

Acculturation and Binge Drinking among Major Immigrant Groups in the United States:  
A Literature Review

Do Heritage and American Culture Identifications Influence Binge Drinking?

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## **VITA**

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# **Part 1: Acculturation and Binge Drinking among Major Immigrant groups in the United States: A Literature Review**

## **Abstract**

The purpose of this literature review was to observe the nature of the association between acculturation and binge drinking in major immigrant groups in the U.S. Acculturation, defined as the alterations in values, identifications and practices of minority group members that occur when they come in contact with a new dominant culture, is one predictor of binge drinking. Articles were included if they measured (a) acculturation in (b) immigrants within the U.S., (c) reported associations with binge drinking behavior within these groups and d) were published in English language. This review included articles ( $N=17$ ) analyzing Hispanic American ( $n=10$ ), Asian American ( $n=4$ ) and mixed immigrant groups ( $n=3$ ). Results found that the nature of the association between acculturation and binge drinking within each of the major immigrant groups was not consistently negative or positive, with some studies reporting acculturation as being protective versus some studies indicating higher acculturation increasing the likelihood of binge drinking. Some of the factors that influenced the nature of the association include immigrant subgroup, age, original heritage culture, receiving context and gender. Future studies should look at exploring understudied populations such as minority immigrant groups and older age groups. Further, qualitative research and longitudinal studies are needed to allow for more comprehensive analyses.

## **Background**

Over 40% of the population growth in the U.S. is attributable to immigrants (Inman, 2009). As the number of immigrants in the U.S. grows, it becomes imperative to study the psychological processes that immigrants in these populations experience, and how these affect their health and well being. Acculturation is a process and a determinant that is known to have consequential health effects in minority populations and is associated with various health risk behaviors, through shaping the socio-cultural context in which an individual lives (Fox, Thayer, & Wadhwa, 2017). Alcohol use behaviors, of which binge drinking patterns are a component, are often influenced by the levels of acculturation experienced by the immigrant (Wahl & Eitle, 2010). Alcohol use epidemiology is a key tool in identifying the causes and effects of alcohol use on the health of individuals, and in guiding future efforts to prevent the negative effects of alcohol risk behaviors on health, such as the increased risk of cardiovascular problems, HIV, liver problems and other harmful health conditions (Rossow & Norstrom, 2013). This literature review aims to identify the relationship between acculturation and binge drinking among major immigrant groups in the U.S. To set the stage for this literature review, I will first outline the concepts involved in this hypothesis, including immigration in the U.S., acculturation and its measurement, binge drinking, and the relationship between these three processes.

### **Immigration in the US**

An immigrant is a term used to define a foreign-born person who resides in the U.S., but was not a citizen of the U.S. at birth (U.S. Census Bureau, 2014). According to the U.S. Census Bureau, the U.S. is often cited as a nation of immigrants (Inman, 2009).

Over 42 million illegal and legal immigrants reside in America as of 2014, accounting for over 13.4% of the U.S. population (U.S. Census Bureau, 2014). Immigrant populations include naturalized citizens, people on work or student visas, lawful permanent residents, people residing under refugee and/or asylee statuses, and people living illegally (Migration Policy Institute, 2015). While reasons to immigrate vary, a few primary reasons govern why people choose to migrate to the U.S. Largely, people choose to migrate to achieve a higher standard of living, or shield themselves from harmful or substandard economic, social or political conditions in their home countries (Alfred, 2001). The three main categories of migrants include highly educated professional migrants who take-up professional white collar jobs, entrepreneurial immigrants with aspirations to set-up businesses, refugees and asylees who seek refuge from persecution or fear of persecution and labor migrants that largely take-up blue collar manual jobs and contribute substantially to the illegal migrant population (Alfred, 2001). Over 40% of the population growth is attributed to immigrants, with 35-40% of undocumented immigrants from Mexico and South America who are, on average, not highly skilled or highly educated. However, around 25% of immigrants, from China and India, are on average highly educated and highly skilled (Inman, 2009). Other large Asian immigrant populations include immigrants from the Philippines, Vietnam, and Korea (Migration Policy Institute, 2015). Furthermore, immigrant populations from Canada, European countries, Sub-Saharan Africa, Central America, and Middle Eastern countries contribute a smaller but notable share to the U.S. immigrant population (Lopez & Bialik, 2017). Over 1.25 million immigrants enter the U.S. annually, and most migration flows are to big states such as California, Texas and New York (Inman, 2009).

## **Acculturation and its Measurement**

Given the vast number of immigrants in the U.S., it is hence of utmost importance to understand their behavioral patterns and processes of adapting and acclimating to their new experiences as immigrants (Kane et al., 2016). The term that encompasses this experience is ‘acculturation’. Acculturation is defined as the experience and complex process of adjustment and adoption of U.S. cultural values, norms, and lifestyle (Kane et al., 2016). All immigrants experience some acculturation (Kane et al., 2016). It is the process of change that is triggered by interactions between individuals who have different cultural values and practices (Schwartz et al., 2016). It is often used to describe the process of change in immigrants, which entails retaining or discarding cultural orientations of the country they immigrate to and retaining or discarding the cultural orientations of their country of origin or heritage (Schwartz, Unger, & Szapocznik, 2016).

While acculturation is a complex process that unfolds over long periods of time, there are four patterns that largely encompass how acculturation may present itself in individuals (Schwartz et al., 2016). Assimilation is the replacement of heritage culture values entirely, with those of the new dominant culture (Berry, 1997). Biculturalism is the process where heritage culture beliefs are retained while new ones are adopted from the dominant culture (Berry, 1997). Traditionalism is the process where heritage culture values are retained while none are adopted from the new dominant cultures (Berry, 1997). Lastly, marginalization is the process where the individual identifies with neither the heritage culture nor the new dominant culture (Berry, 1997).

Further, acculturation can be measured in several ways. Perspectives on how to measure acculturation have differed, and involve different types of scales or proxies

(Kane et al., 2016). However, the three primary scale types are unidimensional, bidimensional, and multidimensional (Ryder, Alden, & Paulhus, 2000).

The unidimensional perspective assumes that adopting new values, beliefs and practices from the dominant culture entails relinquishing those of the heritage culture (Ryder et al., 2000). It views acculturation as a point on a continuum with heritage culture on one end and new dominant culture values on the other (Ryder et al., 2000). Most unidimensional measures use proxies to measure acculturation, and some of the common proxies include generational status, age at immigration, and language spoken at home (Ryder et al., 2000; Des Rosiers, Schwartz, Zamboanga, Ham, & Huang, 2013). The Suinn-Lew Asian self-identity acculturation scale (SL-ASIA) is an example of a commonly used unidimensional scale. Alternatively, the bidimensional perspective assumes that individuals can adopt new values, beliefs and practices from the new dominant culture without having to relinquish those of the heritage culture, and essentially views heritage culture and dominant culture on two different scales (Kane et al., 2016; Ryder et al., 2000). The Vancouver Index of Acculturation (Paulhus, 2013) and Stephenson Multigroup Acculturation Scale (Stephenson, 2000) are prominent examples of bidimensional scales (Ryder et al., 2000). Lastly, the multidimensional approach states that there are three or more individual but related domains through which the retention of heritage culture or adoption of dominant occur, such as practices, values, and identifications. An extensively cited example of a multidimensional scale is the Acculturation Rating Scale for Mexican-Americans (Loury, 2011).

In recent years, the multidimensional and bidimensional perspectives have been increasingly utilized, and literature is moving away from a unidimensional approach for

several reasons (Miyoshi, Asner-self, Yanyan, & Koran, 2017). For example, a unidimensional perspective may identify assimilation and traditionalism, but makes it theoretically impossible to include biculturalism and marginalization as acculturation strategies (Kane et al., 2016). Also, dissatisfaction with often rudimentary proxies, that fail to capture the complexities of bicultural identities, has contributed to the decline of the use of unidimensional models in studies of acculturation (Ryder et al., 2000). However, unidimensional models that use easy to measure proxies are often less expensive and less time-consuming, which accounts for their continued use in the literature. Further, it is only advisable to use bidimensional approaches if both the dimensions involved can be reliably measured, correlate distinctly with variables of interest, do not harbor strong negative correlation, and display concurrent validity (Ryder et al., 2000). Increasing globalization has led to an increase in the analysis of acculturation by professionals such as psychologists, counselors, and academics (Miyoshi et al., 2017). The consensus that has developed recently, strongly favors broader approaches such as those demonstrated by bidimensional and multidimensional perspectives (Miyoshi et al., 2017).

### **Immigrants, Acculturation, and Binge Drinking**

Acculturation is relevant to the study of health, as acculturation creates changes in individual behaviors and norms, and thus affects various health risk behaviors (Wahl & Eitle, 2010). Changes in an individual's cultural context, actions, cognitive thinking, and individualistic ideologies are part of the acculturation process; these factors can lead to changes in risky behaviors such as binge drinking (Iwamoto et al., 2012; Venegas, Cooper, Naylor, Hanson, & Blow, 2012). Indeed, generational status, age at migration,

language used at home, and other indicators of acculturation influence health behaviors, including alcohol use and levels of binge drinking (Iwamoto, Takamatsu, & Castellanos, 2012). However, relatively few studies have investigated the relation between acculturation and alcohol use, despite the large immigrant population within the U.S. (Wahl & Eitle, 2010), making it critical for this topic to be studied in further depth.

The operationalization of binge drinking varies greatly within literature, but a common definition adopted is 4 or more drinks in a 2-hour sitting for women and 5 or more drinks in a two-hour sitting for men (Venegas et al., 2012; Iwamoto et al., 2012). Frequency of binge drinking can be measured through self-reports in surveys or questionnaires (Hahm, Lahiff, & Guterman, 2004; Daniel-Ulloa, Reboussin, & Rhodes, 2014). Binge drinking is associated with several chronic health problems such as liver diseases, certain cancers, increased risk of HIV and cardiovascular problems (Iwamoto et al., 2012). Further, it is associated with increased risk of illicit drug use, sexually transmitted diseases, and the adoption of other risky behaviors such as driving while under the influence (Iwamoto et al., 2012). As binge drinking is linked to so many infectious and chronic diseases, the factors that predict binge drinking must be identified and mitigated. Therefore, it is important to investigate the relationship between acculturation and binge drinking.

One might then assume that acculturation has different effects on alcohol intake and binge drinking behaviors, due to variations in cultural and social norms within different immigrant groups (Li & Wen, 2015). Thus, it is important to investigate these differences within the largest and fastest growing immigrant groups within the U.S.: Hispanic Americans and Asian-Americans (Wahl & Eitle, 2010). Over half of foreign-

born immigrants in the U.S. are Hispanic (Li and Wen, 2015). Typically, Hispanic Americans display lower prevalence of overall alcohol use than non-Hispanic white Americans do; however, there is a higher prevalence and increasing levels of binge drinking among Hispanic populations (Loury et al., 2011). Further, consequences relating to alcohol use have been shown to be higher in Hispanic American populations than in other non-white ethnic groups such as Asian Americans and African Americans (Guilamo Ramos, Jaccard, & Turrissi, 2004). Traditional Latino culture has gender based prohibitive norms towards drinking (Wahl & Eitle, 2010). Women are more prohibited than men in traditional Latino culture, and thus the U.S. drinking environment may be perceived as less prohibitive (Wahl & Eitle, 2010). Thus, it is important to understand how acculturation can contribute to these risk behaviors, and identify how they can be mitigated within this major immigrant group.

