

Demographic and Psychosocial Risk for Alcohol Use: Ethnic Differences*

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ABSTRACT. *Objective:* We examined the influence of demographic variables, and social (parents and peers), attitudinal and intentions variables regarding alcohol use on actual drinking behavior among Asian and white populations. *Method:* Asian ($n = 148$; 79 female, 69 male) and white ($n = 132$; 72 female, 60 male) college students completed a questionnaire. *Results:* Confirmatory factor analyses revealed that social and attitudinal factors reflected a common construct of Psychosocial Vulnerability which, in a structural equation model, was significantly predicted by ethnicity. The white population was exposed to more psy-

chosocial risks to alcohol use compared to the Asian population. Ethnicity, however, did not directly predict either drinking intentions or drinking behavior, after the effects on Psychosocial Vulnerability were considered. *Conclusions:* Our findings suggest that ethnic differences in alcohol use between Asians and whites are mainly due to different levels of exposure to risk factors. Effective prevention programs must consider, not only psychosocial factors, but also certain contextual factors such as sex and ethnicity. (*J. Stud. Alcohol* 57: 521-530, 1996)

DRUG USE and misuse are generated by multiple etiological factors (Hawkins et al., 1992; Newcomb, 1992; Petraitis et al., 1995). Factors that increase the risk of using and abusing alcohol and other drugs can be categorized into two groups: contextual and psychosocial (Hawkins et al., 1992). As contextual factors, demographic variables such as sex, ethnicity and socioeconomic status (SES) are linked to alcohol and other substance use (see Hawkins et al., 1992, for review). Modeling of significant reference groups and social norms concerning substance use are the most important social factors (Petraitis et al., 1995). Parents and friends as sources of social influence play a potent role in the initiation and continuation of substance use (Hawkins et al., 1992). As psychological factors, personal attitudes toward substance use, defined as one's expectations of costs and benefits of substance use (Smith, 1980), are also one of the most consistent predictors of substance use (Keefe, 1994; Newcomb et al., 1988; Stacy et al., 1990). The present study addresses not only psychosocial factors but also contextual factors to understand more fully the processes relating to drinking behavior.

Contextual factors

Across all ethnic groups, males tend to consume more alcohol and other drugs than females (Bachman et al., 1991;

Newcomb et al., 1987; SAMHSA, 1994). This sex difference is especially apparent and is larger among Asians (Bachman et al., 1991; Welte and Barnes, 1987). Asian females are usually abstainers or occasional drinkers (Chi et al., 1988, 1989; Kitano et al., 1988; Welte and Barnes, 1987). Moreover, the relations of psychosocial factors to drinking behavior may differ across sexes (Thombs, 1993).

Ethnicity has also been related to the prevalence of substance use. Numerous studies have reported that alcohol and drug use is more prevalent among white populations compared to Asian populations, regardless of age (Akutsu et al., 1989; Bachman et al., 1991; Gillmore et al., 1990; Zane and Sasao, 1992). Some studies, however, suggest that heavy drinking is not uncommon among Asian males, especially among Japanese males (Chi et al., 1988, 1989; Welte and Barnes, 1987).

The relationship between socioeconomic status (SES) and alcohol use is less clear. Some researchers have found a modest positive correlation between social class and alcohol use (Clarke et al., 1990; Murray et al., 1987), whereas others have found no consistent relationship between the two (Bucholz, 1990; Johnstone, 1994; Wallace and Bachman, 1991).

Psychosocial factors

Despite ample evidence of the differences in alcohol use between Asians and whites (Zane and Sasao, 1992), little systematic effort has been made to explain these group differences. Ethnic differences in alcohol use may be accounted for by two different processes: Asians and whites may be exposed to different levels of risk factors of alcohol use and/or they may differ in their susceptibility to risk factors. The latter process concerns whether risk factors are differentially

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related to alcohol use in different ethnic groups. Thus, the presence of different susceptibilities implies interactive or moderating effects of risk factors with ethnicity. Knowledge about these possible interactive effects would be valuable in developing effective prevention and treatment programs. It is, however, important to note that the two processes are not mutually exclusive but both can operate at the same time. Thus, to further understanding of the sources of ethnic differences in alcohol use, the present study examined both processes in psychosocial factors simultaneously.

There is some support for different levels of exposure to risk factors between Asians and whites. In Newcomb and Bentler (1986), compared to their white peers, Asian adolescents reported that fewer adults they knew used drugs. Similarly, Asian adolescents reported fewer peer models of drug use for all substances than did their white peers (Newcomb and Bentler, 1986). Sue et al. (1979) showed that Asian college students perceived their parents as less approving of alcohol use than did whites. Further, Asian college students themselves approved less of drinking and disapproved more of drunkenness than did their white peers (Sue et al., 1979). However, little is known about Asians' perceived peer norms concerning alcohol use in comparison to those of whites. Further, Asians' specific expectations of costs and benefits of drinking are unknown in comparison to those of whites.

