cleveland, Pennsylvania State University; M. Brent Donnellan, Michigan State University; Alexander T. Vazsonyi, Auburn University; Russell D. Ravert, University of Missouri-Columbia; Richard M. Lee and Stephanie Pituc, University of Minnesota; S. Jean Caraway, University of South Dakota; Gustavo Carlo and Maria Iturbide, University of Nebraska-Lincoln; Thao N. Le, Colorado State University; Sam A. Hardy, Brigham Young University; Adriana Umaña-Taylor, Arizona State University; Melina Bersamin, California State University-Sacramento; Monika Hudson, University of San Francisco; Eric Hurley, Pomona College; and Nolan Zane and Gloria Wong, University of California-Davis.

References

- Abraído-Lanza AF, Armbrister AN, Flórez KR, & Aguirre AN (2006). Toward a theory-driven model of acculturation in public health research. *American Journal of Public Health, 96*, 1342–1346. doi:10.2105/AJPH.2005.064980 [PubMed: 16809597]
- Alba R, & Nee V (2006). *Remaking the American mainstream: Assimilation and contemporary immigration*. Cambridge, MA: Harvard University Press.
- Alegría M, Canino G, Shrout P, Woo M, Duan N, Vila D, ... Meng X-L (2008). Prevalence of mental illness in immigrant and non-immigrant U.S. groups. *American Journal of Psychiatry, 165*, 359–369. doi:10.1176/appi.ajp.2007.07040704
- Alegría M, Shrout P, Sribney W, Guarnaccia P, Woo M, Vila D, ... Canino G (2007). Understanding differences in past year psychiatric disorders for Latinos living in the U.S. *Social Science and Medicine, 65*, 214–230. [PubMed: 17499899]
- Allen ML, Elliott MN, Fugligni AJ, Morales LS, Hambarsoomian K, & Schuster MA (2008). The relationship between Spanish language use and substance use behaviors among Latino youth: A social network approach. *Journal of Adolescent Health, 43*, 372–379. doi:10.1016/j.jadohealth.2008.02.016
- Barker V, Giles H, Noels K, Duck J, Hecht M, & Clément R (2001). The English-only movement: A communication analysis of changing perceptions of language vitality. *Journal of Communication, 51*, 3–37. doi:10.1111/j.1460-2466.2001.tb02870.x
- Berry JW (1997). Immigration, acculturation, and adaptation. *Applied Psychology, 46*, 5–34.
- Berry JW, & Kim U (1988). Acculturation and mental health In Dasen PR, Berry JW, & Sartorius N (Eds.), *Health and cross-cultural psychology: Toward applications* (pp. 207–236). Newbury Park, CA: Sage.
- Bronfenbrenner U (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.
- Castillo LG, & Caver K (2009). Expanding the concept of acculturation in Mexican American rehabilitation psychology research and practice. *Rehabilitation Psychology, 54*, 351–362. doi:10.1037/a0017801 [PubMed: 19929116]