Asian American populations are one of the fastest growing groups in the U.S. (Iwamoto et al., 2012). Between 1980 and 2000 the rates of population growth for this group surpassed 200% (Hahm et al., 2004). However, treating Asian American groups as a homogenous group can be misleading due to intergroup differences stemming from different values, cultures, and norms (Iwamoto et al., 2012). Binge drinking patterns within the subgroups vary, with Japanese, Korean, and Filipino Americans reported as having the highest rates and Vietnamese and Chinese Americans having the lowest (Iwamoto et al., 2012). Only a handful of studies have studied acculturation and binge drinking within specific Asian ethnic subgroups. Thus, it is important that this gap in literature be filled (Kane et al., 2016).

## **Purpose of Review**

The purpose of this literature review is to observe the nature of the association between acculturation and binge drinking in major immigrant groups in the U.S. In order to meet this aim, I identify studies that examine the association between acculturation and binge drinking, within Asian, Hispanic and mixed immigrant groups and summarize the findings. Specifically, this review documents the direction of these relationships, and strengths and limitations of current literature. Finally, this review will identify future directions that are needed to fill the gaps in literature.

## **Methods**

### **Inclusion criteria**

Only articles in the English language have been included. I included articles if they measured (a) acculturation in (b) immigrants within the U.S., and (c) reported associations with binge drinking behavior within these groups. All articles addressing acculturation and binge drinking behavior among any immigrant group within the U.S. were included, with the aim to be as inclusive as possible. By intention, no restriction was placed on how acculturation and binge drinking were operationalized or measured; the articles included a vast multitude of scales, proxies and definitions. Further, there was no time-period specified with regard to the year of publication of the articles included. There is a dearth of literature on this topic, as it has not been studied extensively, thus dissuading the employment of further exclusion criteria.

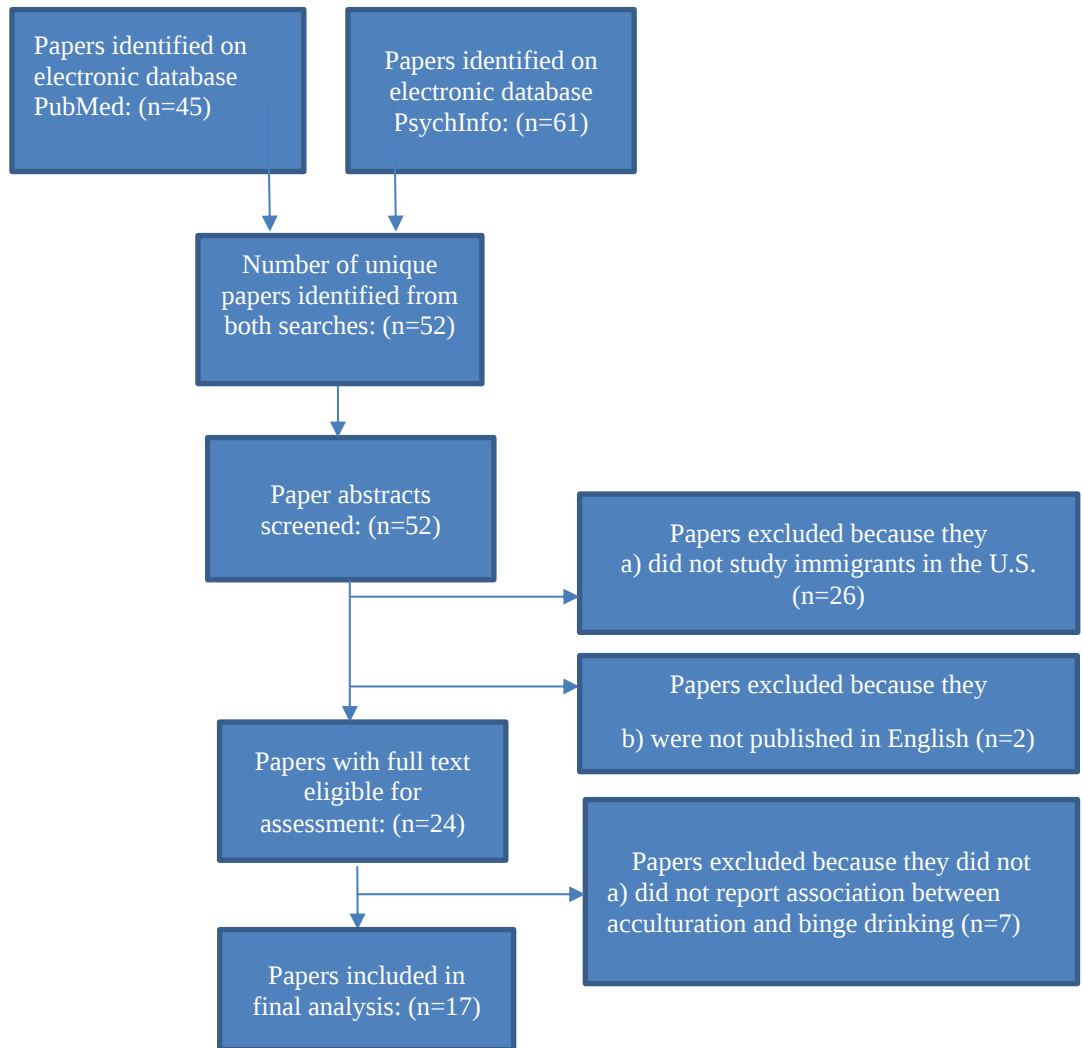
### **Search strategy**

Electronic searches were conducted within two databases, PubMed and PsychInfo. The search terms used were: (("acculturation"[tw] OR "Acculturation"[mesh])

and ("binge drinking"[tw] OR "heavy episodic drinking"[tw] OR "risky single-occasion drinking"[tw] OR "binge drinking"[mesh]) on the PubMed database, to incorporate the exposure and outcome. The search term “tw” denoted text word and the search term “mesh” denoted medical subject heading. The search terms used on the PsychInfo database were: ("acculturation") and ("binge drinking" OR "heavy episodic drinking" OR "risky single-occasion drinking"). The outcome in this analysis—binge drinking—has been cited in literature with several different scientific terms of synonymous meaning, which were included in the search terms used.

After the search terms were utilized, a total of 45 articles were generated on the PubMed database and a total of 61 in the PsychInfo database. First, the articles that were double counted were eliminated, leaving 52 unique studies. Second, the abstracts of each of these articles were screened to eliminate articles that did not meet the inclusion criteria. This resulted in 24 articles for analysis. After a full text assessment for eligibility, a further 7 articles were eliminated. This resulted in a final 17 articles as outlined in Figure 1 below. The 17 articles were then analyzed and separated into three tables, on the basis of the immigrant group being investigated. Each of these tables highlight the demographics of the sample such as average age and gender distribution, the measurement and operationalization of binge drinking, the acculturation scale type, the study design and the reported association between acculturation and binge drinking. These were analyzed in order to understand intergroup discrepancies, to identify possible confounders, and to discern trends in the association between acculturation and binge drinking within subgroups of U.S. immigrants.

**Figure 1: Flow diagram of literature review process**



## **Results**

Literature suggests that different immigrant groups show different associations between acculturation and binge drinking (Eitle, Wahl, & Aranda, 2009; Li & Wen, 2015). The results below have been separated on the basis of three major groups that emerged from my search: studies examining Hispanic American populations ( $n = 10$ ), studies examining Asian American populations ( $n = 4$ ), and studies examining mixed immigrant groups ( $n = 3$ ).

### **Hispanic Americans, Acculturation and Binge Drinking**

**Study design, study location and nature of data.** Five of the ten studies were cross sectional and five were longitudinal in nature. Two of the studies had results specific to the Texas-Mexico Border, two were specific to North Carolina, one specific to Los Angeles, one specific to New Orleans, three used nationally representative samples, and one had incomplete information about location. Five of the ten studies collected primary data and five used data from secondary sources. Two of the five studies using secondary data obtained data from the National Longitudinal Study of Adolescent Health (1994-1995), that addressed different research questions but met the inclusion criteria for this study (Guilamo Ramos et al., 2004; Eitle et al., 2009). Secondary data from the Los Angeles Family and Neighborhood survey (2000-2002), Latino Partnership (2012) and the Multi-Site University of Identity and Culture was also utilized (Eitle et al., 2009; Daniel-Ulloa et al., 2014; Des-Rosiers et al., 2013).

**Sample characteristics.** Five of the ten sampled Hispanic youth, with both genders included. Of these five, three investigated samples of college-attending Hispanic students (Montoya, Wittenburg, & Martinez, 2016; Des Rosiers et al., 2013; Cooper et

al., 2012), and two investigated larger samples of Hispanic adolescents (Guilamo Ramos et al., 2004; Eitle et al., 2009). Five of the ten studies sampled Hispanic adults. Three of the five examined only Hispanic adult men (Daniel-Ulloa et al., 2014; Kissinger et al., 2013; Loury et al., 2011), and three looked at adult Hispanic samples with both genders included (Tolbert, 2009; Caetano, Ramisetty-Mikler, Wallisch, McGrath, & Spence, 2008).

**Acculturation measurement.** Six of the ten studies used validated scales to measure acculturation. Of these, four were multidimensional scales and two were bidimensional in nature. The multidimensional scales used were: the 12 item Short Acculturation Scale for Mexican Americans (Montoya et al., 2016; Daniel-Ulloa et al., 2014), and the 30 item Acculturation Rating Scale (Loury et al., 2011; Caetano et al., 2008). Both the studies that used bidimensional measures utilized the 32 Item Stephenson Multigroup Acculturation Scale (Kissinger et al., 2013; Des Rosier et al., 2013). One study used a scale that measures biculturalism; the 9 item Bicultural Identity Integration scale (Venegas et al., 2012). Three of the ten studies used proxy measures of acculturation. All three proxies had more than one component and did not rely on a single measure. The Guilamo-Ramos et al. (2004) study used length of residence and language spoken at home as the proxy measures. The Tolbert study (2009) used language use in interview and traditional value scale scores as proxy measures. Finally, the Eitle et al. (2009) study used bilingualism, GPA, and family social relations as proxy measures of selective acculturation. In both these studies, the relationship between binge drinking and each of these acculturation proxies was investigated individually.

**Binge drinking operationalization and binge drinking measurement.** Binge drinking was operationalized differently in each of the ten studies. While most of the studies involved binge drinking being defined as over four drinks in women and over five drinks in men, the time period that was utilized often differed. Seven of the ten studies did not distinguish the operationalization on the basis of gender, while three did (Montoya et al., 2016; Des Rosiers et al., 2013; Venegas et al., 2012). Four of the studies used in person surveys or questionnaires (Montoya et al., 2016; Daniel-Ulloa et al., 2014; Des Rosiers et al., 2013; Venegas et al., 2012), five used in person interviews (Kissinger, Althoff, & Burton, 2013; Loury et al., 2011; Tolbert, 2009; Caetano et al., 2008; Guilamo Ramos et al., 2004), and one used a mix of interview and survey techniques to measure binge drinking (Eitle et al., 2009).

