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Ethnic Differences and the Closing of the Sex Gap in Alcohol Use Among College-Bound Students

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Abstract

In this study, the authors used Web-based surveys to examine differences in alcohol use by sex and ethnicity and factors associated with these group differences among 2,241 college-bound students. A Sex $\times$ Ethnicity interaction indicated that the sex gap was much larger for Latino than for Caucasian students. Although peer influence was important for both Caucasian and Latino students, family influences were significant only for Latino youths. The sex differences in drinking among Latino youths were largely explained by the combination of same-sex family member and same-sex peer drinking through values about the acceptability of drinking behavior. Among Caucasians, perceptions of peer behavior exerted a stronger influence on drinking behavior than among Latinos. These results suggest that interventions targeting peer influence are likely to be most effective for Caucasian students. In contrast, for Latinos, particularly Latina women, family characteristics may be an important target for prevention.

Keywords

ethnic and sex differences; alcohol use; approval of drinking; Latinos; college-bound students

Adolescent alcohol use remains a significant public health problem, with 47% of 12th graders reporting alcohol use in the last 30 days (Johnston, O'Malley, Bachman, & Schulenberg, 2006b). Historically, women have been socialized to drink less, and there is significant stigma associated with drinking for many women, particularly those who drink heavily (Blume & Zilberman, 2005). Adolescent drinking differs dramatically by sex, with male adolescents drinking more than female adolescents (Johnston et al., 2006b; Wallace et al., 2003). Sex differences in the 2-week prevalence of five or more drinks, referred to as *heavy episodic drinking*, have tended to be even larger. Although sex differences in lifetime and 30-day prevalence have remained relatively stable over the last 20 years (Johnston, O'Malley, Bachman, & Schulenberg, 2006a), the passage of time has seen a closing of the sex gap among 12th graders with respect to heavy episodic drinking (Johnston et al., 2006a; Wallace et al., 2003). The sex difference among 12th graders has decreased from 17% in 1985 to approximately 11% in 2005. For men, there has been a steady decrease in heavy

episodic drinking, whereas rates have been more stable for women, particularly in the last 10 years.

A narrowing of the gap in alcohol use between men and women has been observed in a number of studies (Johnston et al., 2006a; Wallace et al., 2003), but this may not be equally true for all ethnic/racial groups. For 30-day prevalence of alcohol use, the sex difference among Caucasians, Asian Americans, and American Indians is approximately 7%, whereas African American youths show a sex difference of 11%. Among Latino youths, sex differences tend to be the largest, with a 14% difference for Mexican Americans, a 10% difference for Puerto Rican Americans, and a 9% difference for other Latin American populations. Latino youths also report the largest sex difference in heavy episodic drinking, with a 17% difference among Mexican American 12th graders in the Monitoring the Future study (Johnston et al., 2006a). Although this difference is large by U.S. standards, it is much smaller than sex differences found in Mexico (Vega et al., 2002). Thus, cultural factors appear to lead to particularly large and relatively stable sex differences in drinking among Latino populations.

Although there has been growing interest in ethnic/racial differences in alcohol use and related behaviors (Caetano, Clark, & Tam, 1998; Galvan & Caetano, 2003), few studies have examined sex differences within ethnic/racial minority groups, and even fewer have sought to understand the underlying factors that contribute to these group differences (Collins & McNair, 2002). Although it is not clear whether the large sex difference among Latino youths represents a risk factor for Latino men or a protective factor for Latina women, identification of the factors that contribute to persistent sex differences in this population has the potential to inform prevention and intervention efforts in this population. In addition to its relevance for interventions with ethnic/racial minority populations, the study of sex differences across ethnic/racial groups may help identify more universal risk and protective factors contributing to sex differences.

Progression from early to late adolescence is marked by a shift in the relative influence of parental and peer influence on alcohol use (Schulenberg & Maggs, 2002; Wood, Read, Mitchell, & Brand, 2004). Thus, both sources of influence may be important in understanding sex and ethnic group differences in adolescent alcohol consumption. Parental drinking behavior has been consistently linked to the drinking behavior of offspring (White & Jackson, 2004/2005; White, Johnson, & Buyske, 2001). Although studies have not yet demonstrated that parental drinking contributes to sex differences, recent studies have found that sex specific parental drinking behavior is associated with drinking behavior of adolescents (White et al., 2001; Yu & Perrine, 1997). In addition to potential genetic risk associated with a family history of drinking problems, drinking behaviors of same-sex family members provide one with a model of drinking behavior that may thereby influence one's own drinking behavior.

