Published in final edited form as:
J Addict Med. 2009 December 1; 3(4): 227–233. doi:10.1097/ADM.0b013e3181ab6db7.

Acculturation stress, anxiety disorders, and alcohol dependence in a select population of young adult Mexican Americans

Cindy L. Ehlers, PhD, **David A. Gilder, MD**, **Jose R. Criado, PhD**, and **Raul Caetano, MD, PhD**
From the Molecular and Integrative Neurosciences Department, and the Department of Molecular and Experimental Medicine, The Scripps Research Institute, La Jolla, CA 92037 USA and the University of Texas School of Public Health, Dallas, TX 75390

Abstract

Objectives—Mexican Americans comprise one of the most rapidly growing populations in the U.S. and within this population the process of acculturation has been suggested to be associated with some mental health problems. This study sought to ascertain quantitative information indexing acculturation stress and its association with mental health disorders in a select community sample of Mexican Americans.

Methods—Demographic information, DSM-III-R diagnoses, and information on cultural identity and acculturation stress were obtained from 240 Mexican American young adults that were recruited by fliers and were residing in selected areas of San Diego.

Results—No associations were found between measures of cultural identification and lifetime diagnoses of drug or alcohol dependence, major depressive disorder, anxiety disorders or antisocial personality disorder/conduct disorder in this sample of Mexican American young adults. However, lifetime diagnoses of alcohol dependence, substance dependence, and anxiety disorders were associated with elevations in acculturation stress.

Conclusion—Quantitative measures of acculturation stress, but not cultural identity per se, were found to be significantly associated with substance dependence and anxiety disorders in this select population of Mexican American young adults. These data may be helpful in designing prevention and intervention programs for this high risk population.

Keywords

Mexican Americans; alcohol dependence; acculturation stress; anxiety disorders

Alcohol use and use disorders in Hispanic Americans

Data on drinking patterns and problems between different racial/ethnic groups highlight the importance of studying the etiology of alcohol involvement in Hispanics (Dawson, 1998; Nielsen, 2000; Grant et al., 2004). Adult male Hispanics, particularly those born in the U.S., are more likely to drink frequently and to consume larger quantities of alcohol than Whites or Blacks (Caetano, 1984; Caetano and Kaskutas, 1995; Stinson et al., 1998; Reardon and Buka, 2002). Additionally, while it has been found that the percentage of White men who are frequent heavy drinkers declined between 1984 and 1995, it did not decline and in fact remained high for Hispanic men (Caetano and Clark, 1998a). Further, while it appears that Whites tend to "age out" of heavy drinking after their 20's (Caetano, 1984; Herd, 1990; Johnson et al.,

Corresponding Author: Dr. Cindy L. Ehlers, The Scripps Research Institute, 10550 North Torrey Pines Road, SP30-1501, La Jolla, CA 92037. Telephone: (858) 784-7058; Fax: (858) 784-7409; cindye@scripps.edu.

1998; Nielsen, 1999), for Hispanics, 30–39 years is the peak drinking age (Caetano and Clark, 1998a, 1998b). The Epidemiologic Catchment Area (ECA) study collected data on alcohol and other substance abuse and dependence diagnoses from five U.S. sites (Helzer et al., 1991). In that study the total lifetime prevalence rate of alcoholism (alcohol abuse and dependence) was higher among Hispanic American men than among White men. The higher rates of alcoholism and heavy drinking by some Hispanics also take a heavy toll in health consequences. A study evaluating the age-adjusted death rates for liver cirrhosis using data from the National Center for Health Statistics found that Hispanic men had the highest cirrhosis mortality rates of any ethnic group studied (Stinson et al., 2001; Caetano, 2003).

Alcohol use and use disorders in Mexican Americans

Hispanic American subgroups bring with them a diversity of racial heritage as well as cultures that vary in psychosocial, religious, and economic bases. The importance of specifying subgroups of Hispanics to avoid inaccurate generalizations has been stressed (Caetano et al., 1998). Mexican Americans represent the largest subgroup of Hispanic Americans, nearly two thirds of the total U.S. Hispanic population, followed by Puerto Ricans, Cubans, Caribbeans, Central and South Americans. Within the Hispanic American population, Mexican Americans are an important target population in need of further study. The prevalence rate of past heavy drinking in Mexican Americans was estimated in one report to be three times higher than that reported for a non-Hispanic male population (Lee et al., 1997). Mexican American men are also less likely to abstain than other Hispanic men. Data from the Los Angeles site of the ECA study found that Mexican American men had higher alcoholism rates at all age categories than those of White men, with the highest rates occurring in the 30–39 year age range (Burnam, 1989). However, in a study by Vega and colleagues, higher overall alcoholism rates were only found in U.S. born Mexican Americans (Vega et al., 1998b). More recent studies comparing Hispanic national groups in the U.S. show that Mexican Americans, together with Puerto Ricans, have the highest rates of binge drinking, driving under the influence of alcohol, alcohol abuse and dependence (Caetano et al., 2008a, 2008b, 2009)

Cultural factors that influence drinking in Hispanic Americans

Many issues concerning the etiology of drinking problems in Hispanic Americans in general and Mexican Americans in particular are unresolved and there is a need for further research. Most theoretical models developed to explain Hispanic American drinking practices have focused on socio-cultural variables. These theories posit that social factors such as poverty, lack of education, job discrimination, social prejudice, and the stress of acculturation lead to heavy drinking. Many findings in this area are complex and do not support a simple explanation. For instance, while several investigators have suggested that low income and job discrimination may lead to increased drinking in Hispanics, data suggest that rates for frequent heavy drinking in men increase and rates of abstention in women decrease, as income levels rise (Caetano, 1989). Likewise, in comparing drinking among groups differing in levels of education, men and women with some college education were less likely to abstain, and Hispanic American men with some college education were more likely to have higher rates of frequent heavy drinking (Caetano, 1989). An analysis of the 2002 NESARC data revealed that Hispanic women who were cohabiting and had a higher income were at a higher risk for heavier drinking (Caetano et al., 2006).