**Results.** Six of the ten studies found the relationship between acculturation and binge drinking to be statistically significant, after controlling for confounders. These have been described in Table 1.

Two studies found acculturation to be protective against binge drinking. In the Montoya et al. (2016) study among students who drank, lower levels of Anglo orientation were linked to increased number of drinks and largest number of drinks per occasion ( $\beta = -1.222, p = 0.007$ ), and hence acculturation was shown to be protective against binge drinking. The Eitle et al. (2009) study found that binge drinking was associated with selective acculturation, but this differed among groups. Being bilingual reduced the odds of binge drinking in Mexican adolescents by a factor 0.47. That is, acculturation was protective against binge drinking. High scores on the family relationship index reduced the odds of binge drinking in Mexican and Puerto Rican adolescents by a factor 0.63 and

0.54 respectively, but increased it for Cuban adolescents by a factor 1.77. That is, acculturation was protective against binge drinking for Mexican and Puerto Rican adolescents but not Cuban.

On the other hand, three studies found acculturation to be less protective against binge drinking. In the Des Rosiers et al. (2013) study, low bicultural orientations involved the low retention of both heritage and receiving culture, separated bicultural orientations involved the retention of both cultures with higher retention of heritage culture, high bicultural orientations involved high retention of both cultures and assimilated orientations involved the rejection of the heritage culture and uptake of receiving culture. Separated bicultural and low bicultural orientations were found to be inversely related to the frequency and prevalence of binge drinking respectively, compared to that of the assimilated orientation. Thus, lower levels of acculturation compared to the assimilated group, as depicted through separated and low bicultural orientations, were protective against binge drinking. The Tolbert study (2009) investigated Latino Adults in Los Angeles and found that holding traditional values ( $\beta = -0.05$ ,  $p < 0.01$ ) and speaking Spanish ( $\beta = -0.037$ ,  $p < 0.10$ ) were found to be associated with lower probability of binge drinking, with marginal significance. That is, traditional orientations were shown to be protective against binge drinking. Bivariate models in the Caetano et al. (2008) study found that in a sample of 484 Hispanic women, the Very Anglo oriented women reported higher rates of binge drinking at 17.7% compared to Very Mexican Oriented (11.8%), Bi-Mexican (8.0%) and Bi-Anglo women (16.1%). In this study, Anglo orientations indicated higher acculturation to American culture and Mexican Orientations indicated retention of traditional Mexican culture. Thus, the results

in this study indicated that higher levels of acculturation increased the odds of binge drinking. However, multivariate models predicting binge drinking were limited in women due to the presence of few binge drinkers relative to abstainers. The results of multivariate models for men were not found to be significant.

Lastly, one study reported a complex relationship between acculturation and binge drinking. The Guilamo Ramos et al. (2009) study found that acculturation variables were not related to onset of binge drinking in youth who never experimented with alcohol, but complex relationships existed with those who had ( $\beta = -0.125$ , 95% CI 0.81-0.96). Among Latino adolescents who had ever drank, those from Spanish speaking households who had not lived in the U.S. for a long time, had a higher likelihood of binge drinking; however, this difference disappeared by the time of 12 years of exposure to the U.S. culture, after which English speaking households began to have a higher odds of binge drinking. That is, traditional values were a risk factor against binge drinking in early years of immigration but over time acculturation developed into a risk factor.

In sum, the results of these studies with significant associations were varied. One study reported that higher biculturalism, as measured by bilingualism and strong family relations index led to lower odds of binge drinking (Eitle et al., 2009). One study found that within biculturalism only low biculturalism was predictive of lower odds of binge drinking (Des Rosiers et al., 2013). One study reported that higher levels of Anglo orientation led to lower odds of binge drinking (Montoya et al., 2016). Another study predicted that English language use was predictive of higher levels of binge drinking, but only after the adolescent had resided in the U.S. for over 12 years; hence, the relationship was complex (Guilamo Ramos et al., 2004). One study found that higher levels of

acculturation, as measured by proxies such as English language use at home and loss of traditional values, were predictive of higher odds of binge drinking in both men and women (Tolbert, 2009). Notably this was the only study in this group sampling community-based adults and not adolescents or college students. Finally, the Caetano et al. (2008) study found that higher Anglo orientation led to higher reported frequency of binge drinking in women.

Four studies did not find statistically significant relationships between acculturation and binge drinking; these are described in Table 2. Of the studies that did not report statistical significance, a majority of them cited small sample size and incomplete information as the attributable cause. The Kissinger et al. (2013) study had a very selective sample size of 125 male immigrant participants through respondent driven sampling as opposed to random sampling that could have created a bias in the results due to possibly similar characteristics between participants. The Daniel- Ulloa et al. (2014) study had limitations relating to low internal consistency in scales, a relatively small sample size of 258 men in the specific location of rural North Carolina, and non-random sampling methods that could have contributed to the lack of significant results. The Loury et al. (2010) study cited that the overall low acculturation levels and little acculturation level variability found in the small sample size of 173 Mexican male immigrants prevented the effective determination of the relationship between acculturation and binge drinking in this study. Finally, the Venegas et al. (2012) study cited that the lack of a significant relationship was due to the sample consisting of border region college students, who have been shown to be less affected by cultural issues than

other subgroups of Hispanic students. Past research has found that this is attributed to “culture switching” that results in the adoption of a bicultural identity from a young age.

### **Asian Americans, Acculturation and Binge Drinking**

**Study design, study location and nature of data.** Two of the four studies had designs that were longitudinal in nature and two had cross sectional study designs. Of the four studies, two examined immigrant samples in California (Hahm et al., 2004; Iwamoto et al., 2012), one study examined a sample in Washington (Kane et al., 2016), and one was nationally representative (Ryu et al., 2013). One study collected primary data through a web based survey in a university (Iwamoto et al., 2012). Three of the four studies analyzed secondary data. The secondary data was obtained from diverse sources including the Korean Community Health Survey (2009), California Health Interview Survey (2009), National Longitudinal Study of Adolescent Health (1994-1995), and Cross Cultural Families Project (2001-2005) (Ryu et al., 2013; Hahm et al., 2004; Kane et al., 2016).

**Sample characteristics.** Two of the four studies included a diverse sample of Asian Americans, including Japanese, Chinese, Vietnamese, Korean, South Asian, Filipino and other American (Iwamoto et al., 2012; Hahm et al., 2004). However, the Iwamoto et al. (2012) study also included individuals of mixed Asian heritage; Multi-Asians, in this sample, and the largest ethnic group examined in this study was Chinese American (32.1%), unlike in the Hahm et al. (2004) study where the majority group was Filipino American (44%) and Multi Asians were not included. One of the studies examined Vietnamese and Cambodian women only (Kane et al., 2016). One of the studies examined Native Koreans and Korean Americans (Ryu et al., 2013). Three of the

four studies examined both genders, whereas one examined only women. Of the three that examined both genders, two had a larger female majority in the sample and one did not report gender distribution. Two of the four studies had a sample with an average age of over 19, one with an average age of 44 and one studied adolescents with an average age of 16.1.

**Acculturation measurement.** Three of the four studies used proxies to measure acculturation. One study used generational status as a single measure proxy (Iwamoto et al., 2012). Two studies used proxies with several components. The Hahm et al. (2004) study constructed an acculturation index using three binary variables: place of birth, length of residency in the U.S., and use of English at home. The Ryu et al. (2013) study created a cluster analysis to measure acculturation, and the variables included were nature of citizenship, English proficiency, language of interview, percent of life in U.S., and language of mass media. The Kane et al. (2016) study was the only study to use a validated acculturation scale. In this study, the 8-item revised Suinn-Lew Asian Self-Identity Scale was used, with scores being calculated on three scales measuring traditionalism, biculturalism, and assimilation.

**Binge drinking operationalization and binge drinking measurement.** Binge drinking was operationalized differently in each of the four studies, as outlined in Tables 3 and 4. Of the three studies examining populations with both genders, two used different operationalizations for males and females (Iwamoto et al., 2012; Ryu et al., 2013) and one did not (Hahm et al., 2004). Three of the four studies measured binge drinking as an isolated variable whereas in one study binge drinking was not analyzed in isolation but was included as a part of a composite variable representing alcohol use (Kane et al.,

2016). Binge drinking was measured via self report in interviews conducted in person in two of the four studies (Ryu et al., 2013; Kane et al., 2016), via a self reported web survey in one (Iwamoto et al., 2012), and via a mix of interview and survey techniques over different waves in the final (Hahm et al., 2004).

**Results.** Two of the four studies reported a significant relationship, between acculturation and binge drinking, after controlling for relevant confounders. These have been described in Table 3. In the Kane et al. (2016) study, a higher degree of biculturalism ( $\beta=-1.33$ ,  $p=0.01$ ) and traditional culture identification ( $\beta=-0.94$ ,  $p=0.03$ ) was associated with lower levels of alcohol use (of which a subcomponent was binge drinking), among those who drank. In the Ryu et al. (2013) study, the odds of binge drinking in the acculturated group were not significantly different relative to the traditional group in women. In this study, Native Koreans were defined as adults born and raised in South Korea. Traditional Korean Americans were defined as individuals born in Korea but who spent under 60% of their life in the U.S., and were only partially, not fully acculturated. However, the odds of binge drinking in the Native Korean group were 2.1 times (95%CI 1.2-3.5) that of the traditional Korean American group. This indicated that even a low level of acculturation helped protect against binge drinking, and identifying more with the heritage culture increased the odds of binge drinking.

The other two studies did not report a significant relationship between acculturation and binge drinking, after controlling for confounders. The proxy for acculturation, generational status (IRR=1.07, 95% CI 0.86-1.33), was not significantly linked to binge drinking in the mixed Asian sample in the Iwamoto et al. (2012) study. The acculturation index was initially significantly linked to binge drinking (OR=1.34,

95% CI 1.06-1.67), but no longer remained significant after adjusting for best-friend's alcohol and tobacco use (OR=1.24, 95% CI 0.96-1.61) in the Hahm et al. study (2004).

The heterogeneous results are largely attributable to the different subgroups populations, ages, and genders examined in these studies. Two of the studies examined Asian American Adolescents, while the other two examined adult populations of Vietnamese, Cambodian and Korean populations. Perceptions among the literature illustrate that Asian-American populations have low binge drinking rates, but several studies, such as those used in this review, demonstrate this perception may be incorrect (Iwamoto et al., 2012). While relative levels of binge drinking in Asian American populations are lower than that of White, Black and Latino populations, this must not take away from the fact that populations of Japanese, Korean and Filipino Americans are reported as having high absolute levels of binge drinking (Hahm et al., 2004). Levels of binge drinking in Vietnamese and Chinese groups have been shown to be the lowest among Asian American Populations (Kane et al., 2016). Further, binge rates of Japanese Americans have been shown to be comparable to White Americans (Kane et al., 2016). In addition, Asian American adolescents who drink evidence levels of alcohol use and binge drinking higher than that of any other ethnic group (Hahm et al., 2004). These intergroup differences partially explain the heterogonous results in this small group of studies.