The second process, different susceptibility of Asians and whites, has not received much attention. Even when different susceptibility was examined, the statistical techniques used to test group differences were often inadequate (e.g., Akutzu et al., 1989). Newcomb and Bentler (1986) focused on social modeling and found evidence against different susceptibility. The strength of correlations between alcohol use of adolescents and alcohol use of the adults that adolescents knew did not differ for Asian and white groups (Newcomb and Bentler, 1986). The magnitude of relation between one's own friends' alcohol use also was approximately equal for Asian and white youths (Newcomb and Bentler, 1986).

Unfortunately, possible ethnic differences in susceptibility to either perceived parental and peer norms or personal attitudes toward drinking have not been directly tested for the Asian and white populations.

Ajzen and Fishbein's theory of reasoned action

According to Ajzen and Fishbein's (1980) theory of reasoned action, alcohol use is determined exclusively by a person's reasoned intentions to engage in drinking. In turn, these decisions are determined by two variables: (1) one's perceived social norms concerning drinking and (2) one's attitudes regarding one's own drinking. Consistent with this model, intentions to use drugs have been shown to be correlated with actual drug use for both Asians and whites (Maddahian et al., 1988a). Perceived social norms and personal attitudes are also good predictors of intentions to use sub-

stances among whites and blacks (Biddle et al., 1980; Keefe, 1994). However, Ajzen and Fishbein's (1980) model has not been specifically tested for Asians' substance use.

Present study

The conceptual model used in the current study is presented in Figure 1. As part of contextual factors, three demographic variables (sex, ethnicity and SES) were included. As psychosocial factors, social and attitudinal variables were included. In particular, modeling and perceived social norms of parents and peers, and attitudes toward alcohol use, were included. Ajzen and Fishbein (1980) argued that intentions to use substances can be exclusively explained by perceived social norms and attitudes regarding substance use. However, there is evidence that other variables such as modeling also have direct influences on intentions to use substance (Bentler and Speckart, 1981; Chassin et al., 1984). The present model thus included modeling of alcohol use of parents and peers as part of social influence variables in addition to perceived social norms.

Theories of substance use rarely include demographic variables such as sex and ethnicity. Past research has, however, shown that males and whites are at greater risk for substance use and abuse than females and nonwhites (Bachman et al., 1991). Thus, it is important to understand the processes through which demographic variables affect alcohol use. Values and norms governing alcohol and other substance use differ with distinct cultures (Maddahian et al., 1988b) and the lifestyles associated with SES. Thus, the present model proposed that demographic variables have indirect influences on drinking behavior through their effects on social and attitudinal variables. In addition, the possible direct effects of the demographic variables on drinking behavior were examined.

The present model also expanded Ajzen and Fishbein's (1980) model by proposing that social and attitudinal variables may also have direct effects on drinking behavior. According to Ajzen and Fishbein's (1980) model, social and attitudinal variables affect drinking behavior only indirectly through their mediating effects on drinking intentions. It is critical, however, to examine whether social and attitudinal variables also have direct influences on alcohol use. If social and attitudinal variables directly affect drinking behavior, changing drinking intentions alone would be insufficient to prevent alcohol use and misuse.

In short, the present study addressed four questions: (1) Are there differences in the mean levels of social and attitudinal variables between Asians and whites? (2) Are there differences in the relations between social and attitudinal variables and alcohol use for Asians and whites? (3) How are demographic variables related to drinking behavior? (4) How are social and attitudinal variables related to drinking behavior?