Acculturation and acculturation stress and drinking in Hispanic Americans

The relationship between level of acculturation and drinking practices has also been explored in Hispanic Americans. In one study, the rates of daily drinking were found to increase with each successive generation in the U.S. (Gilbert, 1985; Caetano and Medina-Mora, 1988; Caetano and Clark, 2000). Lower rates of other psychiatric disorders have also been reported

in Mexican American immigrants (Vega et al., 1998b; Alderete et al., 2000a, 2000b). In addition, gender differences have been found with stronger associations between drinking and acculturation seen in women in some surveys (Gilbert, 1985; Caetano and Medine-Mora, 1988; Polednak, 1997). In other studies measures of acculturation have failed to differentiate drinking patterns among Hispanics seeking treatment for alcohol-related problems (Arciniega et al., 1996).

Acculturation stress has been defined as a stress that emerges when an individual develops problems or conflicts associated with adjustment between the immigrant culture and that of the host society (see Born, 1970; De La Rosa, 2002; Berry, 2003). There have been a number of studies of Hispanic communities that have reported positive associations between a measure of acculturation stress and a wide range of self-rated mental health behaviors (Gil et al., 1994; Gil and Vega, 1996; Hovey and Magaña, 2000; Finch et al., 2001; Finch and Vega, 2003; Firestone et al., 2003; Romero and Roberts, 2003; Caetano et al., 2007; Crockett et al., 2007). However, fewer studies have indexed the amount of acculturation stress actually associated with mental health disorders. In one study acculturation-related family stress was found to be associated with substance and psychiatric disorders among Puerto Ricans with substance use disorders (Conway et al., 2007).

The present study was designed to assess associations between alcohol dependence, cultural identification, and acculturation stress in a select sample of young adult Mexican Americans with and without alcohol use disorders. We have previously reported a high prevalence of alcohol dependence in this population. Additionally, there was significant co-morbidity between alcohol dependence and anxiety, affective, conduct/antisocial, and other substance dependence disorders (Gilder et al., 2007). Therefore the role of acculturation stress on other disorders co-morbid with alcohol dependence was also assessed.

Materials and Methods

The aim of the study was not to obtain an epidemiological sample of the population of Hispanics or even Mexican Americans in San Diego but rather to get a sample of young adult Mexican Americans with and without alcohol use disorders from the community. Therefore, participants were recruited using a commercial mailing list that provided the addresses of individuals with Hispanic surnames in 11 zip codes in San Diego County that were identified as having a population that was over 20% Hispanic heritage and were within 25 miles of the research site. The mailed invitation stated that potential participants must be of Mexican American heritage, be between the ages of 18 and 30 years, be residing in the United States legally, and be able to read and write in English. Potential participants were requested to phone research staff for more information. During the phone interview potential participants were screened for the presence of the inclusion criteria as listed on the invitation, and were excluded it they were: pregnant or nursing, currently had a major medical or neurological disorder, or a head injury. Participants were asked to refrain from alcohol or any other substance use for 24 hours prior to testing.

On the test day, after a complete description of the study to the participants, written informed consent was obtained using a protocol approved by The Institutional Review Board of The Scripps Research Institute. Information on demography, personal medical and psychiatric history, drinking history and family history of alcohol and other substance dependence was obtained using a family history interview and the face-to-face Semi-Structured Assessment for the Genetics of Alcoholism (SSAGA). There have been several studies that have evaluated the concurrent diagnostic validity of the Semi-Structured Assessment for the Genetics of Alcoholism (SSAGA) across alcohol and drug dependencies, major depression, anxiety disorders and ASPD. The Schedule for Clinical Assessment in Neuropsychiatry (SCAN) was

used as a comparison instrument in one study because it arises from a different tradition and uses a different format for its administration. The Kappa statistic was used to measure concordance between the SCAN and the SSAGA. Kappa for alcohol dependence was 0.63, Kappa for other drugs ranged from 0.48–0.85, Kappa for ASPD and major depression were high (0.71 and 0.70). Test-retest studies were conducted both within and across sites in order to study the reliability of the SSAGA. Findings from these studies indicated that reliability for the SSAGA was high for DSM-III-R substance dependence disorders and good for depression. These data indicate that the SSAGA is a highly reliable and valid instrument for use in studies of psychiatric disorders, including substance dependence (see Bucholz et al., 1994; Hesselbrock et al., 1999).

Participants were eliminated from the current data analyses if they were taking psychoactive medication or had a positive breath-analyzer test on the day of the evaluation. Lifetime history of alcohol dependence in this population was defined by the Diagnostic and Statistical Manual (DSM)-III-R criteria as originally formulated by the Collaborative Study on the Genetics of Alcoholism (COGA). Family history of alcoholism was assessed using the Family History Assessment Module (FHAM). A participant was classified as family history positive if they had a first degree relative with alcohol dependence. Family history negative participants had no first degree relatives with alcohol dependence.

Diagnoses of lifetime alcohol dependence and other psychiatric disorders were made on the basis of DSM-III-R criteria generated by the SSAGA. Four anxiety disorders (panic disorder with or without agoraphobia, agoraphobia without panic, social phobia, and obsessive-compulsive disorder), major depressive disorder, childhood conduct disorder (CD), and adult antisocial personality disorder (ASPD) were evaluated. Diagnosis of major depressive disorder, for the purposes of the data presented here, required that the participant report inability to function in her or his major role responsibility for 2 days or more, have had psychotic symptoms, and/or have undergone ECT or psychiatric hospitalization for a major depressive episode. Because of the difficulties in diagnosing hypomania, Bipolar II disorder was included with major depressive disorder as a single major depressive disorder category. Childhood CD was diagnosed if the participant had the onset of three or more criteria for conduct disorder before the age of 15 years but did not meet the adult criteria for ASPD. Diagnosis of drug dependence was made if the participant met criteria for dependence on one or more of the following substances: cannabis, cocaine, stimulants, sedatives, opiates, phencyclidine, hallucinogens, or solvents.