### **Mixed Immigrant groups, acculturation and binge drinking**

**Study design, study location and nature of data.** Two of the three studies were longitudinal in nature and one was cross sectional. One study had findings specific to California, whereas the other two used nationally representative samples (Wahl & Eitle, 2010; Li & Wen, 2015). All three studies used data from secondary sources. The

secondary sources used were National Longitudinal Study of Adolescent Health (1994-1995), California Health Interview Survey (2009) and the New Immigrant Survey (2003).

**Sample characteristics.** Each of the three studies looked at diverse groups of immigrants and examined populations with both genders included. Two of the three studies sampled adults, while one sampled adolescents. Bryant and Kim (2013) examined Asian and Hispanic immigrants, aged over sixty. The Li and Wen (2015) study examined adult US immigrants from several continents. The Wahl and Eitle (2010) study examined populations of Mexican American, Puerto Rican, Cuban American as well as non-Hispanic white adolescents.

**Acculturation measurement.** Each of the three studies used proxies for acculturation. Two of these used proxies with over two components, while one used a single measure proxy. Li and Wen (2015) used years of residence in the U.S. as a single measure proxy to measure acculturation. Wahl and Eitle (2010) used bilingualism, GPA (obtaining good grades was treated as normative behavior that reflected acculturation) and family social relations to measure selective acculturation. The relationship between each of these proxies and binge drinking was tested individually. Bryant and Kim (2013) used five items to assess acculturation; language use at home, language use with friends, language of television programs watched, language used for the interview, and overall use and comfort with the English language that generated a cumulative score representing acculturation.

**Binge drinking operationalization and measurement.** Binge drinking was operationalized differently in each of the three studies as outlined in Table 5. Of the three studies, two did not have different operationalizations on the basis of gender (Wahl &

Eitle, 2010; Li & Wen, 2015), whereas one did (Bryant & Kim, 2008). Binge drinking was measured via self report in interviews in all three studies, of which two were conducted in person and one over the telephone (Bryant & Kim, 2008).

**Results.** All three studies reported at least one significant relationship, between acculturation and binge drinking, after controlling for confounders. In the Bryant and Kim (2008) study of immigrants over 60, acculturation was predictive of a decreased probability of past year binge drinking (OR=0.86, 95% CI 0.76-0.97) for Asian American immigrants, though not in Hispanic immigrants. The Bryant and Kim (2013) study found that higher levels of acculturation were protective against past year binge drinking for older Asian immigrants, but not for older Hispanic immigrants. This finding is inconsistent with the literature about Asian immigrants as a whole; however, it was attributed to the fact that Korean immigrants were included in the sample. Literature has indicated that high levels of drinking in Korean culture results in there being an inverse relationship between acculturation and binge drinking for Korean immigrants (Bryant & Kim, 2013). The effects of acculturation on older immigrants have been vastly understudied and this study attempted to fill this gap in literature.

In contrast, Li And Wen (2015) found that longer years of residence in the U.S. was predictive of significantly higher odds of binge drinking in both men (OR=1.03, 95% CI 1.02- 1.04) and women (OR=1.06, 95% CI 1.04-1.08). This study is notable for the diversity of its sample. However, after adjusting for age at migration, the effect of acculturation on binge drinking was only significant for men who migrated between the ages of 0-9 (OR=1.06, 95% CI 1.01, 1.11), and not for women. Thus, greater acculturation, measured through longer years of residence in the U.S., predicted binge

drinking only in men across a wide range of cultures of origin. This study filled a gap in the literature by looking at acculturation through a life course perspective. It examined the relationship between acculturation and binge drinking among several immigrant groups from different continents, including populations from Africa and the Middle East that had previously been understudied. However, place of origin was controlled for and thus intergroup differences were not able to be ascertained. However, this also meant that the results helped identify associations between years of duration and acculturation that were generalizable over a large population as the sample included immigrants groups from several continents.

In the Wahl and Eitle study (2010), bilingualism reduced the odds of binge drinking in all women (OR=0.43 95% CI 0.19- 0.97) but not for all men (OR=0.54 95% CI 0.28-1.07). The sample contained individuals with Puerto Rican, Mexican and Cuban ancestry and non-Hispanic whites. This study offered new insights into how gender, acculturation levels and ethnic variations between groups of adolescents shape their alcohol use and binge drinking. It was the first study to examine this relationship and to include a diverse range of White and Latino adolescents. Results demonstrated that bilingualism was only associated with reduced odds of binge drinking in women. It also highlighted how different Latino groups had different acculturation and binge drinking levels, with special notice given to Mexican male adolescents who had high levels of acculturation and binge drinking that remained high even in adulthood. As in the previous study, this study controlled for subgroups when testing the association between selective acculturation and binge drinking, hence intergroup differences in acculturation and drinking could not be determined. However, it was helpful to stratify the results on the

basis of gender. After controlling for several variables including the ethnicity subgroups, bilingualism was the only aspect of selective acculturation that was negatively associated with binge drinking in women, but not in men.

### **Discussion**

The purpose of this review was to establish a better understanding of the nature of the relationship between acculturation and binge drinking in major immigrant groups in the U.S. The available studies addressed this association within two major immigrant groups (Hispanic-Americans and Asian-Americans) as well as within heterogeneous multi-cultural samples. This literature employed a mix of cross sectional and longitudinal data, as well as a diversity of sample sizes, scales, proxies and binge drinking operationalizations. Further, some studies analyzed young adolescent populations, some adult and some older populations. All of these factors contributed to the heterogeneity of the results found. I will summarize the pattern of the results within immigrant groups, discuss strengths and limitations of this heterogeneous literature and offer directions for future research.

First findings related to Hispanic samples will be reviewed. Six of the ten studies reported significant findings. Two found that higher acculturation led to lower odds of binge drinking (Montoya et al., 2016; Eitle et al., 2009). This was attributed to the fact that alcohol use is a collective practice in Hispanic populations, and the presence of more fiesta drinking occurrences in rural settings causes higher levels of binge drinking in traditional settings than in places of immigration (Loury et al., 2011). Further, lower levels of acculturation have been seen to be related to higher acculturative stress and lower education levels that are associated with higher levels of binge drinking (Daniel-

Ulloa et al., 2014). Consistent with the adoption of the more liberal drinking norms and attitudes in the U.S. culture, three found that higher acculturation increased the odds of binge drinking (Tolbert et al., 2009; Des Rosiers et al., 2013; Caetano et al., 2008). This was attributed to the acculturation stress theory that states that racial and ethnic discrimination resulting from being a minority group, leads to a higher likelihood of individuals attempting to follow norms of the dominant culture and adhering to prevailing norms (Tolbert et al., 2009; Montoya et al., 2016). Further, higher acculturation is shown to increase the adoption of liberal norms and attitudes that leads to higher levels of positive associations with alcohol (Caetano et al., 2008). One study reported complex results where the effects of acculturation changed direction over time (Guilamo-Ramos et al., 2004). This study cited that individuals residing in highly Hispanic areas as opposed to monocultural American areas, would retain more traditional culture and engage in less risky behaviors and that individuals who were bicultural and engaged in both home and U.S. practices were at the least risk of practicing alcohol use risk behaviors. In short, the type of acculturation and receiving context affected the relationship between acculturation and binge drinking (Guilamo Ramos et al., 2004). Another study that supported the idea that acculturation has heterogeneous effects on binge drinking, cited the segmented assimilation model (Eitle et al., 2009). This model suggests that family resources, relations and reception contexts affect the level and type of acculturation that takes place, and binge drinking behaviors vary on this basis and can have a positive or negative association (Eitle et al., 2009).

The fact that these six studies presented different findings in the relationship between acculturation and binge drinking may be a function of variability across the

samples in immigrant subgroup and age. Other reasons that could have contributed to these variabilities within this group of studies include the differences in measurement: two studies used scales, and three used proxies. Further, the operationalization of binge drinking was different in each study that had significant findings.

The results of the small number of studies examining Asian-American samples were quite heterogeneous. Two studies examining student samples reported no significant findings, perhaps reflecting the acculturating influences of attending college. One study reported that traditional Koreans with higher acculturation levels were less likely to binge drink than Native Koreans with lower acculturation levels (Ryu et al., 2013).

Alternatively, one study reported that higher biculturalism and traditional culture orientation (both characterized by continued importance of traditional culture) led to lower odds of binge drinking than in more acculturated individuals (Kane et al., 2016). This limited literature reveals considerable heterogeneity among Asian American populations, such that each subgroup has different binge drinking patterns, so that aggregating them into a homogenous group can mask these variances (Iwamoto et al., 2012). Acculturation presents itself differently within different subgroups of Asian Americans due to widely varying traditional cultural norms and practices related to alcohol use, immigration patterns and languages, but subgroup differences have historically been understudied (Ryu et al., 2013; Kane et al., 2016). Thus, the varied results for each study can be attributed to the fact that acculturation reflects differential disparities in U.S. drinking patterns relative to native cultures among these diverse groups.

The studies analyzing mixed immigrant groups offered information about a diverse range of immigrant groups. Examining relationships between acculturation and binge drinking in varied immigrant groups between different studies can lead to several issues in comparability due to variability in measurement and analysis, hence it was difficult to ascertain a homogenous pattern of acculturation and binge drinking from this set of studies. However, these studies did highlight the importance of not only looking at the relationship between acculturation and binge drinking by heritage culture but also by gender, age categories that include those previously understudied such as that of senior citizens, and by age at immigration.

### **Strengths and limitations**

Several strengths of the literature reviewed should be highlighted. First, many used large national samples, enhancing power and potentially generalizability. Second, most of the analyses controlled for potential confounders, thus, increasing statistical accuracy (Hahm et al., 2004). Some of these included age, gender, employment status, income, parental and peer alcohol use and other potential confounders that could affect the relationship between acculturation and binge drinking. Accounting for these meant that the relationship found was more reliable than if these potential influencing variables had not been accounted for (Hahm et al., 2004). Third, some of the studies analyzing Hispanic groups utilized scales that have been shown to have high internal consistency and reliability such as the Stephenson Multigroup Acculturation Scale and the 30-item Acculturation Rating Scale for Mexican–Americans (Stephenson, 2000; Loury et al., 2011). More sensitive measurement of the acculturation construct should lead to more nuanced conclusions. Lastly, the advantage of examining the three studies investigating

mixed groups, was that they looked at large populations that included many immigrant groups, thus making the results more generalizable.