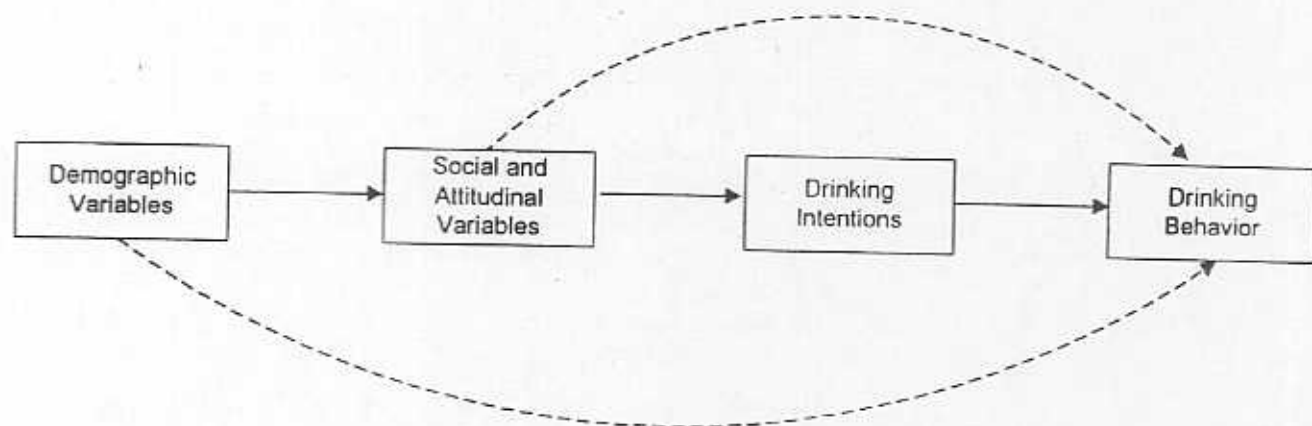


FIGURE 1. Initial conceptual model (the solid arrows indicate staged mediating effects, the dashed arrows indicate possible direct effects)

Method

Subjects

Asian ($n = 148$; 79 female, 69 male) and white ($n = 132$; 72 female, 60 male) college students gave informed consent and participated in the study. The students were recruited from introductory psychology classes at a large university in the Los Angeles area. Past studies have shown that underage college drinkers are likely to consume more alcohol and to experience more problems related to drinking than their legal-age college peers (Allen et al., 1994; Engs and Hanson, 1989, 1990). Underage college drinkers thus appear to be more at risk of use and abuse of alcohol than their legal-age peers. Therefore, the present study focused on the underage students. Only students who were 20 years old or younger were allowed to participate in the study. The mean age of the students was 18.68 years.

The Asian students consisted of 62 Chinese (37 female, 25 male), 14 Filipinos (9 male, 5 female), 16 Japanese (11 female, 5 male), 23 Koreans (13 male, 10 female), 17 Vietnamese (9 male, 8 female) and 16 others (8 male, 8 female).

Procedure

The questionnaires were administered to groups of students during experimental sessions. Because the data were collected throughout the whole academic year, possible seasonal effects (e.g., holidays) were unlikely to affect students' responses. To increase the validity of the self-reports of alcohol use, students were asked not to write their names on the questionnaire. The questionnaires took about 30 minutes to complete.

Measures

Perceived parent's alcohol use. Perceived parents' current alcohol use was assessed by two items: "My father [mother]

uses alcohol." Students responded on a two-point scale of 0 "no" and 1 "yes." Then, the scores on both items were combined as the measure of perceived parental alcohol use, which ranged from 0 to 2. If either parent's alcohol use was not indicated by the student, perceived parents' alcohol use was then computed as missing.

Perceived parents' norms. Perceived parents' norms concerning alcohol use were assessed with seven items. The items were adapted from those used by Johnston et al. (1987) and Schlegel et al. (1977). Because drinking norms may vary with extent of, and social contexts of, alcohol use, the items dealt with different frequencies and quantities of use across various settings for drinking. Each item included a pair of statements that reflect opposing directions of parental norms (e.g., "My parents think that I should not drink at all; My parents think that I should drink"). Students first decided which side was more like their parents and then decided how strongly their parents would agree with that statement on a 5-point scale ranging from "not sure" (0) to "very strongly agree" (4). Students' responses were recorded in a way that -4 indicated the strongest perceived norms against alcohol use, 0 indicated not sure and 4 indicated the strongest perceived norms for alcohol use. The alpha coefficients of all the variables with the total sample were largely comparable to those with Asians and whites, separately. Therefore, only the alpha coefficients with the total sample will be reported. The alpha coefficient for perceived parents' norms was .82.

Perceived friends' alcohol use. Perceived friends' alcohol use was assessed with a single item: "How many of your five closest friends use alcohol?" Students responded on a 6-point scale from "none" to "five."

Perceived friends' norms. Perceived friends' norms were assessed with seven items that were comparable to those for parents. The alpha coefficient for this measure was .83.