Cultural identification was assessed using the Orthogonal Cultural Identification Scale (OCIS) (Oetting and Beauvais, 1990–1991). The OCIS consists of 30 items with six base questions assessing attitudes and behaviors for five ethnic groups (Anglo, Asian, Latino, African and Native American), however in this case Mexican American was substituted in the instrument for “Latino”. The OCIS has been validated among Native American and Hispanic youth (see Oetting et al., 1998; Moran et al., 1999) and Native American adults (Venner et al., 2006). Level of acculturation stress was assessed using an instrument developed by Caetano and colleagues, using items from Mena et al.’s (1987) scale of acculturative stress, Vega et al., (1993) scale of acculturative stress, and additional items. This acculturation stress scale has been used in two studies. The first interviewed 387 Hispanic couples in a study of intimate partner violence (see Caetano et al., 2007). The second study interviewed 5,224 Hispanics in five U.S. metropolitan areas (Miami, New York, Philadelphia, Houston and Los Angeles) (see Caetano et al., 2009). Principal components factor analysis confirmed that scale items represented then acculturation stress construct as proposed. Results showed a main factor with an Eigen value of 4.7 accounting for 43% of the variance in the data. Loadings on this factor varied from 0.412 to 0.813. The scale’s reliability was also high as the Cronbach’s alpha for the scale was 0.86.

Data Analyses

Data analyses focused on the specific aims that were generated based on previous research investigating cultural identification and acculturation stress in Hispanic populations. The first aim was to investigate the relationship between DSM-III-R alcohol dependence and cultural identification as assessed using the OCIS and alcohol dependence and acculturation stress with the Caetano acculturation stress scale. The second aim was to assess associations between acculturation stress and other disorders previously shown to be co-morbid with alcohol dependence in this population (Gilder et al., 2007). Exploratory analyses were also conducted to evaluate whether men and women differed in their relationship between alcohol dependence and acculturation stress.

Comparisons between demographic, diagnoses, cultural affiliation, and acculturation stress were conducted using analysis of variance (ANOVA) for continuous variables and Chi square analyses for 2 dichotomous variables. Statistical significance was set at the probability level: $p > 0.05$. Power analyses indicated there was sufficient power (0.80) at alpha=0.05 to detect differences in our primary analyses.

Results

The young adults who participated in the study included 59% women and the sample had a mean age of 23 years (SD= + 3.9 years). Demographic data including age, gender, number of years of education, marriage, and current drinking history (quantity and frequency/month) are presented in Table 1. Participants with alcohol dependence did not differ from those without a diagnosis on age, income or number of years of education, however they were less likely to be married (Chi square=6.9; df=2; $p<0.008$), reported drinking more often ($F=7.4$, df=1,195; $p<0.007$) and more drinks per occasion ($F=15.0$; df=1,195; $p<0.0001$) than those participants without an alcohol dependence diagnosis. There were no significant differences in age, number of years of education, income, employment or marriage status between men and women. With respect to the drinking variables, women did not report drinking significantly less frequently, however, men reported drinking two more drinks per occasion than women ($F=21.9$; df=1,195; $p<0.0001$). The relationships between the two drinking variables (drinking quantity, drinking frequency) and cultural identification and acculturation stress, were explored and found to be non-significant.

To address the first major research question, associations between scores on the five OCIS scales (Anglo, Mexican American, Asian, African and Native American) were compared between those participants with a lifetime diagnosis of alcohol dependence and those without. No significant differences were found. Associations between total score on the Caetano acculturation stress scale and lifetime diagnosis of alcohol dependence was also evaluated. As seen in figure 1a, a significant association between endorsement of more acculturation stress and alcohol dependence was found ($F= 6.14$, df= 1,237, $p<0.01$). An exploratory analyses revealed that 4 out of the 11 items on the scale were also significantly associated with alcohol dependence: close family members and I have conflicting expectations about my future ($F=11.9$, df=1,237, $p<0.001$), it is hard to express to my friends how I really feel ($F=3.94$, df=1,237, $p<0.048$); I don't feel at home ($F=5.86$, df=1,237, $p<0.016$); I have more barriers to overcome than most people ($F= 7.06$, df=1,237, $p<0.008$). No significant differences were found between men and women on any of the acculturation stress scales.

The second research question sought to determine if acculturation stress was also significantly associated with disorders known to be co-morbid with alcohol dependence in this population. Those disorders included: any anxiety disorder, major depressive disorder, other drug dependence and ASPD/CD (see Gilder et al., 2007). No significant associations were found

between acculturation stress and CD/ASPD or major depressive disorder. However a significant association was found between total scores on the acculturation stress scale and a lifetime diagnosis of "drug dependence other than alcohol or tobacco" ($F= 4.39$, $df=1,237$, $p<0.027$). Additionally, two items were also found to be significantly associated with drug dependence: I don't feel at home ($F= 8.4$, $df=1.237$, $p<0.004$) and I have more barriers to overcome than most people ($F= 4.22$, $df=1,237$, $p<0.041$). As seen in figure 1b, a significant association was found between a lifetime diagnosis of "any anxiety disorder" and acculturation stress. This was significant for the total score ($F=22.73$, $df=1.237$, $p<0.0001$), and all items except one (because of my ethnic background, I feel that other often exclude me from participating in their activities ($F=1.05$, $df=1,237$, $p<0.31$)).