Several limitations characterized the studies reviewed. One disadvantage for all the groups studied was that the number of studies included were limited, especially in the case of the studies examining Asian American and mixed immigrant populations. A second limitation is the common practice of combining immigrants from cultures that are distinct in their relationships with alcohol (e.g., combining Koreans and Japanese), and can thus mask the true direction of the relationship between acculturation and binge drinking if included in the same sample (Ryu et al., 2013). Third, all measures were based on self report, which may be subject to recall and social desirability biases (Hahm et al., 2004). Further, the optimal method of assessment depends on context. The use of questionnaires can increase the likelihood of truthful results being reported relative to face-to-face interviews (Ryu et al., 2013). This is because alcohol use can be sanctioned and stigmatized and can cause participants not to reply in an open-ended and truthful manner when talking to another person (Waterton, 1984). Alternatively, face-to-face interviews can help establish a trustful relationship between the interviewer and interviewee and lead to a more accurate and comprehensive reporting of results (Rye et al., 2013). In the case of research with immigrant groups, it is also important to consider the aspect of cultural mistrust that can play into scenarios where the interviewee and interviewer do not share the same cultural origin. This can be in the form of hesitation in response, preconceived notions and general problems relating to communication cues and language differences (Whaley, 2011). Further, there was a need for more analyses on acculturation and binge drinking differences within the immigrant groups.

Fourth, there were more cross sectional studies than longitudinal studies, which limits ability to infer causation and understand the change in variables over time (Kane et al., 2016). Assessing relationships between variables in cross sectional studies does not allow a determination of the direction of the relationship between variables. It is important to accurately distinguish correlation from causation. Causality requires several markers; temporal order, coherence and covariation (Rindfleisch, Malter, Ganesan, & Moorman, 2008). If a relationship does not meet all of these markers, then there may be other alternative variables or explanations that explain the relationship between the exposure and outcome variable (Rindfleisch et al., 2008). However, longitudinal studies reduce the risk of alternative explanations as they allow researchers to incorporate fixed effects into their study design (Rindfleisch et al., 2008).

Fifth, a majority of the studies used proxy assessments of acculturation. Proxies are unidimensional measures that fail to capture the multidimensional and complex nature of the acculturation process, by not allowing the measurement of the multiple dimensions of acculturation (Ryu et al., 2013; Loury et al., 2011). In addition, several of the proxies used were single measures such as years of residence or language use at home, that exacerbated this problem further (Ryu et al., 2013). Unidimensional scales assume that an increase in host culture involvement results in a decrement in traditional culture involvement, while bidimensional scales look at acculturation as a point on two scales. However, by limiting individuals' responses to points on one or two scales, the results may be biased and not incorporate the variety of factors that affect acculturation levels in an individual, such as behaviors, knowledge, values, cultural identifications and

other factors that signify the complex acculturation process (Gim Chung, Ruth, & Abreu, 2004; Zea, Asner-self, & Birman, 2003).

### **Conclusions and Future Directions**

This literature review summarizes the relationship between acculturation and binge drinking in different immigrant groups, as well as the directions of this relationship. No definitive relationship has emerged between acculturation and binge drinking in this review. It is clear from the results presented in the studies that the direction of the relationship between acculturation and binge drinking is dependent on a number of factors such as original heritage culture, gender, age of the individual, family relations and reception contexts, among others.

Nonetheless, this review has revealed promising directions for future research. First, there is a lack of literature on older immigrant populations, as most studies focus on adolescent to middle aged populations. Second, research is lacking on minority immigrant groups such as those from the Middle East and Africa. Hence, future research should look at exploring these understudied populations. Third, while several studies have investigated the moderating effects of gender on the relationship between acculturation and binge drinking in large groups of Hispanic and Asian immigrant groups, it would be fruitful to investigate this relationship within all immigrant subgroups. In many cultures, we see gendered patterning of drinking behavior, so the responses to acculturation are likely to vary by gender (Wilsnack, Wilsnack, Kristianson, Vogeltanz-Holm, & Gmel, 2009). Fourth, future studies should measure acculturation using multidimensional measures and scales that allow for the assessment of all of the four predominant acculturation strategies as several current studies find results that are

limited or biased by their utilization of unidimensional scales or proxies. Fifth, because acculturation is a process, longitudinal studies should be conducted to help assess the directionality of the relationship between acculturation and binge drinking and changes over time. Sixth, future studies should conduct comparative analyses across more homogenous subgroups within Hispanic, Asian and other majority immigrant groups, as analyzing large heterogeneous groups can prevent the identification of the vast subgroup differences in acculturation levels and binge drinking patterns that exist within these large populations. Finally, it may be informative if more forms of qualitative research are conducted in this field such as focus groups or in depth interviews. As acculturation is a process of social, psychological and cultural change, it may not always be accurately captured by a few questions, proxies or quantitative scales that do not allow for explanations or elaboration of answers. A better understanding of acculturation differences between immigrant groups could inform future alcohol use interventions and health promotion programs.

## **Part 2: Do Heritage and American Culture Identifications Influence Binge Drinking?**

### **Abstract**

Binge drinking is associated with several negative health, mental and social outcomes. Acculturation, defined as the alterations in values, identifications and practices of minority group members that occur when they come in contact with a new dominant culture, is one predictor of binge drinking. The current study aimed to identify whether heritage and/or American culture scores on the Vancouver Index of Acculturation (VIA) uniquely or interactively predict binge drinking. Binge drinking was defined as the consumption of four or more drinks on one or more days of the week for women; five or more drinks on one or more days of the week for men, in this study. Participants ( $N=350$ , 56% female), recruited via Qualtrics survey panels, were current college students who reported having consumed alcohol and having experienced alcohol induced amnesia in the past 12 months. Responses were obtained using an online Qualtrics survey. Descriptive analyses, bivariate correlations and chi square tests were used to characterize the sample and identify covariates. Logistic regression analyses, controlling for biological sex and non Hispanic White race, were conducted to examine the effects of heritage and American scores on the likelihood of binge drinking. Results did not indicate a significant effect of heritage or American culture scores, uniquely or interactively, on binge drinking. Possible factors contributing to non significant results may include sample bias and lack of scale specificity towards a particular cultural group. Future studies should attempt to measure this relationship using diverse samples including different age groups and also conduct longitudinal and qualitative analyses.

## **Background**

Alcohol use is associated with several negative health, mental and social outcomes such as cardiovascular problems, liver diseases, increased risk of HIV infection, certain cancers, emotional distress, higher risk of incarceration, intimate partner violence, sexually transmitted infections, physical and sexual assault, financial indiscretion and driving under the influence, among others (Kissinger et al., 2013; Iwamoto, Takamatsu, & Castellanos, 2012). Over 60% of college students reported alcohol use and 2 in 3 college students reported engaging in binge drinking (five or more drinks on the same occasion on at least 1 day in the past month), in a recent U.S. national survey (NIAAA, 2015). In addition to general alcohol related negative consequences, binge drinking is associated with a higher risk for specific consequences for college students such as sleep or study disruption, property damage and sexual assault (White & Hingston, 2013). Further, binge drinking is the most preventable cause of death for undergraduate college students (Venegas, Cooper, Naylor, Hanson, & Blow, 2012).

The operationalization of binge drinking often involves four or more drinks for women and five or more drinks for men over some time period, such as on one occasion in the past month or year (Des Rosiers et al., 2013; Montoya, Wittenburg, & Martinez, 2016). Binge drinking is a critical form of alcohol use that must be studied as higher levels of drinking increase the risk of the adverse outcomes associated with alcohol use (Miller, Naimi, Brewer, & Jones, 2007; Paul, Grubaugh, Frueh, Ellis, & Edege, 2011) such as infectious and chronic diseases, financial and psychosocial problems. As such, it is important that factors that predict or are associated with binge drinking be identified. Further, given the high prevalence of binge drinking by college students and the

associated increased risk of negative consequences to the self and others, it is critical to examine the predictors of binge drinking in this group in particular.

Acculturation may be one such predictor of binge drinking (Bryant & Kim, 2013). Further, it is especially important to study the predictors of binge drinking in young adults as peer influences and perceived social norms that encourage drinking make college students particularly at risk of excessive drinking (Borsari & Carey, 2001).

An individual who is an immigrant in the U.S. will face a multidimensional process of adjustment and adoption of U.S. cultural values, norms, and lifestyle (Kane et al., 2016). Acculturation refers to the alterations in values, identifications and practices of the minority group members that occur when they come in contact with a new dominant culture (Des Rosiers, Schwartz, Zamboanga, Ham, & Huang, 2013). It involves the retaining or discarding of cultural orientations of the country they immigrate to and retaining or discarding the cultural orientations of their country of origin or heritage (Schwartz, Unger, & Szapocznik, 2016). Further, any individual who is a part of a minority culture may be confronted with the task of having to balance the influence of mainstream U.S. culture values with those of their original heritage culture (Guilamo-Ramos, Jaccard, Johansson, & Turrissi, 2004). Thus, acculturative experiences are not restricted to first generation immigrants, and are also experienced by further generations of immigrants, who may even be naturalized U.S. citizens (Guilamo-Ramos et al., 2004). Further, college students are particularly susceptible to the consequences of acculturation as they often begin to shape their autonomy and identity at college, as they go through adolescence (Hahm et al., 2004). Adopting values and behaviors of peers in the dominant

culture i.e. U.S. cultural values, may play a critical role in socialization and peer acceptance for college students (Hahm et al., 2004).

As acculturation alters an individual's practices, values and norms, it follows that the level of acculturation experienced by an individual plays a critical role on their social, psychological and health behaviors (Schwartz et al., 2016). Of these behaviors, alcohol use is one that has been shown to be strongly influenced by acculturative experiences (Bryant & Kim, 2013). Acculturation can affect alcohol consumption practices via multiple pathways (Bryant & Kim, 2013). For instance, if new dominant culture norms regarding alcohol are less prohibitive for women in the host country than the home country, an immigrant woman may increase her own alcohol consumption due to the increased acceptability in the new environment (Bryant & Kim, 2013). Another theory that associates acculturation with binge drinking is the acculturation stress theory (Gil, Wagner, & Vega, 2000). This theory highlights the importance of the stress often involved with aspects of the acculturation process. Stress can ensue from feelings of being misunderstood or discriminated against, conflict resulting from varying levels of acculturation between family members and general stress involved with adapting to and experiencing a new environment (Gil et al., 2000). These may result in an individual engaging in negative alcohol use behaviors as a coping mechanism (Gil et al., 2000).

Biculturalism involves the possession of cultural values, practices and identifications from both heritage and new dominant culture (Schwartz & Unger, 2010). Individuals with low bicultural identification see their heritage and dominant culture as oppositional and distinct from each other. Individuals with high bicultural identification see their heritage and dominant culture as non-oppositional and compatible, and may

behave in ways characteristic to both or either cultures based on the external cues they are primed with (Benet-Martínez, Leu, Lee, & Morris, 2002). Further, heritage and mainstream identifications are independent and correlate non inversely with an individual's personality, values, self-identity and related variables (Benet-Martinez et al., 2002). Thus, as affiliation with both cultures occurs independently, it becomes important to investigate the effects of both heritage culture and dominant culture on binge drinking.