Attitudes toward alcohol use. Students responded to 16 items on the perceived costs and 19 items on the perceived benefits of alcohol use. The 35 items were selected based on

past literature (e.g., Brown et al., 1987; Jessor et al., 1968a). The items on the perceived costs consisted of three types: social and behavioral impairment (e.g., "If I drink, I will get into fights"), sanctions against alcohol use (e.g., "Drinking is against my religion") and health liability (e.g., "Drinking will make me hooked on alcohol"). The items on the perceived benefits of alcohol use dealt with three types of expectations: social cohesion (e.g., "If I drink, I will feel more part of the group"), enhancement of positive affect (e.g., "Drinking will make me feel good") and reduction of negative affect (e.g., "Drinking will help me forget my personal problems"). Students responded to each item on a 7-point scale ranging from (1) "very unlikely," (4) "not sure" to (7) "very likely." Principal components factor analysis was conducted on all items for the total sample. The items for the perceived cost of alcohol use loaded on one factor; the items for the perceived benefits loaded on a second factor. Students' responses were averaged across the 16 items for the perceived costs and across the 19 items for the perceived benefits. Coefficient alphas for the perceived costs and perceived benefits measures were .89 and .93, respectively.

Drinking intentions. Students were asked whether they intended to drink beer, wine and distilled spirits in the next month and in the next year. The six items were adapted from Chassin et al. (1985). Responses were coded on a 7-point scale ranging from (1) "very unlikely," (4) "not sure" to (7) "very likely." The internal consistency of this measure was .91.

Drinking behavior. To assess alcohol consumption, Jessor et al.'s (1986b) Quantity Index (QI) and the Frequency Index (FI) were included. Jessor et al.'s (1968) QI and FI were concerned with three different types of alcoholic beverages: wine, beer and distilled spirits. The quantity and frequency of drug use indicate distinct aspects of drug consumption, although they are highly correlated (Stein et al., 1988). In particular, the quantity of alcohol use was shown to be a better predictor of drinking problems than the frequency of alcohol use (Stein et al., 1988). In Keefe (1994), for the quantity of alcohol use, the influences of perceived friends' norms became more important with age, whereas for the frequency of alcohol use, the opposite pattern was found. Therefore, instead of combining the quantity and frequency measures, the QI and FI were kept separate.

According to Jessor et al. (1986b), the QI was measured by three questions: "How much do you usually drink at one time when you drink beer [wine, hard liquor]?" Responses were reported on a 6-point scale from (1) "never drink beer [wine, hard liquor]" to (6) "seven or more bottles of beer [a bottle or more wine, 7 or more drinks of hard liquor]." The quantity estimate for each beverage consumption was determined in terms of absolute alcohol content per ounces consumed (for the details of scoring, see Jessor et al., 1968b).

The FI was also assessed with three questions: "How often do you usually drink beer [wine, hard liquor]?" Students responded on a 7-point scale ranging from (1) "never" to (7)

"1 or 2 times a day." Frequency values were assigned to the response for each beverage based on a times-per-day unit (for the details of scoring, see Jessor et al., 1968b). Both the QI and FI have a lowest limit of 0 (no alcohol consumed) and high scores indicate large amount/high frequency of alcohol use. The coefficient alphas for the QI and FI were .79 and .52, respectively. The alpha coefficient for the FI was moderate because of the students' selective use of a particular type of alcohol; specifically, the frequency of wine was weakly correlated with that of beer and hard liquor use (r 's = .13 and .20, p 's < .05, respectively).

Socioeconomic status (SES). As an indicator of SES, father's occupation was used. Father's occupation was coded on an 8-point scale ranging from (1) blue collar, unskilled jobs to (8) white collar, professional jobs. Although the education level of parents was also assessed, parents' education was not included as a final measure of SES. This was because 88% of the Asian students' parents were immigrants and immigrants' education level is not a good indicator of SES. Asian immigrants tend to be significantly better educated, but they usually hold lower status jobs than the immigrants of European ancestry (Hsia, 1988). Thus, there is often a sharp disparity between Asian immigrants' educational level and the jobs held by them in the United States.

Results

Mean comparisons

Two-way ANOVAS were conducted to examine ethnic and sex differences in social and attitudinal variables and drinking intentions and behavior. A summary of these analyses is presented in Table 1. Although diverse Asian groups show distinct cultural values, some common customs and norms of drinking have been noted across the various Asian groups. In particular, Asian cultures emphasize moderation, strongly discourage excessive drinking and mainly use alcohol to enhance social interactions (Austin et al., 1989; Sue, 1987). Although it would be most desirable to analyze data by particular Asian group, such analyses were not practical in the present study because of the relatively small size of the sample. Thus, six subgroups of the Asian students were combined as one group. On all the measured variables, significant ethnic differences between the Asian and white groups were observed. Asian students reported fewer drinking models, perceived their parents and friends as being more negative toward their drinking and expected more costs and fewer benefits of drinking. Asian students were also less likely to intend to drink in the future and engaged in less drinking than did white students. On four out of the nine measured variables, significant sex differences were found. Female students perceived their parents and their friends as being more negative toward their alcohol use and reported less involvement in drinking than did male students. None of the interactions was significant.