Discussion

An important finding in first generation (immigrant generation) Mexican Americans is that alcohol use and other psychiatric disorders increase in frequency with time spent in the U.S. These disorders increase further in subsequent (U.S. born) generations of Mexican Americans. U.S. born Mexican Americans have rates of alcohol use and psychiatric disorders that are two to three times higher than their Mexican born ancestors (Burnam et al., 1987; Golding and Burnam, 1990; Kessler et al., 1994; Vega et al., 1998b, 2003; Grant et al., 2004; Strunin et al., 2007). This increase in rates suggests that the trans-generational process of adapting to living in the U.S. may play an important role in the development of alcohol use, as well other psychiatric, disorders (Burnam et al., 1987; Escobar, 1998; Ortega et al., 2000).

The rates of independent anxiety and affective disorders found in this sample of young adult, suburban-urban dwelling Mexican Americans have been reported previously (Gilder et al., 2007). The rates for these disorders were found to be comparable to those observed in the National Co-morbidity Survey (NCS) and also in studies of predominantly urban dwelling U.S. born Mexican Americans (Karno et al., 1987, 1989; Kessler et al., 1994; Vega et al., 1998b; Grant et al., 2004). The most recent epidemiologic data on Mexican Americans suggest that, as generational time in the U.S. increases, rates of anxiety and affective disorders increase until they approach those of U.S. born Euro Americans (Vega et al., 1998b; Grant et al., 2004). Since 88% of the present sample was second and later generation Mexican Americans, these data are consistent with the finding that rates of anxiety and affective disorders in U.S. born Mexican Americans are similar to rates seen in the general U. S. population. A high rate of alcohol dependence was observed in this study population, which may also be a result of the fact that the participants in this study were predominantly second and later generation immigrants.

One factor that has been associated with problems with acculturation has been ethnic identity. It has been suggested that low levels of identity with any culture may be related to culturally deviant behavior such as problematic drinking (Ferguson, 1976; May, 1982; Oetting and Beauvais, 1990–1991). Whereas, high identification with at least one culture has been association with more well-being (Phinney, 1989; Oetting and Beauvais, 1990–1991; Moran et al., 1999). The orthogonal cultural identification scale was developed to index cultural identification with several cultures, and the orthogonal model recognizes that one may not be identified or well integrated with any culture or may have associations with more than one culture. Using this scale no associations were found with lifetime diagnoses of drug or alcohol dependence in this sample of Mexican American young adults. These findings are consistent with the results of Trimble (1995) who also did not find any relationships between ethnic identity and alcohol use or abuse.

The increase in alcohol use disorders and other psychiatric disorders seen in Mexican Americans that is associated with time spent living in the U.S. may not be associated with changes in cultural identification per se but may be the result of the "stress" of acculturation.

Many analyses of the effects of acculturation on risk factors for mental health have assumed that these effects are a result of the "stress" inherent to the acculturation process. However, many studies have not actually measured acculturation stress directly. Additionally, it has been proposed that the assumption that acculturation is associated with stress may not be warranted with regards to alcohol usage, as the increase in drinking associated with acculturation could simply be a normal adaptation to more liberal U.S. drinking norms (Markides et al, 1990; Black and Markides, 1993; Caetano and Medina-Mora, 1998; Zemore, 2004, 2005; Caetano et al., 2007). In the present community based study of Mexican American young adults, lifetime diagnoses of alcohol dependence, substance dependence, and anxiety disorders were associated with elevations in acculturation stress.

An exploration of the items that were significantly elevated on the acculturation stress scale in participants who were alcohol dependent vs. those with no lifetime diagnoses of alcohol dependence revealed that these young Mexican American adults endorsed conflict with family members, difficulty in expressing feelings, not feeling "at home" and having more barriers to overcome than most people. Not feeling "at home" and having more barriers to overcome than most people were also significantly associated with a lifetime diagnosis of drug dependence in this population. More significantly, anxiety disorders were positively associated with all items on the acculturation stress scale except being excluded from activities because of ethnic background.

How acculturation stress may directly impact the development of alcohol and drug abuse disorders is not currently known. In one study, evaluating Latino males in middle school in south Florida, a path model was developed in which acculturation stress led to less positive identification with family values, which then led to a disposition to deviant behavior and ultimately alcohol involvement (Gil et al., 2000). This model, however, may not apply to Latinas who may be less likely to enter drug usage through deviant behaviors (Vega et al., 1998a). Additional studies have indicated that Hispanic adolescents from Arizona may be less vulnerable to stress than Caucasians (Barrera et al., 1995), thus it is not known whether such a model applies equally to men and women or to Hispanic groups not residing in south Florida. The data from the present study suggests that in this Mexican American population that anxiety disorders may be more associated with acculturation stress than disorders associated with deviant behavior such as ASPD/CD. What is not known is whether having an anxiety disorder makes one more susceptible to, or to experience more, the impact of acculturation stress or alternatively, whether acculturation stress increases the prevalence of anxiety disorders.

It is important to consider some of the present study's limitations. The study was not an epidemiological sample of Hispanics living in San Diego County but rather a study of Mexican American young adults with and without alcohol use disorders who responded to a flier to participate in research. Therefore, the findings may not generalize to all Mexican Americans, or all Hispanic young adult Americans. Over half of the participants in the present study were women and thus findings may not generalize to previous studies that have focused on samples of mostly male participants. Second, the study was limited to young adults between the ages of 18 and 30 years and those who spoke English. This allowed the use of validated instruments and an investigation of the association between alcohol dependence and acculturation stress, however, since not all of the participants in the study had passed through the age of risk, the strength of this association with alcohol use disorders may be limited. Additionally, although the acculturation stress scale that was used has been validated it does contain items that may index "stress" in general rather than acculturation stress in particular. Therefore when an individual endorses such items generalized stress and acculturation stress may be confounded. Further studies employing a longitudinal design will be required to test the relationship of acculturation stress and eventual alcohol related morbidity and mortality. Despite these limitations, this report represents an important first step in an ongoing investigation to

determine risk and protective factors associated with the development of substance use disorders in Mexican Americans.