In this paper, I will be using a bidimensional approach to measure acculturation. Bidimensional scales measure acculturation through two scores that represent heritage and mainstream culture, respectively (Ryder et al., 2000; Kane et al., 2016). When investigating identifications of individuals in the U.S., the two scores would represent their traditional culture and that of U.S. mainstream culture (Kane et al., 2016). Bidimensional approaches are strongly preferred over unidimensional approaches as they allow for the existence of bicultural identities in an individual and allow both the heritage and dominant culture score to vary independently (Des Rosiers et al., 2013). Further, it is particularly important to use a bidimensional scale when investigating how heritage and American identifications relate to a certain dependent variable or outcome (Des Rosiers et al., 2013). This is because a unidimensional instrument may not be able to identify a strong association between a dependent variable and the heritage and/or American cultural identifications as the two effects could risk being cancelled out (Des Rosiers et al., 2013).

### **Purpose of Present Study**

This first goal of this paper is to test if degree of affiliation with one's heritage culture and American culture uniquely predict binge drinking. I expect to find that

American culture identifications will significantly predict binge drinking, as individuals who identify with and adopt White American cultural practices have been shown to engage in higher levels of binge drinking and alcohol related behaviors than those who identify with other minority racial and ethnic groups in the U.S. (Des Rosiers et al., 2013).

The second aim of this paper is to investigate the potential interaction between American and heritage culture scores on the presence of binge drinking in individuals. This will entail examining whether a stronger identification with American culture is more strongly associated with the likelihood of binge drinking in individuals at lower versus higher levels of heritage culture identification. I expect to find that stronger identification with American culture will more strongly predict the presence of binge drinking at lower levels of heritage culture identification as opposed to higher. This is because lower levels of heritage culture identification and higher levels of adoption of mainstream U.S. values have been found to be predictive of binge drinking and alcohol related risk outcomes, due to the higher acceptability of alcohol use in mainstream U.S. culture as opposed to in other minority racial and ethnic groups in the U.S. (Des Rosiers et al., 2013). Further, higher levels of both heritage and American culture identifications have been shown to be less predictive of binge drinking than high and low identifications i.e. different levels of heritage and American culture identifications (Des Rosiers et al., 2013). This is because varying levels of identifications can lead to more stress in adapting to the new environment and increase the risk of alcohol related risk behaviors such as binge drinking, as a means of coping with stress (Des Rosiers et al., 2013; Gil et al., 2000).

This topic is especially important as a majority of acculturated individuals possess some level of bicultural identities, and it is rare for individuals to exclusively retain their heritage culture or absolutely reject the mainstream culture (Ryder et al., 2000; Des Rosiers et al., 2013). Thus, as there are a vast number of individuals who adopt varying forms of bicultural identifications, each of which may influence binge drinking, this question becomes critical to answer in order to mitigate the preventable negative consequences of harmful binge drinking behavior among young adults.

## **Methods**

### **Participants and Recruitment**

The sample used in the present study was recruited for a larger study on college students' experiences with blackouts. Participants ( $N=350$ , 56% female) were eligible if they self-reported: (a) age 18-29, (b) current college student in a 2- or 4- year degree granting institution, (c) having consumed alcohol in the past 12 months and (d) having experienced alcohol-induced amnesia in the past 12 months. As the measures were provided in English, individuals who did not read or speak English were excluded from the study. Individuals who indicated current college enrollment were recruited using Qualtrics survey panels. Participants were credited between \$2.25 to \$5.25 for their participation to their online panel account, as per the Qualtrics User Agreement. Further descriptions of the study sample have been provided in Table 6.

### **Procedures**

The students recruited via Qualtrics survey panels were sent an email invitation that included a link to complete the online survey. If accepted, the link provided a three step process where (a) screening measures were provided, (b) if screening measures

indicated eligibility, the student was redirected to an informed consent page and (c) a baseline survey was completed.

## **Measures**

**Demographic data.** Demographic data collected from participants included information regarding their age, biological sex, weight, gender identity, race/ethnicity, year in school, housing, type of degree-granting institution, varsity athlete status and fraternity/sorority membership. A binary indicator (0, 1) of non-Hispanic White race/ethnicity was created by coding as 1 only those individuals who had responded no to question “Are you Hispanic or Latino/a?” and checked only the “White” race box in question “How would you describe your race? Please check all that apply.”

**Drinking behavior.** Participants’ drinking behavior was assessed using a weekly grid from the Daily Drinking Questionnaire (DDQ) (Collins, Parks, & Marlatt, 1985). Participants indicated how many standard drinks they typically consumed on each day of the week during the past 30 days. Using these data, the binge drinking outcome variable was operationalized as a binary outcome with “0” indicating no presence of binge drinking and “1” indicating presence of binge drinking (i.e., consumption of four or more drinks on one or more days of the week for women; five or more drinks on one or more days of the week for men). Data from this grid were also used to calculate sample drinking descriptives including drinks per week, drink per drinking day and typical blood alcohol concentration (BAC).

**Acculturation.** The acculturation levels of participants were assessed using the Vancouver Index of Acculturation (VIA) (Ryder, Alden, & Paulhus, 2000). This scale consists of 20 questions with odd numbered questions relating to heritage culture and

even numbered questions relating to mainstream American culture. A few examples of the items included are: “I often participate in [my heritage/American] cultural traditions” and “I often behave in ways that are typical of [my heritage/American] culture.” Each question had a response on a scale from 1 to 9, with 1 denoting highest disagreement and 9 denoting highest agreement. The mean of the 10 heritage culture items (odd numbered questions) generates the heritage culture subscale score and the mean of the 10 American culture items (even numbered questions) generates the American culture subscale score. The American and heritage subscale scores were the two predictor variables included in this model. The Cronbach’s alpha was found to be 0.92 for both the heritage and the American culture subscale. The correlation between these two subscales was 0.50 ( $p < 0.01$ ), indicating that they were related but not entirely overlapping constructs.

### **Data Analysis**

All statistical analyses were conducted using Stata 14. Descriptive analyses were conducted to identify the characteristics of the sample. Bivariate correlations and chi square tests were used to examine demographic variables related both to the binge drinking outcome variable and cultural scores, in order to identify appropriate covariates. Potential covariates included sex, age, and race/ethnicity based on prior research. Specifically, sex has been shown to be strongly linked to acculturative experiences and alcohol use. The nature of this association depends on the gender-based norms relating to alcohol consumption, in the country of origin, and whether the norms are more or less prohibitive in the receiving country (Wahl & Eitle, 2010). Age has been shown to be linked to acculturation as well as binge drinking, with significant differences in acculturative experiences and alcohol consumption reported between different age groups

such as adolescents, middle aged individuals or senior citizens, on the basis of stressors such as the presence of peer pressure, work or unemployment related stress (Blazer & Wu, 2009; Bryant & Kim, 2013). Individuals who identify as White have been found to have higher rates of binge drinking than other racial and ethnic groups (Loury et al., 2011). Further, acculturation experiences have been found to be distinctly different between racial and ethnic groups, particularly between those who are of white race versus other races (Kane et al., 2016). After determining appropriate covariates, logistic regression analyses were conducted to examine the effects of heritage and American scores, uniquely (Model 1) and interactively (Model 2), on the likelihood of binge drinking.

## **Results**

### **Descriptive Characteristics**

The study sample consisted of male and female college students with a past history of alcohol induced impairment ( $N=350$ ). The average age of the participants in the sample was 22 years (*range*: 18-29,  $SD=2.83$ ). Fifty four percent of the sample reported being non-Hispanic White ( $n=199$ ). Ninety three percent of the participants ( $n=326$ ) reported attending a 4 year institution (versus 2 year) and 74% reported attending a public institution ( $n=258$ ). The average number of drinks consumed per week by participants was 12 ( $SD=10.57$ ). Binge drinking was reported in 59% of the participants ( $n=205$ , 64%). The mean heritage culture score was 6.15 ( $SD=1.85$ ), while the mean American culture score was 7.03 ( $SD=1.56$ ). As these answers were reported on a scale of 1 to 9 with nine denoting highest agreement, the means reported indicated responses with

higher agreement than disagreement. Further descriptive characteristics are presented in Table 6.

### **Potential Covariates**

Age was not found to be significantly associated with either of the predictor variables or the outcome variable. Being of female sex was found to be significantly related to presence of binge drinking ( $\chi^2(1) = 10.4, p < 0.001$ ) and was correlated with scoring lower on the heritage culture score ( $r = -0.17, p < 0.001$ ). Being non-Hispanic White was significantly related to presence of binge drinking ( $\chi^2(1) = 6.4, p < 0.01$ ) and was correlated with scoring higher on American culture score ( $r = 0.19, p < 0.004$ ). Based on these findings, sex and non-Hispanic White race were included as controls in the logistic regression models.

### **Regression Models**

Model 1, testing main effects of heritage and American scores, revealed that the likelihood of binge drinking was not significantly predicted by either culture score, after controlling for sex and non Hispanic White race. Model 2 tested the potential additional effects on likelihood of binge drinking of the interaction between the two acculturation scores, again controlling for sex and non Hispanic White race. For this model, heritage and American culture scores were centered prior to creating the interaction term. Contrary to the hypothesis, Model 2 revealed that the interaction was not significantly related to binge drinking. In both models, the odds of binge drinking in females were significantly higher than in males (Model 1: 1.85 (1.18-2.92) Model 2: 1.84(1.17-2.91). Further information can be found in Table 7.

## **Discussion**

This analysis aimed to assess whether heritage and American culture scores uniquely or interactively predict binge drinking in U.S. college students with varying levels of acculturation. The hypothesis in this paper followed from prior research demonstrating that high American culture identification uniquely predicts binge drinking in individuals, and that high American culture identifications predict a higher presence of binge drinking at lower levels of heritage culture identifications as opposed to higher (Des Rosiers et al., 2013). However, the results of the present study depicted that binge drinking was not significantly associated with either score, or their interaction. Below, this lack of significant findings is placed in the context of prior research, and potential explanations for a failure to support the hypotheses are described.

There are several reasons that may have contributed to a lack of expected significant effects of heritage and American culture on binge drinking in this study. Some of these reasons are related to characteristics of the present study sample. First, the sample in this study included participants who had reported having consumed alcohol and having experienced an alcohol induced blackout in the past 12 months. The sample included higher risk drinkers due to these eligibility criteria, which may have led to a restriction of range in the outcome variable and biased results. Second, the participants were all between the ages of 18-29, thus it is possible that the age group was not diverse enough to represent the relationship between bicultural identifications and binge drinking, due to the very specific sample of only college students who reported recent alcohol-induced memory loss. Literature has shown that young adults are more likely to largely embrace dominant culture values and discard original heritage culture, and are

thus shown to be less likely to possess bicultural identifications than older age groups (Cabassa, 2003). Further, second and third generation, more acculturated immigrants have been found to engage in more binge drinking and alcohol use than first generation immigrants ((Eitle, Wahl, & Aranda, 2009). However, this survey did not collect information about immigrant generation and thus we were unable to examine whether this characteristic could have contributed to the results.

Other reasons for a lack of significant effects may relate to measurement. The acculturation process is dynamic, and entirely capturing cultural identifications through any form of instrument or tool is challenging (Cabassa, 2003). Existing scales, including the scale used in this study, do not focus on contextual factors that may influence acculturative experiences and the behavioral risk consequences that follow, such as those relating to alcohol consumption, and may not capture all the mediators and moderators of the acculturation experience (Cabassa, 2003). Some such factors that have been shown to moderate the acculturation experience but have not been included in this study are marital status, religion, and levels of social support, among others (Flaskerud & Uman, 1996).