Although adolescents may have less information about the drinking behavior and attitudes of their peers, adolescents' perceptions of peer drinking appear to have a profound influence on their own behavior (Borsari & Carey, 2003; Carey, Borsari, Carey, & Maisto, 2006). Descriptive norms refer to an individual's perception of the prevalence or pattern of drinking behaviors in a relevant group (e.g., members of his or her social group). There is considerable evidence that sex-specific descriptive norms are related to alcohol use among college students (Korcuska & Thombs, 2003; Lewis & Neighbors, 2004; Thombs, Ray-Tomasek, Osborn, & Olds, 2005). These studies have largely been conducted with college students and have not examined whether these relations are similar across ethnic groups. Because Latinas and other ethnic minority women express lower levels of drinking (Gilbert & Collins, 1997), they may also perceive less drinking by same-sex peers. Thus, perceptions

of peer use may be one mechanism through which sex differences in drinking develop among Latino youths.

In addition to directly influencing drinking behavior, perceptions of parental and peer drinking may contribute to the development of personal attitudes about the acceptability of alcohol use. Thus, personal values may be a final pathway through which parental and peer influences operate. Caetano et al. (1998) found that the acceptability of alcohol use differed across ethnic groups, and a review of cultural differences in alcohol use and its correlates by Gilbert and Collins (1997) noted that Latinas, in particular, have less permissive attitudes about alcohol use than their male peers. Galanti (2003) provided further evidence that personal values may mediate the influence of more distal environmental influences by showing that men with a more traditional gender-role orientation held values promoting heavy use of alcohol. Although not assessed in Galanti's study, identification with traditional gender roles in combination with fewer same-sex drinking models may lead to less permissive values toward drinking behavior among women.

In the current study, we examined the role of perceptions of family and peer drinking and personal drinking values as possible mediators of ethnic/racial and sex differences in drinking behavior. We hypothesized that the large sex differences among Latino students identified previously in the study sample (Fromme & Corbin, unpublished manuscript) would be largely explained by perceptions of parental and peer drinking and by personal values regarding drinking behavior. Specifically, we expected that Latina students would have fewer same-sex drinkers in the family and perceive less drinking by same-sex peers and that these perceptions would lead to less permissive personal values about drinking.

Method

Participants

Participants were 2,245 (59.9% women) students from the 2004 incoming freshmen class at a large southwestern university. This sample was recruited to complete one high school assessment and biyearly surveys beginning in the fall of their freshmen year. Participants were primarily Caucasian (55.0%; 714 women and 497 men), though there were relatively large samples of Asian Americans (18.4%; 232 women and 172 men) and Hispanics/Latinos (15.5%; 212 women and 130 men). Remaining participants identified as African American (4.2%; 69 women and 24 men) or multiethnic/other (6.8%; 97 women and 53 men). The ethnic/racial distribution is similar to the university's 2003–2004 enrollment demographics (Caucasian 60.6%, Asian American 17 %, Hispanic/Latino 14%, and African American 3.6%).

Measures

Demographics—Demographic information assessed included sex, ethnicity, and socioeconomic variables (occupation and level of education for parents and family income). From these variables, a revised Hollingshead index was created to assess socioeconomic status (SES).¹

¹A four-level variable was created for both mothers and fathers from the 14 occupations assessed. The four levels were as follows: (1) unskilled or semi-skilled labor; (2) office, retail, service work, or skilled labor; (3) sales or management; and (4) professional. The higher of the two values (mother or father) for the new four-level occupation variable and the original six-level education variable were used to create the revised Hollingshead index. The occupation variable was multiplied by seven, and the education variable was multiplied by four to create the summary score with a range of 11–52. The original 8-point income measure was included with the revised Hollingshead index as an additional measure of SES.