TABLE 1. Means and standard deviations of measured variables for each ethnic group and for each sex

Measures	Ethnicity		<i>F</i> (1,276 df)	Sex		<i>F</i> (1,276 df)
	Asian	White		Female	Male	
Parents' alcohol use	0.55 ± 0.73	0.98 ± 0.89	19.89 [†]	0.72 ± 0.81	0.79 ± 0.86	0.74
Parents' norms	-1.72 ± 1.88	-0.91 ± 1.85	13.66 [†]	-1.56 ± 1.82	-1.08 ± 1.99	4.92*
Friends' alcohol use	2.18 ± 1.72	3.86 ± 1.52	73.83 [‡]	2.87 ± 1.89	3.09 ± 1.76	1.57
Friends' norms	-0.15 ± 2.00	1.17 ± 1.70	35.32 [‡]	0.27 ± 1.90	0.72 ± 2.05	4.32*
Costs of drinking	3.53 ± 1.18	2.92 ± 1.06	20.29 [†]	3.17 ± 1.20	3.32 ± 1.13	1.05
Benefits of drinking	2.96 ± 1.16	3.66 ± 1.17	25.77 [†]	3.20 ± 1.12	3.39 ± 1.31	1.99
Drinking intentions	3.48 ± 1.95	5.10 ± 1.80	51.82 [‡]	4.22 ± 2.04	4.27 ± 2.06	0.09
Drinking quantity	1.79 ± 2.04	3.89 ± 3.08	50.44 [‡]	2.14 ± 2.26	3.53 ± 3.15	22.50 [‡]
Drinking frequency	0.06 ± 0.14	0.17 ± 0.19	28.02 [‡]	0.09 ± 0.16	0.14 ± 0.18	5.74*

**p* < .05. †*p* < .001.*Moderating or interactive effects*

The second set of analyses examined the possible interactive effects of ethnicity and social and attitudinal variables, and the interactive effects of sex and social and attitudinal variables, on drinking intentions and behavior. Three sets of hierarchical multiple regression analyses were run. One set of regressions used drinking intentions as the dependent variable; the second set used drinking frequency as the dependent variable; the third set used drinking quantity as the dependent variable. In each set of hierarchical regression, father's occupation was entered first as a control variable, because SES is often confounded with ethnicity. In the second step, ethnicity, sex and the six social and attitudinal variables were entered. In the third step, the interaction terms of ethnicity and the social and attitudinal variables, and the interaction terms of sex and the social and attitudinal variables, were entered.

Tests of the significance of the interaction terms indicate whether the relations between the predictors and the measures of alcohol use differ across ethnic groups or across sexes. To reduce multicollinearity, all predictors were centered by subtracting the mean from each score (Aiken and West, 1991).

None of the interactions involving ethnicity was significant, suggesting that the effects of social and attitudinal variables on drinking intentions and behavior are similar for the two groups. One out of 18 interactions involving sex was significant. Thus, this significant effect can be best attributed to chance.

Initial conformity factor analysis (CFA)

An initial CFA was performed using the EQS program (Bentler, 1995). CFA is a test to determine whether the vari-

ables hypothesized to represent specific constructs in fact reflect them in a reliable manner (Newcomb, 1990). The initial model assumed four factors: Parental Influence, Friends' Influence, Attitudes toward Drinking and Drinking Behavior. The three demographic variables, sex, ethnicity and SES, and drinking intentions were also included as measured variables. Parental Influence was intended to reflect two measured variables: perceived parents' alcohol use and perceived parents' norms. Similarly, Friends' Influence was used to reflect perceived friends' alcohol use and perceived friends' norms. Attitudes toward Drinking had indicators of perceived costs and benefits of alcohol use. Drinking Behavior was reflected by the frequency and quantity of alcohol use. The four latent factors and four measured variables were allowed to correlate freely.

A CFA model is said to fit the data if the relationships in a hypothesized model generate an estimated covariance matrix that closely matches the covariance matrix obtained from the sample data. Several indices reflect the degree to which a model fit the data. The nonnormed fit index (NNFI) (Bentler, 1995) takes into account the degrees of freedom of the model and can be outside the 0-1 range. The higher the NNFI, the better the fit. The comparative fit index (CFI) (Bentler, 1990) has the advantage over the NNFI in reflecting fit relatively well at all sample sizes, and in avoiding the underestimation of fit. Chi square is generated by comparing the elements of the model covariance matrix with those of the sample covariance matrix. If the chi square is less than two times the degree of freedom, the model is a good representation of the data (Newcomb, 1994). Average off-diagonal absolute standardized residuals also indicate the degree of similarity between the hypothesized model and the data. Values of .05 or less reveal a good fit.