Further, while the scale used to measure American and heritage culture scores has been cited as an effective bidimensional acculturation measurement tool in literature (Ryder et al., 2000), it possibly lacks the comprehensiveness found in multidimensional scales that measure acculturation through a multi-domain approach that captures various identifications and values (Loury et al., 2011). This paper used a bidimensional tool as multidimensional scales often have more questions included and thus, obtaining and analyzing responses can be a time consuming process. Given that this survey was conducted online, with the acculturation scale included at the end, a shorter

bidimensional tool seemed more apt so as not to cause response fatigue in the participants (Bosnjak & Tuten, 2001). However, it is possible that the employment of a more comprehensive multidimensional scale could have resulted in significant findings.

Finally, a majority of studies in current literature use scales that have been developed solely for the measurement of acculturation in particular groups or ethnicities such as Hispanic or Asian American groups (Guilamo-Ramos et al., 2004; Ryder et al., 2000; Hahm et al., 2004). Such scales have been refined by testing on target populations, in addition to asking questions that are specific to the particular heritage culture (Ryder et al., 2000). One such example is the Acculturation Rating Scale for Mexican Americans that asks questions relating to growing up with friends of Mexican origin and Spanish speaking preferences, among other specific questions relating to the Hispanic culture (Caetano, Ramisetty-Mikler, Wallisch, McGrath, & Spence, 2008). It is possible that the lack of the VIA's specificity towards a particular culture, and the large number of cultures represented among the participants in this study, could have resulted in less efficacy in the results of this study than if a particular culture and an accompanying culturally specific scale had been employed. The above mentioned limitations of the study sample and measurement should all be addressed in future research.

### **Strengths**

Despite the limitations of this study, it also has several strengths. The VIA has been found to cover multiple domains and possess good psychometric properties, in addition to being cited frequently in literature (Celenk & Van de Vijver, 2011). It has been touted for its comprehensiveness despite its relatively short length compared to other bidimensional scales in literature (Ryder et al., 2000). Further, both the heritage and

American subscales in it had high internal consistency and reliability, as depicted by an alpha over 0.9 (Tavakol & Dennick, 2011). There was large variation in race, ethnicity, and near equal representation of both sexes in the survey sample, thus allowing for more generalizable results. The survey was administered online, thus allowing for more truthful responses than in the case of face to face research methods, given the sensitive and potentially stigmatizing nature of the research topic (Wright, 2005).

### **Conclusion and Future Directions**

This study found that heritage and American culture scores do not uniquely or interactively predict binge drinking. While this paper employed one scale, the Vancouver Index of Acculturation, future studies should aim to analyze the nature of the interaction between heritage and American culture scores and binge drinking through a variety of validated bidimensional and multidimensional scales that assess heritage and mainstream cultural values, identifications and practices. Future studies should recruit participants who are of diverse ages or not restrict to current students. This will allow for better representation through a diverse range of participants, as acculturation strategies and experiences have been documented as varying between different age groups (Cabassa, 2003). Thus, examining a restricted sample may have biased results when investigating an overall relationship between variables. In addition, cultural identifications and acculturative experiences are complex processes that are largely being measured through scales and surveys in current literature (Ryder et al., 2000). More qualitative research such as focus groups, ethnographic studies or interviews should be conducted to examine in more depth how cultural identifications uniquely and interactively influence binge drinking and other alcohol use behaviors. Lastly, acculturation is a dynamic and

developing process, and thus future research should investigate how heritage and dominant culture identifications change for individuals over time (Cabassa, 2003), such as from youth to adulthood, and how these changes influence alcohol use.

Table 1: Studies examining the relationship between Acculturation and Binge Drinking in Hispanic American populations that found significant results

| Article                                                                                  | Acculturation Scale                                      | Scale Type<br>Subscales                                                                        | Study Design<br>Association between exposure and outcome | N<br>Average age (range)<br>%M/F                                                | Binge Drinking Operationalization<br>Binge Drinking Measure                                                                                                                                                                                          | Results<br>(covariates)                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Montoya J, Wittenburg D, Martinez V. November 2016; 42(6):707-714.</b>                | 12 item Acculturation rating scale for Mexican Americans | Multidimensional<br><br>Orientation towards Mexican culture, Orientation towards Anglo culture | Cross Sectional<br><br>Cross Sectional                   | 157 Hispanic students<br><br>21.68 (< 30)<br><br>79.6% F<br>20.4% M             | 4 or more drinks per occasion in women, 5 or more drinks per occasion in men<br><br>Obtained from 5 item Questionnaire within section 15 of Behavioral Risk Factor Surveillance System Questionnaire<br><br>Self report in questionnaire (in person) | Among those who drink, lower levels of Anglo orientation were linked to increased number of drinks and largest number of drinks per occasion.<br><br>(age)                                                                                                                                              |
| <b>Des Rosiers S, Schwartz S, Zamboanga B, Ham L, Huang S. April 2013;69(4):319-340.</b> | 32 item Stephenson Multigroup Acculturation Scale        | Bidimensional<br><br>Ethnic Society Immersion, Dominant Society Immersion                      | Cross Sectional<br><br>Cross Sectional                   | 1527 Hispanic undergraduate students<br><br>20.53 (18-25)<br><br>76% F<br>24% M | 4 or more drinks on a single occasion for women and 5 or more drinks on a single occasion for men in past 30 days<br><br>Obtained from Alcohol Use Disorders Identification Test<br><br>Self report in questionnaire (web based)                     | Separated bicultural orientation and low bicultural orientations were predictive of lower odds of binge drinking than the more acculturated assimilated orientation.<br><br>(gender, university settings, type of living environment)                                                                   |
| <b>Rachel Tolbert K.2009;(5):1145.</b>                                                   | -----                                                    | Proxy<br><br>Language of interview, 7 item traditional values scale                            | Longitudinal<br><br>Cross Sectional                      | 2023 Latino Adults                                                              | 5 or more drinks on one occasion in the past 30 days<br><br>Obtained from Los Angeles Family and Neighborhood survey (L.A.FANS)                                                                                                                      | Holding traditional values and speaking Spanish were associated with lower odds of binge drinking, with marginal significance.<br><br>(nativity, sex, age, education, employment, whether respondent grew up with parents, household income, whether there are children in the household, neighborhood) |

|                                                                                                     |                                                                     |                                                                                   |                                        |                                          |                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------------------------------|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                     |                                                                     |                                                                                   |                                        |                                          | Self report in interview<br>(in person)                                                                                                                               | ethnic composition and poverty level)                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Eitle T, Wahl A, Aranda E. January 1, 2009; 38:732-742.</b>                                      | -----                                                               | Proxy<br><br>Bilingualism, GPA, Family Social Relations                           | Longitudinal<br><br>Cross Sectional    | 1504 Latina/o adolescents                | 5 or more drinks in a row in one day<br><br>Self report in interview and survey (in person)                                                                           | Binge drinking was associated with selective acculturation, but this differed among groups. Being bilingual reduced the odds of binge drinking in Mexican adolescents. High scores on the family relationship index reduced the odds of binge drinking in Mexican and Puerto Rican adolescents but increased it for Cuban adolescents.<br><br>(gender, age, parental alcohol use, parental education) |
| <b>Guilamo-Ramos V, Jaccard J, Johansson M, Turrisi R. June 2004; 18(2):135-142.</b>                | -----                                                               | Proxy<br><br>Length of residence, Language spoken at home                         | Longitudinal<br><br>Cross Sectional    | 2035 Latino Youth                        | 5 or more drinks in a row in the past 12 months<br><br>Obtained from National Longitudinal Study of Adolescent Health<br><br>Self report in interview (in person)     | Acculturation variables were not related to binge drinking in youth who never experimented with alcohol, but complex relationships existed with those who had.<br><br>(Latino subgroup, grade, gender, religion, religiosity, maternal education, family income, family structure)                                                                                                                    |
| <b>Caetano R, Ramisetty-Mikler S, Wallisch L, McGrath C, Spence R. February 2008;32(2):314-321.</b> | 30 item Acculturation Rating Scale for Mexican-Americans (ARSMA-II) | Multidimensional<br><br>Mexican-Oriented Scale (MOS), Anglo-Oriented Scale (AOS). | Cross Sectional<br><br>Cross Sectional | 956 Hispanic Adult<br><br>49% M<br>51% F | No. of times 5 or more drinks consumed per occasion in past year<br><br>5 or more drinks on same occasion in past 30 days<br><br>Self report in interview (in person) | Very Anglo oriented women reported higher rates of binge drinking as compared to very Mexican oriented, Bi-Mexican and Bi-Anglo women, indicating that higher acculturation increased the odds of binge drinking.<br><br>(age, gender, ethnicity)                                                                                                                                                     |

Table 2: Studies examining the relationship between Acculturation and Binge Drinking in Hispanic American populations that found no significant results

| Article                                                                           | Acculturation Scale                                     | Scale Type<br>Subscales                                                      | Study Design<br>Association between exposure and outcome | N<br>Average age (range)<br>%M/F                                | Binge Drinking Operationalization<br>Binge Drinking Measure                                                                                                                                                                                                                          | Results<br>(covariates)                                                                                                                                                                                            |
|-----------------------------------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Daniel-Ulloa J, Reboussin B, Rhodes S, et al. 2014; 8(4):339-348.</b>          | 12 item Short Acculturation Scale for Mexican Americans | Multidimensional domains<br><br>Language Use, Media, Ethnic Social Relations | Longitudinal<br><br>Cross Sectional                      | 258 Rural Immigrant Latino men<br><br>100% M (>18)              | TWD; No of days individual gets drunk in a typical week<br><br>Past 30 day HED; No. of times 5 or more drinks consumed in one occasion in past 30 days<br><br>Obtained from Behavioral Risk Factor Surveillance System Questionnaire<br><br>Self report in questionnaire (in person) | Combined acculturation measure was not significantly linked to TWD or HED after adjusting for covariates.<br><br>(born in Mexico, entered United states as an adult, employment, education, religious affiliation) |
| <b>Kissinger P, Althoff M, Burton N, et al. September 2013; 133(3), 814–824.</b>  | 32 item Stephenson Multigroup Acculturation Scale       | Bidimensional<br><br>Ethnic Society Immersion, Dominant Society Immersion    | Longitudinal<br><br>Longitudinal                         | 125 Spanish Speaking Latino Migrants<br><br>100% M (>18)        | 5 or more alcoholic drinks in one sitting<br><br>Obtained from standard definition used in literature<br><br>Self report in interview (in person)                                                                                                                                    | Ethnic Society Immersion and Dominant Society Immersion were not statistically associated with binge drinking.<br><br>(time)                                                                                       |
| <b>Venegas J, Cooper T, Naylor N, Hanson B, Blow J. March 2012;21(2):145-149.</b> | 9 item Bicultural Identity Integration (BII)            | -----<br>BII Blendedness and BII Harmony                                     | Cross Sectional<br><br>Cross Sectional                   | 160 Hispanic College Students<br><br>19.9<br><br>50% F<br>50% M | 5 drinks or more in a 2 hour sitting for men or 4 or more drinks in a 2 hour sitting for women<br><br>Obtained from Daily Drinking Questionnaire<br><br>Self report in survey (in person)                                                                                            | There were no significant differences between biculturalization levels between participants who engaged in HED and participants who did not.<br><br>(not applicable)                                               |

|                                                                    |                                                                                      |                                                                            |                                        |                                                          |                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                              |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>Loury S, Jesse E, Wu Q.<br/>August 2011;<br/>13(4):664-670.</b> | 30 item Acculturation Rating Scale for Mexican-Americans (ARSMA-II, Spanish version) | Multidimensional Mexican-Oriented Scale (MOS), Anglo-Oriented Scale (AOS). | Cross Sectional<br><br>Cross Sectional | 173 Adult Mexican Immigrants<br><br>33 (21-63)<br>100% M | 5 or more drinks on one occasion<br><br>Items related to alcohol use were obtained from: the National Health Interview Survey 1999 (NHIS), the Hispanic Health and Nutrition Examination Survey (HHANES), National Health and Nutrition Examination Survey (NHANES), National Household Survey on Drug Abuse (NHSDA)<br><br>Self report in interview (in person) | Unable to determine relationship between acculturation and other variables due to small sample size.<br><br>(not applicable) |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|