- Centers for Disease Control and Prevention. (2008, 6 6). Youth risk behavior surveillance—United States, 2007. *Morbidity and Mortality Weekly Report*, 57, 1–131. [PubMed: 18185492]
- Chae DH, Takeuchi DT, Barbeau EM, Bennett GG, Lindsey JC, Stoddard AM, & Krieger N (2008). Alcohol disorders among Asian Americans: Associations with unfair treatment, racial/ethnic discrimination, and ethnic identification. *Journal of Epidemiology and Community Health*, 62, 973–979. doi:10.1136/jech.2007.066811 [PubMed: 18854501]
- Cheung GW, & Rensvold RB (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, 9, 233–255. doi:10.1207/S15328007SEM0902_5
- Chirkov V (2009). Summary of the criticisms and of the potential ways to improve acculturation psychology. *International Journal of Intercultural Relations*, 33, 177–180. doi:10.1016/j.ijintrel.2009.03.005
- Chou SP, Grant BF, Dawson DA, Stinson FS, Saha T, & Pickering RP (2005). Twelve-month prevalence and changes in driving after drinking: United States, 1991–1992 and 2001–2002. *Drug and Alcohol Dependence*, 80, 223–230. doi:10.1016/j.drugalcdep.2005.03.013 [PubMed: 16216703]
- Cornelius W (2002). Ambivalent reception: Mass public responses to the “new” Latino immigration to the United States In Suárez-Orozco MM & Pérez MM (Eds.), *Latinos: Remaking America* (pp. 165–189). Berkeley, CA: University of California Press.
- Dawson DA, Grant BF, Stinson FS, & Chou PS (2005). Psychopathology associated with drinking and alcohol use disorders in the college and general adult populations. *Drug and Alcohol Dependence*, 77, 139–150. doi:10.1016/j.drugalcdep.2004.07.012 [PubMed: 15664715]
- Espinosa-Hernández G, & Lefkowitz ES (2009). Sexual behaviors and attitudes and ethnic identity during college. *Journal of Sex Research*, 46, 471–482. doi:10.1080/00224490902829616 [PubMed: 19288336]
- Grello CM, Welsh DP, & Harper MS (2006). No strings attached: The nature of casual sex in college students. *Journal of Sex Research*, 43, 255–267. doi:10.1080/00224490609552324 [PubMed: 17599248]
- Guo X, Schwartz SJ, & McCabe BE (2008). Aging, gender, and self: Dimensionality and measurement invariance analysis on self-construal. *Self and Identity*, 7, 1–24. doi:10.1080/15298860600926873
- Halperin S (Ed.). (2001). *The forgotten half revisited: American youth and young families, 1988–2008*. Washington, DC: American Youth Policy Forum.
- Hofstede G (2001). *Culture’s consequences: Comparing values, behaviors, institutions, and organizations across nations* (2nd ed.). Thousand Oaks, CA: Sage.
- Huntington SP (2004). *Who are we? The challenges to America’s national identity*. New York, NY: Simon & Schuster.
- Hussey JM, Hallfors DD, Waller MW, Iritani BJ, Halpern CJ, & Bauer DJ (2007). Sexual behavior and drug use among Asian and Latino adolescents: Association with immigrant status. *Journal of Immigrant and Minority Health*, 9, 85–94. doi:10.1007/s10903-006-9020-z [PubMed: 17111214]
- Johnson TP (2007). Cultural-level influences on substances use and misuse. *Substance Use and Misuse*, 42, 305–316. doi:10.1080/10826080601142022 [PubMed: 17558932]
- Kauermann G, & Carroll RJ (2001). A note on the efficiency of sandwich covariance matrix estimation. *Journal of the American Statistical Association*, 96, 1387–1396. doi:10.1198/016214501753382309
- Kiang L, Yip T, & Fuligni AJ (2008). Multiple social identities and adjustment in young adults from ethnically diverse backgrounds. *Journal of Research on Adolescence*, 18, 643–670. doi:10.1111/j.1532-7795.2008.00575.x
- Kim BSK, & Abreu JM (2001). Acculturation measurement: Theory, current instruments, and future directions In Ponterotto JG, Casas JM, Suzuki LA, & Alexander CM (Eds.), *Handbook of multicultural counseling* (2nd ed., pp. 394–424). Thousand Oaks, CA: Sage.
- Kohatsu EL (2005). Acculturation: Current and future directions In Carter RJ (Ed.), *Handbook of racial-cultural psychology and counseling: Theory and research* (Vol. 1, pp. 207–231). Hoboken, NJ: Wiley.