Alcohol use—Two questions were asked of all participants who indicated interest in the study and completed a contact information form ($N = 3,046$). The first question asked about typical frequency of drinking on a 6-point scale (1 = *never*, 2 = *1–2 times per month*, 3 = *3–5 times per month*, 4 = *1–2 times per week*, 5 = *3–5 times per week*, 6 = *nearly every day*). The second question asked about typical quantity on drinking days on a 6-point scale (1 = 1, 2 = 2, 3 = 3, 4 = 4, 5 = 5–9, 6 = 10 or more). For both variables, we created a pseudocontinuous variable by taking the midpoint of the true value for each response (e.g., 4 = 3–5 times per week; 7 = 5–9 drinks). The resulting variables reflected number of drinking days per week and number of drinks per drinking day. These two items were used only in the preliminary analyses comparing completers with noncompleters. For the primary analyses, we developed an alcohol use composite score using four measures. We assessed typical number of drinking days per week (frequency) and typical number of drinks per drinking day (quantity) using the Daily Drinking Questionnaire (Collins, Parks, & Marlatt, 1986). Single items assessed frequency of getting drunk “not just a little high” on alcohol (Jackson, Sher, Gotham, & Wood, 2001), and frequency of heavy episodic drinking defined as five or more drinks in a sitting for men and four or more for women (Wechsler & Isaac, 1992). Internal reliability of the four-item composite was excellent ($\alpha = .94$).

Family drinking behavior—The Family Tree Questionnaire (Mann, Sobell, Sobell, & Paven, 1985) was used to assess family history of alcoholism. Participants were asked to classify parents, siblings, and grandparents into the following drinking categories: never drank, social drinker, possible problem drinker, or definite problem drinker. The number of same-sex family members who drank was calculated and divided by the total number of same-sex family members,² resulting in an index of “family density” of alcohol use.

Descriptive norms—We collected descriptive norms using an adapted version of the Daily Drinking Questionnaire in which participants responded for members of their social group. Instructions were as follows: “For the typical man/woman in your social group, indicate the number of alcoholic drinks you think he/she consumed each day” for each day of the week. An index of sex-specific norms was created by taking the sum of the number of drinks for each day of the week for same-sex members of the individual’s social group.

Personal drinking values—Using 5-point Likert scales, participants rated their approval of alcohol use from seven statements (Perkins & Berkowitz, 1986); for example, “it is okay for me to get drunk even if it sometimes interferes with my grades or responsibilities.” From these items a composite measure was derived. The internal reliability of the composite (without one item that was removed because of a low loading) was adequate ($\alpha = .71$).

Recruitment and Data Collection Procedures

Incoming 1st-year students who met inclusion criteria (between the ages of 17 and 19 years and who had not previously attended a college or university) were invited to participate ($N = 6,390$; 94% of the incoming class). Approximately 75.6% of students ($n = 4,832$) expressed interest in participating in the study by completing a contact information form and met the final criterion of being unmarried. These students were then randomly assigned to one of three study samples: high school and Year 4 assessments ($n = 976$), Year 4 assessment only ($n = 810$), and semiannual longitudinal assessments ($n = 3,046$). The 3,046 students randomly assigned to the semiannual assessment condition comprised the sample of interest in the current study. Of this group, 2,241 provided informed consent and completed the high school survey (73.7%). Considering the entire eligible sample and the proportion randomly

²Analyses utilizing different patterns of family drinking (i.e., social vs. problem) did not yield significantly different results. As such, the “family drinking density” variable based on any drinking was used in the final analyses.

assigned to the condition utilized in this study, the response rate for this survey was approximately 55.7%, which is higher than the 14%–46% rates found for studies on the utility of Web-based survey methods (Carini, Hayek, Kuh, Kennedy, & Ouimet, 2003; McCabe, Diez, Boyd, Nelson, & Weitzman, 2006). During the consent process, participants were informed that their data would only be presented in group format with no identifying information and that neither parents nor school officials would have access to their data. Students assigned to the longitudinal sample completed the high school version of an online survey in which they were asked to report their behaviors and attitudes during the last 3 months of their senior year in high school. Participants were paid \$25 for completion of the high school survey. For a more detailed description of the study methods, see Fromme and Corbin (unpublished manuscript).