Table 3: Studies examining the relationship between Acculturation and Binge Drinking in Asian American populations that found significant results

| Article                                                                                                                   | Acculturation Scale                                | Scale Type<br>Subscales                                                                                                                                 | Study Design<br>Association between exposure and outcome | N<br>Average age (range)<br>%M/F                                    | Binge Drinking Operationalization<br>Binge Drinking Measurement                                                                                                                                                                                                                                                                                                                                                        | Results<br>(covariates)                                                                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Kane, J. C., Johnson, R. M., Robinson, C., Jernigan, D.H., Harachi, T. W., &amp; Bass, J. K. 2016; 51(6), 702-709.</b> | 8 item revised Suinn-Lew Asian Self-Identity Scale | Bidimensional<br><br>Traditionalism, Biculturalism, Assimilation                                                                                        | Longitudinal<br><br>Cross Sectional                      | 147 Cambodian American, 155 Vietnamese American<br><br>42<br>100% F | Consuming at least 5 or 6 drinks in a single occasion (0 = never; 2 = once or twice a month; 3 = once or twice a week; 4 = at least three times per week or daily)<br><br>Obtained from National Institute of Alcohol Abuse and Alcoholism<br><br>Self report in interview (in person)                                                                                                                                 | Significant negative association between traditionalism and biculturalism and alcohol use in those who drank.<br><br>(baseline age, marital status, traumatic event history, income, religion, religiosity)                                                                                |
| <b>Ryu, S. Y., Crespi, C. M., &amp; Maxwell, A.E. 2013; 15(6), 1073-81.</b>                                               | -----                                              | Proxy<br><br>Citizenship, English proficiency, language of interview, percent of life in U.S., language of mass media such as TV, radio and news papers | Cross Sectional<br><br>Cross Sectional                   | 92791 Koreans, 854 Korean Americans<br><br>(>19)                    | 5 or more drinks for males or 4 or more drinks for females on at least one occasion during the previous month (CHIS);<br><br>7 or more drinks for males or 6 or more drinks for females on at least one occasion during the previous month(KCHS)<br><br>(Obtained from Korean Community Health Survey and California Health Interview Survey)<br><br>Self report in interview (in person for KCHS, telephone for CHIS) | The native group (Koreans) had higher odds ratios for binge drinking than the traditional group (Korean Americans with low levels of acculturation), indicating that acculturation was protective against binge drinking.<br><br>(age, marital status, educational level, level of income) |

Table 4: Studies examining the relationship between Acculturation and Binge Drinking in Asian American populations that found no significant results

| Article                                                                 | Acculturation Scale | Scale Type<br>Subscales                                                                | Study Design<br>Association between exposure and outcome | N<br>Average age (range)<br>%M/F                                          | Binge Drinking Operationalization<br>Binge Drinking Measurement                                                                                                                              | Results<br>(covariates)                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------------------------------|---------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Iwamoto D, Takamatsu S, Castellanos J. July 2012; 18(3):219-227.</b> | -----               | Proxy<br><br>Generational Status                                                       | Cross sectional<br><br>Cross Sectional                   | 1575 Asian American undergraduates<br><br>19.85<br><br>71.9% F<br>28.1% M | 5 drinks or more in a 2 hour sitting for men or 4 or more drinks in a 2 hour sitting for women<br><br>Self report in survey (web based)                                                      | Generational status was not significantly related to binge drinking.<br><br>(effects of quantity, Greek status, male gender, lower ethnic identity, being Filipino)                                                                                                                                                                                                                   |
| <b>Hahm H, Lahiff M, Guterman N. May 2004; 32(3):295-308.</b>           | -----               | Proxy<br><br>English use at home, Place of birth, Length of residency in United States | Longitudinal<br><br>Cross Sectional                      | 714 Asian American Adolescents<br><br>16.1<br><br>54% F<br>46% M          | Number of days drank 5 or more drinks in a row in the past 12 months (Obtained from National Longitudinal Study of Adolescent Health)<br><br>Self report in interview and survey (in person) | A higher level of acculturation was not significantly associated with higher levels of binge drinking after mediating for friends' alcohol and tobacco use. Peer use covaried out the significant association.<br><br>(gender, age, family socio-economic status, self-esteem, school attachment, parent-adolescent attachment, acculturation, best friends' alcohol and tobacco use) |

Table 5: Studies examining the relationship between Acculturation and Binge Drinking in Mixed Immigrant populations that found significant results

| Article                                               | Acculturation Scale | Scale Type<br>Subscales                                                                                                                                                                       | Study Design<br>Association between exposure and outcome | N<br>Average age (range)<br>%M/F                                                                                                                                    | Binge Drinking Operationalization<br>Binge Drinking Measure                                                                                                                                                                           | Results<br>(covariates)                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Bryant A, Kim G. March 2013; 17(2):147-156.</b>    | -----               | Proxy<br><br>language use at home, language use with friends, language of television programs watched, language used for the interview, and overall use and comfort with the English language | Cross Sectional<br><br>Cross Sectional                   | 546 Asian Immigrants, 224 Hispanic Immigrants<br><br>(>60)                                                                                                          | Past year binge drinking-whether or not 5 or more drinks were consumed in past year for males, and 4 for females.<br><br>Obtained from National Institute on Alcohol Abuse and Alcoholism<br><br>Self report in interview (telephone) | Significant association between higher acculturation and decreased past year binge drinking for Asians, but not for Hispanic populations.<br><br>(age, male, married, educational attainment, employed, poverty level, general health condition)                                                                                                   |
| <b>Kelin L, Ming W. February 2015; 17(1):156-164.</b> | -----               | Proxy<br><br>Years of duration: subtracting the current age from age at migration                                                                                                             | Longitudinal<br><br>Cross Sectional                      | 7397 Adult Immigrants (Latin America/Caribbean, East and South Asia, Sub-Saharan Africa, Europe/ Central Asia, Middle East/North Africa).<br><br>49.8% F<br>50.2% M | 4 or more drinks on one occasion in the past 3 months<br><br>Obtained from New Immigrant Survey<br><br>Self report in interview (in person)                                                                                           | In immigrants of both genders, longer duration effect (years of residence), was associated with higher odds of binge drinking. After adjusting for age at migration, this result was only statistically significant for men who arrived in the U.S. between age 0-9.<br><br>(age, marital status, health status, education level, place of origin) |
| <b>Wahl A, Eitle T. April 2010;12(2):153-165.</b>     | -----               | Proxy<br><br>Bilingualism, GPA, family social relations                                                                                                                                       | Longitudinal<br><br>Cross Sectional                      | 6792 non-Hispanic whites, 910 Mexican Americans, 290 Cuban Americans, and 336 Puerto Ricans                                                                         | Drinking 5 or more drinks in a row in one day over the past 12 months<br><br>Obtained from National Longitudinal Study of Adolescent Health<br><br>Self report in interview (in person)                                               | Bilingualism reduced the odds of binge drinking in females. GPA and family relations index were not significantly related to binge drinking.<br><br>(age, parental alcohol use, parents' high school graduation status, single parent family)                                                                                                      |

Table 6  
*Sample descriptive characteristics*

|                                  | Total sample<br>(N = 350) |
|----------------------------------|---------------------------|
|                                  | n (%)                     |
| Race                             | --                        |
| White/Caucasian                  | 256 (73%)                 |
| Black/African American           | 42 (12%)                  |
| Asian                            | 39 (11%)                  |
| Native American/Alaskan          | 5 (1%)                    |
| Native Hawaiian/Pacific Islander | 1 (<1%)                   |
| Other                            | 22 (6%)                   |
| Hispanic/Latino                  | 62 (18%)                  |
| Non Hispanic White               | 199(54%)                  |
| Year in school                   |                           |
| Freshman                         | 64 (18%)                  |
| Sophomore                        | 76 (22%)                  |
| Junior                           | 98 (28%)                  |
| Senior                           | 112 (32%)                 |
| Type of institution              |                           |
| 4-year (vs. 2-year)              | 326 (93%)                 |
| Public (vs. private)             | 258 (74%)                 |
| Housing                          |                           |
| Dormitory                        | 115 (33%)                 |
| Off-campus residence             | 157 (45%)                 |
| With family/spouse               | 68 (19%)                  |
| Fraternity/sorority house        | 10 (3%)                   |
| Fraternity/sorority member       | 106 (30%)                 |
| Varsity athlete                  | 65 (19%)                  |
| Binge                            | 205(59%)                  |
|                                  | <i>M (SD)</i>             |
| Heritage score                   | 6.15(1.85)                |
| American score                   | 7.03(1.56)                |
| Age                              | 21.78 (2.83)              |
| Drinks per week                  | 11.73 (10.57)             |
| Drinks per drinking day          | 3.87 (2.49)               |
| Typical BAC                      | .06 (.07)                 |
| Alcohol consequences             | 9.55 (5.93)               |

*Note.* Binge= Individual who binge drinks

Table 7

*Odds ratios for the logistic regression of presence of binge drinking on Heritage and American culture score (Model 1) and their interaction (Model 2)*

| Predictor                      | Odds Ratio (95% Confidence Interval) |                  |
|--------------------------------|--------------------------------------|------------------|
|                                | Model 1                              | Model 2          |
| Heritage culture score         | 0.98(0.85-1.13)                      | 1.00(0.86-1.16)  |
| American culture score         | 1.09(0.92-1.30)                      | 1.03(0.84-1.25)  |
| Female Sex (covariate)         | 1.85(1.18-2.92)*                     | 1.84(1.17-2.91)* |
| Non Hispanic White (covariate) | 1.46(0.92-2.32)                      | 1.45(0.91-2.30)  |
| Heritage x American            |                                      | 0.95(0.89-1.02)  |

*Note.* \* $p \leq 0.05$ .

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