- Kokotailo PK, Egan J, Gangnon R, Brown D, Mundt M, & Fleming M (2004). Validity of the Alcohol Use Disorders Identification Test in college students. *Alcoholism: Clinical and Experimental Research*, 28, 914–920.
- Kulis S, Nieri T, Yabiku S, Stromwall LK, & Marsiglia FF (2007). Promoting reduced and discontinued substance use among adolescent substance users: Effectiveness of a universal prevention program. *Prevention Science*, 8, 35–49. doi:10.1007/s11121-006-0052-3 [PubMed: 17096196]
- Le TN, Goebert D, & Wallen J (2009). Acculturation factors and substance use among Asian American youth. *Journal of Youth and Adolescence*, 30, 453–473.
- Le TN, & Kato T (2006). The role of peer, parent, and culture in risky sexual behavior for Cambodian and Lao/Mien adolescents. *Journal of Adolescent Health*, 38, 288–296. doi:10.1016/j.jadohealth.2004.12.005
- Markus H, & Kitayama S (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, 98, 224–253. doi:10.1037/0033-295X.98.2.224
- Marsiglia FF, Kulis S, Hecht ML, & Sills S (2004). Ethnicity and ethnic identity as predictors of drug norms and drug use among preadolescents in the U.S. Southwest. *Substance Use and Misuse*, 39, 1061–1094. doi:10.1081/JA-120038030 [PubMed: 15387204]
- Martens MP, Pedersen ER, LaBrie JW, Ferrier AG, & Cimini MD (2007). Measuring alcohol-related protective behavioral strategies among college students: Further examination of the Protective Behavioral Strategies Scale. *Psychology of Addictive Behaviors*, 21, 307–315. doi:10.1037/0893-164X.21.3.307 [PubMed: 17874881]
- Mills BA, & Caetano R (2010). Hispanic Americans Baseline Alcohol Survey (HABLAS): Predictors of alcohol attitudes and expectancies in Hispanic national groups. *Alcoholism: Clinical and Experimental Research*, 34, 790–799. doi:10.1111/j.1530-0277.2010.01151.x
- Mokdad AH, Marks JS, Stroup DF, & Gerberding JL (2004). Actual causes of death in the United States, 2000. *Journal of the American Medical Association*, 291, 1238–1245. doi:10.1001/jama.291.10.1238 [PubMed: 15010446]
- Muthén LK, & Muthén B (2007). *Mplus user's guide* (5th ed.). Los Angeles, CA: Muthén & Muthén.
- Nagayama Hall GC, Teten TL, & Sue S (2003). The cultural context of sexual aggression: Asian American and European American perpetrators. *Annals of the New York Academy of Sciences*, 989, 131–143. doi:10.1111/j.1749-6632.2003.tb07299.x [PubMed: 12839892]
- Nasim A, Corona R, Belgrave F, Utsey SO, & Fallah N (2007). Cultural orientation as a protective factor against tobacco and marijuana smoking for African American young women. *Journal of Youth and Adolescence*, 36, 503–516. doi:10.1007/s10964-006-9097-7
- Neal-Barnett A, Stadulis R, Singer N, Murray M, & Demmings J (2010). Assessing the effects of experiencing the “acting White” accusation. *The Urban Review*, 42, 102–122. doi:10.1007/s11256-009-0130-5
- Oyserman D, Coon HM, & Kemmelmeier M (2002). Rethinking individualism and collectivism: Evaluation of theoretical assumptions and meta-analyses. *Psychological Bulletin*, 128, 3–72. doi:10.1037/0033-2909.128.1.3 [PubMed: 11843547]
- Phinney JS (1992). The Multigroup Ethnic Identity Measure: A new scale for use with diverse groups. *Journal of Adolescent Research*, 7, 156–176. doi:10.1177/074355489272003
- Phinney JS (2003). Ethnic identity and acculturation In Chun KM, Organista PB, & Marín G (Eds.), *Acculturation: Advances in theory, measurement, and applied research* (pp. 63–81). Washington, DC: American Psychological Association. doi:10.1037/10472-006
- Phinney JS, Cantu CL, & Kurtz DA (1997). Ethnic and American identity as predictors of self-esteem among African American, Latino, and White adolescents. *Journal of Youth and Adolescence*, 26, 165–185. doi:10.1023/A:1024500514834
- Phinney JS, & Ong AD (2007). Conceptualization and measurement of ethnic identity: Current status and future directions. *Journal of Counseling Psychology*, 54, 271–281. doi:10.1037/0022-0167.54.3.271
- Portes A, & Rumbaut RG (2001). *Legacies: The story of the immigrant second generation*. Berkeley, CA: University of California Press.