Data Management

Of the initial 2,245 participants, 45 were excluded from data analyses on the basis of race/ethnicity (35 without valid data; 8 Pacific Islanders and 2 American Indians with insufficient sample sizes for meaningful comparison), resulting in a sample of 2,200. Prior to conducting the primary analyses, all variables were evaluated for potential outliers and nonnormality. Possible outliers were identified as scores greater than three standard deviations from the mean. When these values were separated from the remainder of the distribution and seemed unlikely to reflect true values, they were removed. On the basis of these criteria, 15 cases (0.007% of the sample) were removed for a final sample of 2,185. After removal of outliers, four variables (heavy episodic drinking, drinking until “drunk,” weekly frequency, and perceived social group drinking) were positively skewed and kurtotic (values > 3). The positive skew in these data was driven by the substantial number of individuals who indicated that they were nondrinkers (37.4 %). Therefore, these variables were log-transformed, resulting in acceptable skewness and kurtosis ($-3 \leq \text{values} \leq 3$). The four drinking variables were then mean centered before summing to create the composite. Because of the large number of missing values, mean imputation within each racial/ethnic group was used for the SES variables in the regression analyses. In the structural equation model (SEM) analyses, no missing values were imputed, as AMOS handles missing data using maximum likelihood estimation of means and intercepts based on all available data (Byrne, 2001).

Data Analytic Plan

Prior to conducting the primary analyses, chi-square analyses were conducted to evaluate gender and racial/ethnic group differences between those who completed the survey and those who consented to be assigned to a study condition but failed to complete the survey. In addition, analysis of variance (ANOVA) was used to evaluate differences in alcohol use (typical frequency and quantity) between those who completed the survey and those who did not. We then conducted analyses of the primary study hypotheses using multiple regression and SEMs. In all analyses, the revised Hollingshead index (or the variables that comprised it) and the family income variable were included to account for ethnic group differences in SES. For the regression analyses, the ethnicity variable was converted into four dummy codes representing contrasts between Caucasians and each of the ethnic/racial minority groups. Multiple regression was used to identify Sex $\times$ Ethnicity interactions on the drinking composite measure. Remaining analyses used SEMs to evaluate factors (perceptions of peer and family drinking and personal values) that contribute to sex and ethnic group differences in drinking behavior. Values greater than or equal to .95 for normed fit index (NFI), Tucker–Lewis index (TLI), and comparative fit index (CFI), as well as a root-mean-square error of approximation (RMSEA) of less than .06, were considered indicative of good model fit (Schreiber, Stage, King, Nora, & Barlow, 2006). After examining a structural model for the complete sample, we conducted multigroup models using procedures consistent with those

outlined by Byrne (2001) to test for invariance of the model across ethnic groups. Models constraining measurement weights and then structural weights were compared with an unconstrained model to determine whether the models were comparable across ethnic groups. A decrement in model fit when measurement and structural constraints are imposed suggests that the paths from the latent constructs to the measured variables (measurement) or between the latent constructs (structural) differ significantly between the ethnic groups. Under these conditions, the measurement and structural paths need to be free to vary by ethnic group (unconstrained) to accurately characterize the relations among the variables in the model.

Results

Comparison of Completers and Noncompleters

Chi-square analyses were used to evaluate gender and racial/ethnic group differences between those who completed the first survey and those who were assigned to the semiannual assessment condition but failed to complete the first survey. The analysis for gender yielded a significant chi-square, $\chi^2(1, N = 2,870) = 28.37, p < .001$, with a higher percentage of men (31.4%) relative to women (22.6%) failing to complete the first survey. The analysis for race/ethnicity did not yield a significant chi-square, $\chi^2(4, N = 2,870) = 5.00, p = .29$, suggesting that race/ethnicity was not related to the likelihood of completing the first survey. ANOVA was then used to evaluate differences in drinking behavior between completers and noncompleters. Data for typical drinking frequency were available for 2,133 (of 2,141) participants who completed the first survey and 851 (of 805) who were assigned to the annual assessment condition but did not complete the first survey; the former group was coded as 1, and the latter was coded as 2. Although the frequency variable was significantly skewed, results of the analyses were virtually identical using either the raw scores or the log-transformed scores. Thus, for ease of interpretation, the nontransformed scores were used. The ANOVA for drinking frequency produced a significant main effect of group, $F(1, 2982) = 28.12, p < .001$, with those who completed the survey ($M = 0.36, SD = 0.64$) drinking less frequently than those who did not ($M = 0.52, SD = 0.91$). The analysis for typical drinking quantity (only among those who reported any drinking) also found a significant main effect of group, $F(1, 1536) = 7.07, p = .008$, with those who completed the survey ($M = 3.94, SD = 2.41$) drinking less per drinking day than those who did not complete the survey ($M = 4.30, SD = 2.49$).