Acknowledgments

Supported in part by the National Institute of Alcoholism and Alcohol Abuse Grants: AA006420, AA010201, the National Center on Minority Health and Health Disparities (NCMHD) and the Stein Endowment fund. The authors would like to thank Phil Lau and Gina Stouffer for assistance in data analyses and Shirley Sanchez for editing the manuscript.

References

1. Alderete E, Vega WA, Kolody B, Aguilar-Gaxiola S. Lifetime prevalence of and risk factors for psychiatric disorders among Mexican migrant farmworkers in California. Am J Public Health 2000a; 90:608–614. [PubMed: 10754977]
2. Alderete E, Vega WA, Kolody B, Aguilar-Gaxiola S. Effects of time in the United States and Indian ethnicity on DSM-III-R psychiatric disorders among Mexican Americans in California. J Nerv Ment Dis 2000b;188:90–100. [PubMed: 10695837]
3. Arciniega LT, Arroyo JA, Miller WR, Tonigan JS. Alcohol, drug use and consequences among Hispanics seeking treatment for alcohol-related problems. J Stud Alcohol 1996;57:613–618. [PubMed: 8913992]
4. Barrera M Jr, Li SA, Chassin L. Effects of parental alcoholism and life stress on Hispanic and non-Hispanic Caucasian adolescents: a prospective study. Am J Community Psychol 1995;23:479–507. [PubMed: 8546108]
5. Berry, JW. Conceptual approaches to acculturation. In: Chun, KM.; Balls, OP.; Marin, G.; Sue, S., editors. Acculturation: advances in theory, measurement, and applied research. Washington, DC: American Psychological Association; 2003. p. 17-37.
6. Black SA, Markides KS. Depressive symptoms and mortality in older Mexican Americans. Ann Epidemiol 1999;9:45–52. [PubMed: 9915608]
7. Born DO. Psychological adaption and development under acculturative stress. Soc Sci Med 1970;3:529–547. [PubMed: 5483545]
8. Bucholz KK, Cadoret R, Cloninger CR, et al. A new, semi-structured psychiatric interview for use in genetic linkage studies: a report on the reliability of the SSAGA. J Stud Alcohol 1994;55:149–158. [PubMed: 8189735]
9. Burnam MA, Hough RL, Karno M, Escobar JI, Telles CA. Acculturation and lifetime prevalence of psychiatric disorders among Mexican Americans in Los Angeles. J Health Soc Behav 1987;28:89–102. [PubMed: 3571910]
10. Burnam, MA. Prevalence of alcohol abuse and dependence among Mexican Americans and non-Hispanic Whites in the community. In: Spieger, D.; Tate, D.; Aitken, S.; Christian, CM., editors. NIAAA Research Monograph No. 18, DHHS Publication No. (ADM) 89-1435; Alcohol Use Among U.S. Ethnic Minorities: Proceedings of a Conference on the Epidemiology of Alcohol Use and Abuse among Ethnic Minority Groups; September 1985; Rockville, MD: USDHHS, SAMSHA, NIAAA, U.S. Government Printing Office; 1989. p. 163-177.
11. Caetano R. A note on arrest statistics for alcohol-related offenses. Drinking Pract Surv 1984;19:12–17.
12. Caetano, R. National Institute on Drug Abuse ed. Washington, D.C: U.S. Government Printing Office; 1989. Drinking patterns and alcohol problems in a national sample of U.S. Hispanics; p. 147-162.
13. Caetano R. Alcohol-related health disparities and treatment-related epidemiological findings among whites, blacks, and Hispanics in the United States. Alcohol Clin Exp Res 2003;27:1337–1339. [PubMed: 12966334]
14. Caetano R, Clark CL. Trends in alcohol consumption patterns among Whites, Blacks and Hispanics: 1984 and 1995. J Stud Alcohol 1998a;59:659–668. [PubMed: 9811087]
15. Caetano R, Clark CL. Trends in alcohol-related problems among Whites, Blacks, and Hispanics: 1984–1995. Alcohol Clin Exp Res 1998b;22:534–538. [PubMed: 9581665]