- Portes A, & Rumbaut RG (2006). *Immigrant America: A portrait* (3rd ed.). Berkeley, CA: University of California Press.
- Raffaelli M, Zamboanga BL, & Carlo G (2005). Acculturation status and sexuality among Cuban-American college students. *Journal of American College Health*, 54, 7–13. doi:10.3200/JACH.54.1.7-13 [PubMed: 16050323]
- Ramirez JR, Crano WD, Quist R, Burgoon M, Alvaro EM, & Grandpre J (2004). Acculturation, familism, parental monitoring, and knowledge as predictors of marijuana and inhalant use in adolescents. *Psychology of Addictive Behaviors*, 18, 3–11. doi:10.1037/0893-164X.18.1.3 [PubMed: 15008680]
- Ravert RD, Schwartz SJ, Zamboanga BL, Kim SY, Weisskirch RS, & Bersamin M (2009). Sensation seeking and danger invulnerability: Paths to college student risk taking. *Personality and Individual Differences*, 47, 763–768. doi:10.1016/j.paid.2009.06.017
- Rodriguez L, Schwartz SJ, & Whitbourne SK (2010). American identity revisited: The relation between national, ethnic, and personal identity in a multiethnic sample of emerging adults. *Journal of Adolescent Research*, 25, 324–349. doi:10.1177/0743558409359055
- Romano JL, & Netland JD (2008). The application of the theory of reasoned action to prevention science in counseling psychology. *The Counseling Psychologist*, 36, 777–806. doi:10.1177/0011000007301670
- Roycircar-Sodowsky G, & Maestas MV (2000). Acculturation, ethnic identity, and acculturative stress: Evidence and measurement In Dana RH (Ed.), *Handbook of cross-cultural and multicultural personality assessment* (pp. 131–172). Mahwah, NJ: Erlbaum.
- Rudmin FW (2009). Constructs, measurements, and models of acculturation and acculturative stress. *International Journal of Intercultural Relations*, 33, 106–123. doi:10.1016/j.ijintrel.2008.12.001
- Rumbaut RG (2008). Reaping what you sow: Immigration, youth, and reactive ethnicity. *Applied Developmental Science*, 12, 108–111. doi:10.1080/10888690801997341
- Ryder AG, Alden LE, & Paulhus DL (2000). Is acculturation unidimensional or bidimensional? A head-to-head comparison in the prediction of personality, self-identity, and adjustment. *Journal of Personality and Social Psychology*, 79, 49 – 65. doi:10.1037/0022-3514.79.1.49 [PubMed: 10909877]
- Saint-Jean G (2010). Gender differences in the salience of psychosocial mediators of the impact of acculturation on substance abuse among Hispanic youth in Florida. *Journal of Immigrant and Minority Health*, 12, 166–172. doi:10.1007/s10903-008-9196-5 [PubMed: 18839310]
- Sam DL (2006). Acculturation: Conceptual background and core components In Sam DL & Berry JW (Eds.), *Cambridge handbook of acculturation psychology* (pp. 11–26). Cambridge, England: Cambridge University Press.
- Saunders JB, Aasland OG, Babor TF, De La Puente JR, & Grant M (1993). Development of the Alcohol Use Disorders Screening Test (AUDIT). *Addiction*, 88, 791–804. doi:10.1111/j.1360-0443.1993.tb02093.x [PubMed: 8329970]
- Savin-Williams RC (in press). Identity development among sexual minority youth In Schwartz SJ, Luyckx K, & Vignoles VL (Eds.), *Handbook of identity theory and research*. New York, NY: Springer.
- Schafer JL, & Graham JW (2002). Missing data: Our view of the state of the art. *Psychological Methods*, 7, 147–177. doi:10.1037/1082-989X.7.2.147 [PubMed: 12090408]
- Schlomer GL, Bauman S, & Card NA (2010). Best practices for missing data management in counseling psychology. *Journal of Counseling Psychology*, 57, 1–10. [PubMed: 21133556]
- Schwartz SJ, Mason CA, Pantin H, Wang W, Brown CH, Campo AE, & Szapocznik J (2009). Relationships of social context and identity to problem behavior among high-risk Hispanic adolescents. *Youth and Society*, 40, 541–570. doi:10.1177/0044118X08327506 [PubMed: 19412356]
- Schwartz SJ, Unger JB, Zamboanga BL, & Szapocznik J (2010). Rethinking the concept of acculturation: Implications for theory and research. *American Psychologist*, 65, 237–251. doi:10.1037/a0019330