Primary Analyses

The multiple regression analysis used to test for a Sex $\times$ Ethnicity interaction on alcohol use included SES, sex, and the four ethnicity dummy codes in the first block. The second block of variables included the Sex $\times$ Ethnicity interactions (one for each dummy code). Table 1 presents the means and standard deviations of alcohol use variables comprising the composite outcome by sex and ethnicity. Results from the regression model are presented in Table 2. Block 1 was significant, $F(7, 2183) = 17.12, p < .001$, with main effects indicating that Caucasians consumed significantly more alcohol than Asian Americans. Block 2 variables accounted for significant remaining variability in drinking, $F(11, 2183) = 12.32, p < .001$, with significant Sex $\times$ Ethnicity interactions for contrasts between Caucasian and Latino students and between Caucasian and African American students. Tests of simple main effects found that Latinas reported significantly less alcohol use than Latinos, $F(1, 339) = 9.92, p < .01$, and Caucasian women, $F(1, 916) = 9.39, p < .01$. A similar pattern emerged for the African American students in the sample, with African American women drinking less than African American men, $F(1, 90) = 6.49, p < .05$, and Caucasian women, $F(1, 773) = 25.31, p < .001$. Subsequent SEMs were tested only with the Caucasian and Latino groups, as the small sample of African American participants was not sufficient for

conducting multigroup SEM, and no interaction between sex and ethnicity was identified for Asian American or multiethnic students.

Overall SEM: Caucasian and Latino Students

In the full sample, results of the SEM model investigating the relations among perceptions of peer and family drinking, personal values, and alcohol use provided adequate model fit, $\chi^2(56, N = 1,539) = 377.18, p < .001$, CFI = .970, NFI = .965, TLI = .951, RMSEA = .061. See Figure 1 for all structural weights and significance values. Results indicate that perceptions of peer drinking ($p < .001$) and personal drinking values ($p < .001$) were the only variables significantly associated with alcohol use. Both peer ($p < .001$) and family ($p < .001$) drinking exerted indirect effects on alcohol use via personal drinking values. Those who were exposed to more same-sex family and peer drinking reported values more permissive toward drinking and greater consequent consumption. Other significant paths in the model included a sex effect on same-sex family drinking ($p < .001$) and an SES effect on personal drinking ($p < .01$). Men reported more same-sex family drinking, and those with higher SES reported greater consumption.

Multigroup SEM: Caucasian and Latino

Next, multigroup models were conducted to identify expected differences between Caucasian and Latino students on the basis of the results of the regression analysis. When compared with an unconstrained model, the model constraining the measurement weights across ethnic groups produced a significant decrement in model fit, $\chi^2(119, N = 1,539) = 405.97, p < .001$; CMIN (the minimum value of the discrepancy function between the sample covariance matrix and the estimated covariance matrix referred to as the *minimum sample discrepancy*) = 18.64, $p < .01$. The model in which measurement weights and structural weights were constrained also provided significantly worse model fit than the model that constrained only measurement weights, $\chi^2(128, N = 1,539) = 442.98, p < .001$; CMIN = 55.65, $p < .001$. These results indicate that both the measurement model (paths from the latent constructs to the measured variables) and structural model (paths between latent constructs) differed significantly by ethnic group. Thus, the unconstrained model was retained to accurately characterize the relations among the study variables for the two groups (see Figures 1 and 2). The chi-square for the unconstrained model was $\chi^2(112, N = 1,539) = 387.33, p < .001$, and the fit indices suggested good model fit, CFI = .972, NFI = .962, TLI = .955, RMSEA = .040. See Table 3 for means and standard deviations for the proposed mediating variables by sex and ethnicity.

To better understand the specific structural weights that led to poor fit in the constrained model, we examined critical ratios for parameter differences. The relation between sex and family drinking ($p < .001$) was stronger for Latino than for Caucasian students, suggesting that family influences may account for sex differences in drinking for Latino students. The paths between same-sex peer drinking and personal values ($p < .01$) and between same-sex peer drinking and alcohol use ($p < .05$) also differed by group. In both cases, the relations were stronger for Caucasian students, highlighting the power of peer influence for this group.