16. Caetano R, Clark CL. Hispanics, Blacks and Whites driving under the influence of alcohol: results from the 1995 National Alcohol Survey. Accid Anal Prev 2000;32:57–64. [PubMed: 10576676]
17. Caetano R, Clark CL, Tam T. Alcohol consumption among racial/ethnic minorities: theory and research. Alcohol Health Res World 1998;22:233–241. [PubMed: 15706749]
18. Caetano R, Kaskutas LA. Changes in drinking patterns among Whites, Blacks and Hispanics, 1984–1992. J Stud Alcohol 1995;56:558–565. [PubMed: 7475037]
19. Caetano R, Medine-Mora ME. Acculturation and drinking among people of Mexican descent in Mexico and the United States. J Stud Alcohol 1988;49:462–471. [PubMed: 3216651]
20. Caetano R, Ramisetty-Mikler S, Caetano Vaeth PA, Harris TR. Acculturation stress, drinking, and intimate partner violence among Hispanic couples in the U.S. J Interpers Violence 2007;22:1431–1447. [PubMed: 17925291]
21. Caetano R, Ramisetty-Mikler S, Floyd LR, McGrath C. The epidemiology of drinking among women of child-bearing age. Alcohol Clin Exp Res 2006;30:1023–1030. [PubMed: 16737461]
22. Caetano R, Ramisetty-Mikler S, Rodriguez LA. The Hispanic Americans Baseline Alcohol Survey (HABLAS): Rates and predictors of DUI across Hispanic national groups. Accid Anal Prev 2008a; 40:733–741. [PubMed: 18329428]
23. Caetano R, Ramisetty-Mikler S, Rodriguez LA. The Hispanic Americans Baseline Alcohol Survey (HABLAS): rates and predictors of alcohol abuse and dependence across Hispanic national groups. J Stud Alcohol Drugs 2008b;69:441–448. [PubMed: 18432387]
24. Caetano R, Vaeth PA, Ramisetty-Mikler S, Rodriguez LA. The Hispanic Americans Baseline Alcohol Survey (HABLAS): Alcoholic beverage preference across Hispanic national groups. Alcohol Clin Exp Res 2009;33:150–159. [PubMed: 18976346]
25. Conway KP, Swendsen JD, Dierker L, Canino G, Merikangas KR. Psychiatric comorbidity and acculturation stress among Puerto Rican substance abusers. Am J Prev Med 2007;32:S219–S225. [PubMed: 17543714]
26. Crockett LJ, Iturbide MI, Torres Stone RA, McGinley M, Raffaelli M, Carlo G. Acculturative stress, social support, and coping: relations to psychological adjustment among Mexican American college students. Cultur Divers Ethnic Minor Psychol 2007;13:347–355. [PubMed: 17967103]
27. Dawson DA. Beyond black, white and Hispanic: race, ethnic origin and drinking patterns in the United States. J Subst Abuse 1998;10:321–339. [PubMed: 10897287]
28. De La Rosa M. Acculturation and Latino adolescents' substance use: a research agenda for the future. Subst Use Misuse 2002;37:429–456. [PubMed: 12064428]
29. Escobar JI. Immigration and mental health: why are immigrants better off? Arch Gen Psychiatry 1998;55:781–782. [PubMed: 9736003]
30. Ferguson FN. Stake theory as an explanatory device in Navajo alcoholism treatment response. Hum Organ 1976;35:65–78. [PubMed: 1028744]
31. Finch BK, Humner RA, Kolody B, Vega WA. The role of discrimination stress in the physical health of Mexican-origin adults. Hispanic J Behav Sci 2001;23:399–429.
32. Finch BK, Vega WA. Acculturation stress, social support, and self-rated health among Latinos in California. J Immigr Health 2003;5:109–117. [PubMed: 14512765]
33. Firestone JM, Harris RJ, Vega WA. The impact of gender role ideology, male expectancies, and acculturation on wife abuse. Int J Law Psychiatry 2003;26:549–564. [PubMed: 14522225]
34. Gil AG, Vega WA. Two different worlds: Acculturation stress and adaption among Cuban and Nicaraguan families. J Soc Per Rel 1996;13:435–456.
35. Gil AG, Vega WA, Dimas JM. Acculturation stress and personal adjustment among Hispanic adolescent boys. J Commun Psychol 1994;22:43–54.
36. Gil AG, Wagner EF, Vega WA. Acculturation, familism, and alcohol use among Latino adolesscent males. Longitudinal relations. J Commun Psychol 2000;28:443–458.
37. Gilbert, JJ. Mexican Americans in California: intracultural variations in attitudes and behavior related to alcohol. In: Bennett, LA.; Ames, GM., editors. The American experience with alcohol: contrasting cultural perspectives. New York: Plenum Press; 1985. p. 255-277.
38. Gilder DA, Lau P, Gross A, Ehlers CL. Co-morbidity of alcohol dependence with other psychiatric disorders in young adult Mexican Americans. J Addict Dis 2007;26:31–40. [PubMed: 18032230]