- Schwartz SJ, Zamboanga BL, Ravert RD, Kim SY, Weisskirch RS, Williams MK, ... Finley GE (2009). Perceived parental relationships and health risk behaviors in college-attending emerging adults. *Journal of Marriage and Family*, 71, 727–740. doi:10.1111/j.1741-3737.2009.00629.x
- Schwartz SJ, Zamboanga BL, Rodriguez L, & Wang SC (2007). The structure of cultural identity in an ethnically diverse sample of emerging adults. *Basic and Applied Social Psychology*, 29, 159–173.
- Shieh G (2001). Sample size calculations for logistic and Poisson regression models. *Biometrika*, 88, 1193–1199. doi:10.1093/biomet/88.4.1193
- Singelis TM (1994). The measurement of independent and interdependent self-construals. *Personality and Social Psychology Bulletin*, 20, 580–591. doi:10.1177/0146167294205014
- Steiner N (2009). *International migration and citizenship today*. New York, NY: Routledge.
- Stephenson M (2000). Development and validation of the Stephenson Multigroup Acculturation Scale (SMAS). *Psychological Assessment*, 12, 77–88. doi:10.1037/1040-3590.12.1.77 [PubMed: 10752366]
- Sue S, & Chu J (2003). The mental health of ethnic minority groups: Challenges posed by the Surgeon General's report on mental health. *Culture, Medicine, and Psychiatry*, 27, 447–465. doi:10.1023/B:MEDI.0000005483.80655.15
- Trejos-Castillo E, & Vazsonyi AT (2009). Risky sexual behaviors in first and second generation Hispanic immigrant youth. *Journal of Youth and Adolescence*, 38, 719–731. doi:10.1007/s10964-008-9369-5 [PubMed: 19636766]
- Triandis HC (1972). *The analysis of subjective culture*. New York, NY: Wiley.
- Triandis HC (1995). *Individualism and collectivism*. Boulder, CO: Westview Press.
- Triandis HC, & Gelfand MJ (1998). Converging measurement of horizontal and vertical individualism and collectivism. *Journal of Personality and Social Psychology*, 74, 118–128. doi:10.1037/0022-3514.74.1.118
- Turner CF, Ku L, Rogers SM, Lindberg LB, Pleck JH, & Sonsenstein LH (1998, 5 8). Adolescent sexual behavior, drug use, and violence: Increased reporting with computer survey technology. *Science*, 280, 867–873. doi:10.1126/science.280.5365.867 [PubMed: 9572724]
- Unger JB (in press). Cultural identity and public health In Schwartz SJ, Luyckx K, & Vignoles VL (Eds.), *Handbook of identity theory and research*. New York, NY: Springer.
- Vandello JA, & Cohen D (1999). Patterns of individualism and collectivism across the United States. *Journal of Personality and Social Psychology*, 77, 279–292. doi:10.1037/0022-3514.77.2.279
- Vandenberg RJ, & Lance CE (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods*, 3, 4–70. doi:10.1177/109442810031002
- Wang CD, & Mallinckrodt BS (2006). Acculturation, attachment, and psychosocial adjustment of Chinese/Taiwanese international students. *Journal of Counseling Psychology*, 53, 422–433. doi:10.1037/0022-0167.53.4.422
- Warner TD, Fishbein DH, & Krebs CP (2010). The risk of assimilating? Alcohol use among immigrant and U. S.-born Mexican youth. *Social Science Research*, 39, 176–186. doi:10.1016/j.ssresearch.2009.07.001 [PubMed: 20161417]
- Whitten L (2008). Studies identify factors surrounding rise in abuse of prescription drugs by college students. Retrieved from http://archives.drugabuse.gov/NIDA_notes/NNvol20N4/Studies.html
- Worthington RL, Navarro RL, Savoy HB, & Hampton D (2008). Development, reliability, and validity of the measure of sexual identity exploration and commitment. *Developmental Psychology*, 44, 22–33. doi:10.1037/0012-1649.44.1.22 [PubMed: 18194002]
- Zamboanga BL, Horton NJ, Tyler KMB, O'Riordan SS, Calvert BD, & McCollum EC (2007). The utility of the AUDIT in screening for drinking game involvement in female college athletes. *Journal of Adolescent Health*, 40, 359–361. doi:10.1016/j.jadohealth.2006.11.139
- Zamboanga BL, Raffaelli M, & Horton NJ (2006). Acculturation status and heavy alcohol use among Mexican American college students: An investigation of the moderating role of gender. *Addictive Behaviors*, 31, 2188–2198. doi:10.1016/j.addbeh.2006.02.018 [PubMed: 16603321]
- Zamboanga BL, Schwartz SJ, Jarvis LH, & Van Tyne K (2009). Acculturation and substance use among Hispanic early adolescents: Investigating the mediating roles of acculturative stress and self-esteem. *Journal of Primary Prevention*, 30, 315–333. doi:10.1007/s10935-009-0182-z