Finally, we examined indirect effects of sex on drinking behavior within the Latino sample to understand factors that may contribute to the substantial sex differences in alcohol use. The chi-square for the Latino model was $\chi^2(56, N = 337) = 132.57, p < .001$, and the fit indices suggested adequate model fit, CFI = .965, NFI = .941, TLI = .943, RMSEA = .064. We expected that differences in family and peer drinking and personal drinking values would mediate the relation between sex and drinking behavior. Consistent with our hypotheses, sex exerted indirect effects on drinking behavior via both family and peer

drinking. For peer drinking, two different types of indirect paths were observed (see Figure 2). The first path led from sex to peer drinking to alcohol use. Latinas perceived less alcohol use among same-sex peers relative to Latinos, and lower perceptions of peer use were associated with less personal alcohol use. The second indirect path was itself indirect via personal drinking values. Lower levels of peer drinking among Latinas were associated with less permissive attitudes about alcohol use, which in turn were associated with less personal alcohol use. The beta for the total indirect effects of same-sex peer drinking was $\beta = .198, p < .001$. The latter of these two same-sex peer drinking paths was also apparent for same-sex family member drinking ($\beta = .114, p < .05$). The perception of Latinas that fewer family members drink was associated with less permissive drinking values, which in turn were associated with lower levels of personal alcohol use. Thus, personal drinking values were a proximal correlate of drinking through which perceptions of both family and peer drinking may operate. In the final model for the Latino sample, the direct path from sex to personal drinking was not significant ($\beta = .033, p = .54$), suggesting that the indirect effects through family and peer drinking fully mediated the sex differences observed in the regression model.

Discussion

The findings in the Latino sample are consistent with prior research indicating that Latina women are less likely to drink and less likely to hold values that are permissive of substance use (Gilbert & Collins, 1997) and that family influence is particularly strong for this group (Santiago-Rivera, Arredondo, & Gallardo-Cooper, 2002). It is possible that Latinas have internalized the behavior of their female family members as discouraging alcohol use for women. Likewise, for Latinos the drinking behavior of their male family members may be internalized as encouraging alcohol use. Such norms may be, in part, related to “machismo,” which is often associated with heavy alcohol use (Galanti, 2003). Although aspects of Latino culture may promote heavier drinking among Latino men relative to Latina women, it is important to note that the Latino men in this sample did not drink more than their Caucasian counterparts. As such, the internalization of same-sex family drinking behavior may be seen as a protective factor for Latinas rather than a risk factor for Latinos. Perceptions of peer use also mediated sex differences in alcohol use for Latinas (and Caucasians as well). Thus, the relatively low rates of drinking among Latinas appear to be driven by both peer and family/cultural influences, though family influence was the only factor that was differentially predictive of sex differences across ethnic/racial groups.

In addition to improving the understanding of sex differences in drinking behavior, the current findings have obvious implications for the development of culturally congruent prevention efforts with Latino youths. In a review of prevention approaches for Latino youths, family-based prevention and intervention for Latino youths has focused on family involvement and bonding and has been found to improve family functioning and reduce substance use (Castro et al., 2006). One recommendation offered by these authors includes further investigation of more specific cultural variables, including gender roles. Although we did not investigate gender roles in the current research, we provide some preliminary evidence that inclusion of sex specific family member substance use may be useful in the development of prevention initiatives for Latino youths. Thus, future efforts to incorporate family characteristics differently for women and men may improve the efficacy of such prevention efforts. For Latinas, family oriented programs may help fortify values and behaviors instilled by the family. For Latino men, family-based prevention efforts may be used to garner support from same-sex family members for not drinking or drinking responsibly.

In contrast to the implications for Latino youths, results in the Caucasian sample suggest that interventions targeting perceptions of peer behavior may be most effective in reducing alcohol consumption. Peer drinking exerted a more powerful influence on drinking for this group, and the behavior of family members was not related to drinking directly or through personal values. Although there is some evidence suggesting that interventions targeting descriptive norms may be effective for Caucasian students, it is important to consider the possibility that the narrowing of sex differences in drinking among Caucasians is due, at least in part, to a reduction in the protective influence of family for Caucasian women. Thus, family-based interventions that encourage parental role models for abstinence or moderate alcohol use among Caucasian mothers may help reverse this trend among Caucasian women.