The initial CFA model moderately fit the data, yielding fit values of .87 for the NNFI, .94 for the CFI and 3.52 for χ^2/df .

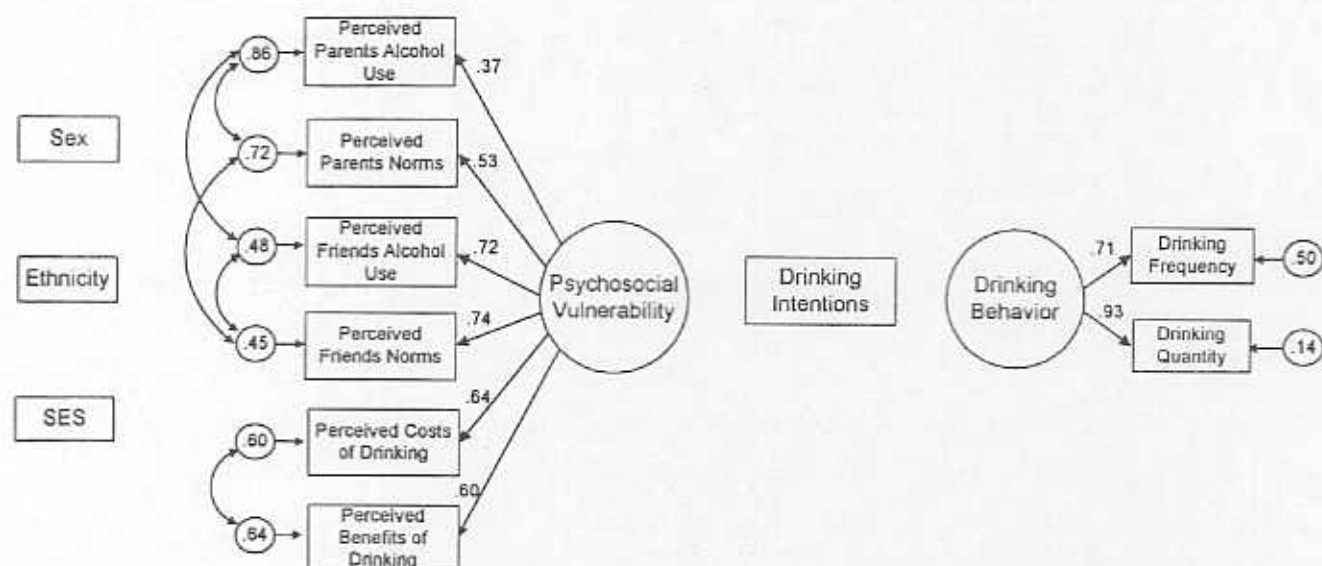


FIGURE 2. Final confirmatory factor analysis model (all parameter estimates are significant at $p < .001$; large circles are latent constructs and rectangles are measured variables; small circles are residual variables; parameter estimates are standardized; significance levels are based on critical ratios)

The average off-diagonal absolute standardized residuals were .03. However, the hypothesized three factors of Parental Influence, Friends' Influence, and Attitudes toward Drinking were highly correlated with one another (r 's = .82–1.00), suggesting that they did not reflect separate constructs.

A second, two-factor model was then tested. In addition to Drinking Behavior, a new Psychosocial Vulnerability factor was used to reflect the six variables from three previous constructs: both parents' and friends' influence and attitudes toward drinking. Five hypothesized correlated residuals were also added: a correlation between perceived parents' alcohol use and perceived parents' norms, one between perceived friends' alcohol use and perceived friends' norms, another between perceived costs and benefits of drinking, another between perceived alcohol use of parents and friends, and, finally, one between perceived parents' and friends' norms.

TABLE 2. Intercorrelations of factors, demographic variables and drinking intentions variable for the final confirmatory factor analysis model

Variable	1	2	3	4	5	6
1. Sex ^a						
2. Ethnicity ^a	-.01					
3. SES ^a	.02	.18 [†]				
4. Psychosocial vulnerability	.08	.49 [‡]	.16 [*]			
5. Drinking intentions	.01	.40 [‡]	.16 [†]	.83 [‡]		
6. Drinking behavior	.26 [‡]	.41 [‡]	.09	.80 [‡]	.76 [‡]	

Note: Significance level is determined by a critical ratio of the unstandardized parameter estimate divided by its standard error.

^aA higher score indicates males.

^bA higher score indicates white students.

^cA higher score indicates higher SES.

^{*} $p < .05$. [†] $p < .01$. [‡] $p < .001$.