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 Chun KM, Organista PB, & Marín G (Eds.), *Acculturation: Advances in theory, measurement, and applied research* (pp. 39–60). Washington, DC: American Psychological Association.
doi:10.1037/10472-005

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

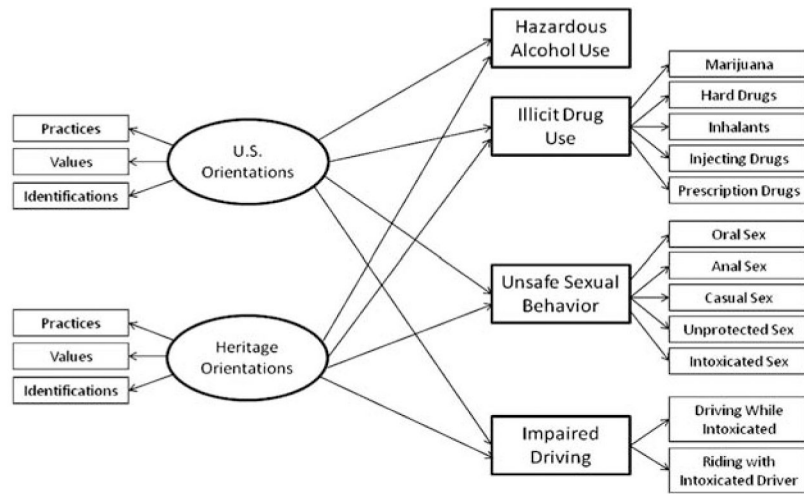


Figure 1.
Analytic model.

Table 1

Spearman Rank-Order Correlations Among Risk Behaviors

Behavior	1	2	3	4	5	6	7	8	9	10	11	12
1. Marijuana use	—	.39***	.35***	.30***	.36***	.26***	.26***	.23***	.34***	.48***	.30***	.45***
2. Hard drug use		—	.67***	.58***	.55***	.16***	.35***	.15***	.37***	.31***	.31***	.31***
3. Inhalant use			—	.65***	.66***	.16***	.37***	.16***	.37***	.27***	.30***	.29***
4. Injecting drug use				—	.66***	.13***	.42***	.17***	.40***	.24***	.27***	.26***
5. Prescription drug misuse					—	.16***	.35***	.18***	.32***	.30***	.24***	.28***
6. Oral sex						—	.33***	.62***	.23***	.46***	.20***	.24***
7. Anal sex							—	.26***	.35***	.31***	.24***	.24***
8. Unprotected sex								—	.19***	.43***	.19***	.21***
9. Casual sex									—	.33***	.43***	.38***
10. Sex while drunk/high										—	.35***	.41***
11. Driving while drunk/high											—	.50***
12. Riding with drunk driver												—

 $p < .001$.