Although the results of the current study improve the understanding of sex differences in drinking across racial/ethnic groups, future studies are needed to determine whether the relationships identified are stable during the transition to college, vary across Latinos with different national origins, or vary by level of acculturation. The transition to college represents a time characterized by identity development, increased independence, more peer influences, and less parental involvement (Arnett, 2000). As this transition occurs, it is unclear whether the decreased involvement of family might yield a change in drinking behavior among Latinas. Alternatively, it is possible that Latinas will maintain strong ties with family and that the influence of family drinking behavior will continue to be strong. The relationship and ties to family may also vary depending upon level of acculturation, which in turn could influence rates of alcohol use.

These remaining questions speak to several limitations of the current study. The survey was limited in its assessment of cultural factors beyond SES and ethnicity/race. For example, measures of acculturation that have been shown to be related to differences in rates of substance use were not included (Gil, Wagner, & Vega, 2000; Guilamo-Ramos, Jaccard, Johansson, & Tunisi, 2004). Additionally, we did not assess the degree to which participants subscribe to traditional gender roles, which may be an important moderator of the relationship between sex and alcohol use among Latinos. Further, data on national origin were not collected, limiting our ability to test for subgroup differences. Census data for the state of Texas and enrollment information for the university suggest that the results from the current sample of Latino students are likely to represent primarily Mexican American students. The Latino population in the state of Texas is largely of Mexican decent (76%; U.S. Census Bureau, 2003), and the majority of University of Texas students are from within the state (92% in the 2004 entering class). Because the overall Latino population is heterogeneous in national origin and studies have indicated that there are differences in substance use among different Latino adolescent subgroups (Epstein, Botvin, & Diaz, 2002; Gil et al., 2000), it will be important to assess for national origin in future studies of sex and ethnic group differences in drinking behavior.

Three issues related to study methodology are also important to consider when interpreting the results. First, family drinking behavior is more directly observable for high school students still living at home. In contrast, peer drinking may be more difficult to directly observe and, therefore, less closely tied to actual behavior. Although perceptions of peer use (despite potential inaccuracy) are predictive of personal drinking behavior, it is important to keep in mind that these perceptions may be based on personal attitudes in addition to objective information about peer use. A second issue worth noting is that the sample was drawn from a large public university in the southwest. Given established differences in college student drinking by region of the country (O'Malley & Johnston, 2002; Wechsler, Lee, Kuo, & Lee, 2000), it is quite possible that ethnic and/or sex differences also vary on the basis of the geography of the campus. Finally, analyses comparing those who completed the initial survey with those who completed a contact form (indicating a willingness to

participate) but did not complete the survey found that women and those who drank less frequently and in lower volume were more likely to complete the survey. Although differences in drinking between groups were statistically significant, the absolute differences in drinking frequency and quantity were small, collectively amounting to a difference of less than one drink per week on average. Still, it is possible that this study missed those students who were the heaviest drinkers, as those who did not complete a contact form may have been even heavier drinkers than those who completed a form but did not complete the survey.

Despite these limitations, the results of the current study provide evidence for the role of family drinking behavior and personal values in explaining sex and ethnic group differences in alcohol use among college-bound seniors. A major strength of this study was the large number of Latino students, providing the opportunity to investigate ethnicity-specific relationships. Although Latinos are the largest minority group in the United States and are younger in age than other ethnicities (Ramirez & de la Cruz, 2003), there have been few studies that have examined the correlates of alcohol use in a Latino college-bound population. The narrowing of sex differences in terms of heavy alcohol use is particularly concerning for women. For Latinas, the value placed upon family relationships may be protective against heavy drinking, thereby making prevention efforts that build upon existing family relationships particularly useful. Although family-based interventions might also have utility with Caucasian students, strong peer influence for this group suggests that interventions targeting perceptions of peer use may have the greatest utility.

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Figure 1. Structural equation model of factors contributing to drinking behavior for the full Caucasian and Latino sample. SES = socioeconomic status; Ed = education; Oc = occupation; Inc = income.

Figure 2. Multigroup structural equation model of factors contributing to drinking behavior for Latino and Caucasian youths. SES = socioeconomic status; Ed = education; Oc = occupation; Inc = income.