39. Golding JM, Burnam MA. Immigration, stress, and depressive symptoms in a Mexican-American community. J Nerv Ment Dis 1990;178:161–171. [PubMed: 2307968]
40. Grant BF, Stinson FS, Hasin DS, Dawson DA, Chou SP, Anderson K. Immigration and lifetime prevalence of DSM-IV psychiatric disorders among Mexican Americans and non-Hispanic Whites in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. Arch Gen Psychiatry 2004;61:1226–1233. [PubMed: 15583114]
41. Helzer, JE.; Burnam, A.; McEvoy, LT. Alcohol abuse and dependence. In: Robins, LN.; Regier, DA., editors. Psychiatric disorders in America: the epidemiologic catchment area study. New York: The Free Press; 1991. p. 81-115.
42. Herd D. Subgroup differences in drinking patterns among black and white men: results from a national survey. J Stud Alcohol 1990;51:221–232. [PubMed: 2342362]
43. Hesselbrock M, Easton C, Bucholz KK, Schuckit M, Hesselbrock V. A validity study of the SSAGA--a comparison with the SCAN. Addiction 1999;94:1361–1370. [PubMed: 10615721]
44. Hovey JD, Magana C. Acculturative stress, anxiety, and depression among Mexican immigrant farmworkers in the midwest United States. J Immigr Health 2000;2:119–131. [PubMed: 16228745]
45. Johnson FW, Gruenewald PJ, Treno AJ, Taff GA. Drinking over the life course within gender and ethnic groups: a hyperparametric analysis. J Stud Alcohol 1998;59:568–580. [PubMed: 9718110]
46. Karno M, Golding JM, Burnam MA, et al. Anxiety disorders among Mexican Americans and non-Hispanic whites in Los Angeles. J Nerv Ment Dis 1989;177:202–209. [PubMed: 2703825]
47. Karno M, Hough RL, Burnam MA, et al. Lifetime prevalence of specific psychiatric disorders among Mexican Americans and non-Hispanic whites in Los Angeles. Arch Gen Psychiatry 1987;44:695–701. [PubMed: 3498453]
48. Kessler RC, McGonagle KA, Zhao S, et al. Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States. Results from the National Comorbidity Survey. Arch Gen Psychiatry 1994;51:8–19. [PubMed: 8279933]
49. Lee DJ, Markides KS, Ray LA. Epidemiology of self-reported past heavy drinking in Hispanic adults. Ethn Health 1997;2:77–88. [PubMed: 9395591]
50. Markides K, Ray LA, Stroup-Benham C, Trevino F. Acculturation and alcohol consumption in the Mexican American population of the southwestern United States: Findings from HHANES 1982–1984. Am J Public Health 1990;80 (Suppl):42–46. [PubMed: 9187581]
51. May PA. Substance abuse and American Indians: prevalence and susceptibility. Int J Addict 1982;17:1185–1209. [PubMed: 6757155]
52. Mena FJ, Padilla AM, Maldonado M. Acculturative stress and specific coping strategies among immigrant and later generation college students. Hispanic J Behav 1987;9:207–225.
53. Moran JR, Fleming CM, Somervell P, Manson SM. Measuring bicultural ethnic identity among American Indian adolescents: A factor analytic study. J Adolsc Res 1999;14:405–426.
54. Nielsen AL. Testing Sampson and Laub's life course theory: Age, Race/ethnicity, and drunkenness. Diviant Behav 1999;20:129–151.
55. Nielsen AL. Examining drinking patterns and problems among Hispanic groups: results from a national survey. J Stud Alcohol 2000;61:301–310. [PubMed: 10757141]
56. Oetting ER, Beauvais F. Orthogonal cultural identification theory: the cultural identification of minority adolescents. Int J Addict 1990–1991;25:655–685.
57. Oetting ER, Swaim RC, Chiarella MC. Factor structure and invariance of the orthogonal cultural identification scale among American Indian and Mexican American youth. Hispanic J Behav Sci 1998;20:131–154.
58. Ortega AN, Rosenheck R, Alegria M, Desai RA. Acculturation and the lifetime risk of psychiatric and substance use disorders among Hispanics. J Nerv Ment Dis 2000;188:728–735. [PubMed: 11093374]
59. Phinney JS. Stages of ethnic idenitity development in minority groupo adolescents. J Early Adolesc 1989;9:34–49.
60. Polednak AP. Gender and acculturation in relation to alcohol use among Hispanic (Latino) adults in two areas of the northeastern United States. Subst Use Misuse 1997;32:1513–1524. [PubMed: 9336862]

61. Reardon SF, Buka SL. Differences in onset and persistence of substance abuse and dependence among whites, blacks, and Hispanics. Public Health Rep 2002;117 (Suppl 1):S51–S59. [PubMed: 12435827]

62. Romero AI, Roberts RE. Stress within a bicultural context for adolescents of Mexican descent. Cultur Divers Ethnic Minor Psychol 2003;9:171–184. [PubMed: 12760328]

63. Stinson FS, Grant BF, Dufour MC. The critical dimension of ethnicity in liver cirrhosis mortality statistics. Alcohol Clin Exp Res 2001;25:1181–1187. [PubMed: 11505049]

64. Stinson, FS.; Yi, H.; Grant, BF.; Chou, P.; Dawson, DA.; Pickering, R. NIAAA ed. U.S. Alcohol Epidemiologic Data Reference Manual. NIH Publication No. 99-3519. 1. Vol. 6. Rockville, MD: NIAAA; 1998. Drinking in the United States: Main Findings from the 1992 National Longitudinal Alcohol Epidemiologic Survey (NLAES).

65. Strunin L, Edwards EM, Godette DC, Heeren T. Country of origin, age of drinking onset, and drinking patterns among Mexican American young adults. Drug Alcohol Depend 2007;91:134–140. [PubMed: 17624686]

66. Trimble, JE. Toward an understanding of ethnicity and ethnic identification and their relationship with drug use research. In: Botvin, G.; Schinke, S.; Orlandi, M., editors. Drug abuse prevention with multi-ethnic youth. Thousand Oaks, CA: Sage Publishing; 1995. p. 3-27.

67. Vega WA, Alderete E, Kolody B, Aguilar-Gaxiola S. Illicit drug use among Mexicans and Mexican Americans in California: the effects of gender and acculturation. Addiction 1998a;93:1839–1850. [PubMed: 9926572]

68. Vega WA, Gil AG, Warheit GJ, Zimmerman RS, Apospori E. Acculturation and delinquent behavior among Cuban American adolescents: toward an empirical model. Am J Community Psychol 1993;21:113–125. [PubMed: 8213645]

69. Vega WA, Kolody B, Aguilar-Gaxiola S, Alderete E, Catalano R, Caraveo-Anduaga J. Lifetime prevalence of DSM-III-R psychiatric disorders among urban and rural Mexican Americans in California. Arch Gen Psychiatry 1998b;55:771–778. [PubMed: 9736002]

70. Vega WA, Sribney WM, Achara-Abrahams I. Co-occurring alcohol, drug, and other psychiatric disorders among Mexican-origin people in the United States. Am J Public Health 2003;93:1057–1064. [PubMed: 12835179]

71. Venner KL, Wall TL, Lau P, Ehlers CL. Testing of orthogonal measure of cultural identification with adult Mission Indians. Cultur Divers Ethnic Minor Psychol 2006;12:632–643. [PubMed: 17087525]

72. Zemore, SE. Acculturation and alcohol among Latinos in the U.S.: a comprehensive review. Berkeley, CA: Alcohol Research Group, Public Health Institute; 2004.