Table 2

Health Risk Behavior Engagement by Gender and by Ethnicity

Behavior	Gender		Ethnicity					$\chi^2(4)$	
	Male	Female	White	Black	Hispanic	Asian	Middle Eastern		
Hazardous alcohol use	43.9	31.1	32.39***	45.2	27.7	31.6	39.3	36.8	25.91***
Illicit drug use									
Marijuana use	25.3	16.8	20.99***	24.3	19.0	19.9	19.5	11.2	10.74*
Hard drug use	7.2	4.1	8.69**	6.2	4.7	4.9	5.9	3.5	2.31
Inhalant use	6.7	3.4	12.01**	7.6	3.0	4.1	4.7	4.1	6.82
Injecting drug use	4.2	1.1	21.15***	2.9	2.0	1.3	3.2	1.8	6.94
Prescription drug misuse	7.2	3.9	10.57**	8.1	4.3	4.4	5.3	3.5	6.17
Unsafe sexual behavior									
Oral sex	46.7	47.0	0.02	57.6	42.3	56.0	34.6	37.3	80.40***
Anal sex	15.5	10.7	9.61**	12.9	10.7	14.2	10.0	7.7	9.78*
Unprotected sex	29.7	35.8	7.28**	39.7	34.8	40.4	26.4	21.8	44.04***
Casual sex	18.8	8.2	51.07***	13.8	13.0	10.2	10.9	9.9	3.67
Sex while drunk/high	24.6	22.5	1.21	33.8	19.0	23.9	21.9	17.1	20.61***
Impaired driving									
Driving while drunk/high	25.2	16.8	20.50***	18.5	18.4	19.7	17.5	19.9	1.29
Riding with impaired driver	29.0	25.7	2.50	34.3	23.3	27.4	25.6	23.4	9.42

Note. Numbers refer to the percentage of participants in each gender and ethnic group who reported any engagement in the behavior in question.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 3

Correlations Among Acculturation-Related Variables

Variable	1	2	3	4	5	6	7	8	9	10
American orientation										
1. American practices	—	.29***	.15***	.40***	.56***	-.13**	.28***	.23***	.29***	.15***
2. Horizontal individualism		—	.24***	.51***	.22***	.14***	.28***	.25***	.13*	.28***
3. Vertical individualism			—	.22***	.19***	.04	.03	.15***	.20***	.11**
4. Independence				—	.34***	.23***	.42***	.33***	.26***	.35***
5. American identity					—	.01	.32***	.30***	.30***	.30***
Heritage orientation										
6. Heritage practices						—	.18***	.20***	.18***	.47***
7. Horizontal collectivism							—	.47***	.44***	.35***
8. Vertical collectivism								—	.50***	.43***
9. Interdependence									—	.32***
10. Heritage identity										—

* $p < .05$.** $p < .01$.*** $p < .001$.

Table 4

Health Risk Behavior Subscales by U.S. and Heritage Orientations

Racial/ethnic group	Risk behavior subscale	U.S. orientation IRR [95% CI]	Heritage orientation IRR [95% CI]
White	Illicit Drug Use	0.84 [0.40, 1.77]	0.66 [0.41, 1.05]
	Unsafe Sexual Behavior	0.99 [0.83, 1.17]	0.90 [0.76, 1.06]
	Impaired Driving	1.05 [0.90, 1.22]	0.79*** [0.70, 0.89]
Black	Illicit Drug Use	0.55* [0.34, 0.87]	1.38 [0.73, 2.61]
	Unsafe Sexual Behavior	0.87 [0.74, 1.02]	1.18 [0.93, 1.50]
	Impaired Driving	1.05 [0.87, 1.26]	0.79** [0.68, 0.91]
Hispanic	Illicit Drug Use	0.81 [0.63, 1.03]	0.85* [0.73, 0.99]
	Unsafe Sexual Behavior	1.02 [0.92, 1.15]	0.96* [0.91, 0.99]
	Impaired Driving	0.97 [0.90, 1.04]	0.96 [0.91, 1.02]
East Asian	Illicit Drug Use	1.25 [0.97, 1.60]	0.84* [0.72, 0.99]
	Unsafe Sexual Behavior	1.19* [1.01, 1.41]	0.98 [0.89, 1.07]
	Impaired Driving	1.03 [0.87, 1.21]	0.94 [0.84, 1.05]
South Asian	Illicit Drug Use	0.85 [0.66, 1.08]	1.06 [0.80, 1.40]
	Unsafe Sexual Behavior	1.11 [0.91, 1.35]	0.94 [0.67, 1.32]
	Impaired Driving	1.15 [0.91, 1.46]	0.83 [0.61, 1.14]

Note. Significant findings are displayed in bold for ease of presentation. IRR = incidence rate ratio.

* $p < .05$.

** $p < .01$.

*** $p < .001$.