This final measurement model fit the data better than the initial model (NNFI = .92; CFI = .95; $\chi^2/df = 2.53$). The average off-diagonal absolute standardized residuals were .03. Figure 2 depicts the final CFA model. Psychosocial Vulnerability clearly represented a significant amount of common variance among the indicators of social influence and personal attitudes. Drinking Behavior also captured a considerable amount of common variance of the indicators of frequency and quantity of alcohol use.

Correlations among the factors and measured variables in this final CFA model are shown in Table 2. Sex was significantly correlated only with Drinking Behavior and indicates that male students were more likely to drink heavily and frequently than were female students. Ethnicity was correlated with SES, Psychosocial Vulnerability, Drinking Intentions and Drinking Behavior. The direction of these correlations suggests that white students were likely to be of higher SES, to have more social and attitudinal vulnerability to alcohol use and to drink more than their Asian counterparts. Psychosocial Vulnerability was strongly correlated with both drinking intentions and Drinking Behavior.

Multi-group comparisons of the CFA between Asians and whites

Even though the factor structure was supported by the whole group, it was possible for the factor structure to be different between the two ethnic groups. To test whether factor loadings and factor intercorrelations were similar for Asian and white groups, multi-group CFAs were run. An initial baseline model with no constraints was tested for comparison purposes. The cross-group equality con-

straints on factor loadings indicated that these constraints were not statistically acceptable ($\chi^2_{diff} = 44.37$, 8 df_{diff} , $p < .001$). The Lagrange Multiplier tests revealed that factor loadings for drinking frequency, drinking quantity and perceived parents' alcohol use variables differed between the two groups. However, further constraints on the relationships between factors and measured variables and on the correlations between factors revealed no further significant differences between the groups ($\chi^2_{diff} = 10.99$, 15 df_{diff} , $p > .50$). Despite the differences in factor loadings, the relations among the measured variables and factors appeared to be similar for the Asian and white populations. Thus, further analyses were performed with the two groups together.

Evaluations of structural equation path models (SEM)

After the CFA model was developed, the path models were also explored for the entire sample. A saturated model was estimated first. All the possible paths between the latent variables, demographic variables and drinking intentions variable were included in the initial model. Nonsignificant paths were then dropped gradually, until only significant paths remained. The final structural model fit the data well (NNFI = .94; CFI = .95; $\chi^2/df = 2.21$; average off-diagonal absolute standardized residuals = .04), and is depicted in Figure 3.

Ethnicity was correlated with SES, and significantly predicted Psychosocial Vulnerability, but did not predict either drinking intentions or Drinking Behavior. Sex significantly predicted Psychosocial Vulnerability, but did not predict either drinking intentions or Drinking Behavior. Sex significantly predicted Drinking Behavior. Psychosocial Vulnerability predicted both drinking intentions and Drinking Behavior. Drinking intentions predicted Drinking Behavior.

TABLE 3. Effect decomposition for the final model

Dependent factor	Source of influence	Type of effect		
		Direct	Indirect	Total
Drinking intentions	Psychosocial vulnerability	.828 [†]		.828
	Ethnicity		.408 [†]	.408
Drinking behavior	Drinking intentions	.328 [†]		.328
	Psychosocial vulnerability	.520 [†]	.272 [†]	.792
	Sex	.233 [†]		.233
	Ethnicity		.391	.391

[†] $p < .01$. [‡] $p < .001$.

To further examine the relationship between ethnicity and drinking intentions and Drinking Behavior, the indirect effects of ethnicity were examined by using the EQS program (Bentler, 1995). EQS can compute total indirect effects and total effects that consist of direct and indirect effects. Thus, total effects can be decomposed into direct and indirect effects. Table 3 shows the decomposition of effects for drinking intentions and behavior, respectively. The indirect effect of ethnicity on drinking intentions was significant ($p < .001$). The indirect effect of ethnicity on Drinking Behavior, however, was not significant, once the effect of Psychosocial Vulnerability was taken into account.