73. Zemore SE. Re-examining whether and why acculturation relates to drinking outcomes in a rigorous, national survey of Latinos. Alcohol Clin Exp Res 2005;29:2144–2153. [PubMed: 16385184]

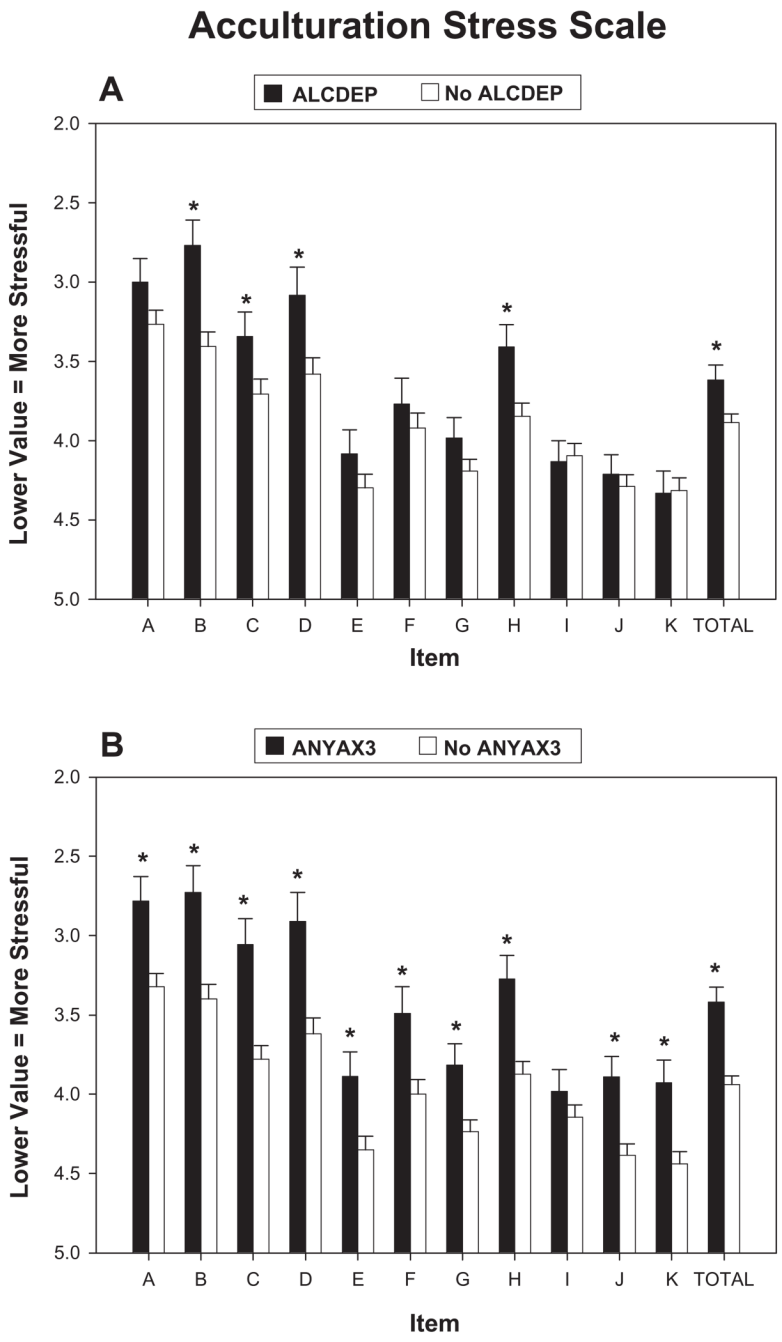

Figure 1.

Acculturation stress levels, as indexed by the Caetano acculturation stress scale, in study participants with (in black bars) and without (open bars) alcohol dependence (fig 1A) and in participants with (in black bars) and without (open bars) anxiety disorders (fig 1B). Values are given as mean ± SEM. Lower values on this scale indicate the participants endorsed higher levels of stress. Asterisk indicates significant difference between groups ($p<0.05$). For each graph the letters indicate the following items on the acculturation stress scale:

A. **It bothers me that family members I am close to do not understand my new values.**

B. **Close Family members and I have conflicting expectations about my future.**

C. **It is hard to express to my friends how I really feel.**

D. **I don’t feel at home.**
E. **People think I am unsociable when, in fact, I have trouble communicating in English.**
F. **It bothers me when people pressure me to assimilate or live the Anglo-American way.**
G. **I often think about my cultural background.**
H. **I have more barriers to overcome than most people.**
I. **Because of my ethnic background, I feel that others often exclude me from participating in their activities.**
J. **People look down upon me if I practice customs of my culture.**
K. **People dislike me because I am Hispanic.**

TABLE 1

Demographic and drinking variables in Mexican American men and women (n=237)

	No Alcohol Dependence			Alcohol Dependence		
Variable	**Males (n=68)**	**Females (n=108)**	**All (n=176)**	**Males (n=30)**	**Females (n=31)**	**All (n=61)**
Age (mean ± S.D.)	23.0 ± 3.8	23.1 ± 3.8	23.1 ± 3.8	23.8 ± 4.1	24.3 ± 3.9	24.0 ± 4.0
Years of education	13.4 ± 1.6	13.4 ± 1.7	13.4 ± 1.7	13.7 ± 1.6	14.0 ± 1.8	13.9 ± 1.7
Income (median)	$40 – <$50K	$40 – <$50K	$40 – <$50K	$50K – <$75K	$30K – <40K	$50K – <$75K
Not Married (n)	58	81	139	27	30	57
Not Employed	19	32	51	7	8	15
Drinking Quantity (drinks per occasion)	3.3 ± 2.9	2.2 ± 1.7	2.7 ± 2.3	5.6 ± 3.6	2.9 ± 2.5	4.2 ± 3.4
Drinking Frequency (drinks per month)	2.5 ± 3.4	2.7 ± 3.4	2.6 ± 3.4	4.4 ± 5.8	4.3 ± 5.0	4.3 ± 5.4