Table 1

Means and Standard Deviations by Sex and Ethnicity

Variable	Alcohol use—Composite ^a		No. of drinking days per week ^b		No. of drinks per drinking day ^b		No. of binge drinking episodes—Last 3 months ^b		No. of times intoxicated—Last 3 months ^b	
	M	SD	M	SD	M	SD	M	SD	M	SD
Caucasian	0.13	0.98	0.91	1.25	1.54	2.29	2.58	5.18	2.08	4.22
Men	0.09	1.02	0.87	1.34	1.66	2.69	2.69	5.51	2.15	4.61
Women	0.15	0.95	0.94	1.19	1.46	1.95	2.50	4.95	2.03	3.93
Latino	0.05	0.89	0.95	1.28	1.56	2.21	1.95	4.42	1.28	4.21
Men	0.24	1.00	1.16	1.42	2.16	2.70	2.82	5.50	2.02	4.11
Women	-0.07	0.80	0.82	1.17	1.20	1.75	1.41	3.50	0.83	2.00
African American	-0.33	0.65	0.52	0.95	0.74	1.80	0.54	2.00	0.60	1.91
Men	-0.05	0.90	0.75	1.07	1.66	3.01	1.33	3.42	1.42	3.01
Women	-0.43	0.50	0.43	0.89	0.41	0.92	0.26	1.06	0.31	1.24
Asian American	-0.39	0.62	0.41	0.97	0.56	1.41	0.65	2.53	0.41	1.51
Men	-0.42	0.57	0.40	0.98	0.53	1.29	0.41	1.74	0.27	1.21
Women	-0.36	0.66	0.42	0.96	0.57	1.50	0.82	2.97	0.51	1.69
Multieethnic	0.01	0.90	0.81	1.06	1.30	2.04	2.01	4.85	1.58	3.59
Men	0.07	1.00	0.87	1.17	1.51	2.21	2.58	6.37	2.12	4.72
Women	-0.02	0.84	0.77	0.99	1.87	1.95	1.70	3.80	1.30	2.80
Total	0.01	0.91	0.80	1.06	1.31	2.14	2.00	4.62	1.55	3.62
Men	0.01	0.97	0.82	1.29	1.50	2.51	2.22	5.08	1.74	4.12
Women	-0.01	0.88	0.79	1.14	1.19	1.84	1.86	4.29	1.43	3.25

^aThe alcohol composite is a z score.

^bThe raw coefficients are displayed for these variables for ease of interpretation. The log transformed coefficients were used to create the alcohol use composite.

Table 2**Sex $\times$ Ethnicity Interactions and Alcohol Use**

Variable	Standardized β	<i>t</i>	<i>p</i>	ΔR^2
SES Variable 1	.060	2.200	.028	.052*
SES Variable 2	-.027	-1.019	.308	
Sex	.009	0.420	.675	
Ethnicity—Asian vs. Caucasian	-.208	9.260	<.001	
Ethnicity—African American vs. Caucasian	-.091	-4.140	<.001	
Ethnicity—Latino vs. Caucasian	-.017	-0.700	.484	
Ethnicity—Mixed vs. Caucasian	-.031	-1.448	.148	
Sex $\times$ Ethnicity interaction—Asian vs. Caucasian	-.001	-0.047	.962	.007*
Sex $\times$ Ethnicity interaction—African American vs. Caucasian	.049	1.996	.049	
Sex $\times$ Ethnicity interaction—Latino vs. Caucasian	.097	3.354	.001	
Sex $\times$ Ethnicity interaction—Mixed vs. Caucasian	.026	0.978	.328	

Note. The degrees of freedom for each main effect are 1, 2183 and 1, 2179 for each interaction. SES = socioeconomic status.

* $p < .01$.

Table 3

Personal Drinking Values, Norms, and Drinking Density by Sex and Ethnicity

Variable	Caucasian				Latino			
	Men		Women		Men		Women	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Personal drinking values	2.28	0.93	2.28	0.86	2.27	0.82	1.96	0.79
Same sex peer norms	0.65	0.53	0.63	0.46	0.83	0.53	0.69	0.43
Same sex family member drinking	0.77	0.28	0.70	0.30	0.75	0.28	0.54	0.36