Discussion

One of the major goals of this study was to compare levels of exposure to, and susceptibility to, risk factors between Asians and whites. Our findings provided strong support for different levels of exposure to risk factors. On all social and

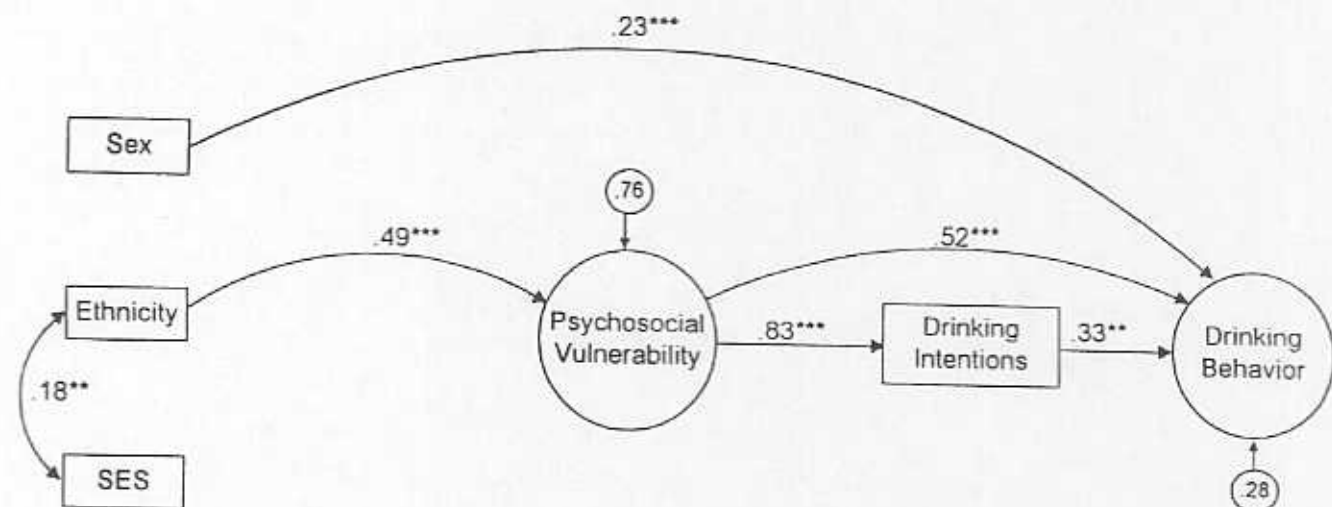


FIGURE 3. Final structural or path model (path coefficients are standardized and significance levels are based on the critical ratios on the unstandardized coefficients; ** $p < .01$; *** $p < .001$)

attitudinal variables, there were significant mean differences between Asians and whites. Consistent with the findings of past research (Akutsu et al., 1989; Bachman et al., 1991; Newcomb and Bentler, 1986), Asians reported fewer drinking models, perceived their parents and friends as being more negative toward their drinking and expected more costs and fewer benefits of drinking than did whites. Accordingly, Asians were less likely to intend to drink and reported lower involvement in drinking compared to their white peers.

On the other hand, our results provided little evidence for different susceptibility between Asians and whites. In the regression analyses, not a single interaction term involving ethnicity was statistically significant. That is, the relations between social and attitudinal variables and drinking intentions and behavior were similar for both Asians and whites. Further analyses of the equality constraints on factor loadings and factor intercorrelations yielded evidence similar to those of the regression analyses. Ethnic differences in alcohol use between Asians and whites thus were not due to different susceptibility, but due to different levels of exposure to psychosocial risk factors. These findings support those of Rowe et al. (1994) and of Newcomb and Bentler (1986).

Our next question concerned how demographic variables (sex, ethnicity and SES) were related to drinking behavior. We expected demographic variables to affect drinking behavior indirectly through their effects on social and attitudinal variables. In the SEM, ethnicity was the only demographic variable that had an indirect influence on drinking intentions through its effects on Psychosocial Vulnerability. The indirect effect of ethnicity on Drinking Behavior was nonsignificant, however, once its effects on Psychosocial Vulnerability were taken into account.

Sex was the only demographic variable that had a direct effect on Drinking Behavior. Sex was not a significant predictor of either Psychosocial Vulnerability or drinking intentions, however. Despite lack of sex differences in these two variables, males were more likely to use alcohol than females, a finding that is consistent with the results of past research (e.g., Newcomb et al., 1987; Zane and Sasao, 1992). It is speculated that these results may be best explained in terms of sex differences in socialization and the expression of symptomatology. Males are encouraged to externalize, and females are encouraged to internalize, distress (Gjerde et al., 1988). Thus, males are likely to report more drug and behavior problems while females are likely to report more depression and affective disorders (Dohrenwend and Dohrenwend, 1976; Horwitz and White, 1987).

SES was not significantly related to either Psychosocial Vulnerability to alcohol use or drinking intentions and Drinking Behavior, which is consistent with recent findings (Bucholz, 1990; Johnstone, 1994). Because alcohol use is prevalent in all walks of life, SES is not a good predictor of psychosocial risks or actual drinking.

Our final question was how social and attitudinal variables were related to drinking behavior. Consistent with Ajzen and Fishbein's model (1980), Psychosocial Vulnerability predicted drinking intentions. Drinking intentions were also significantly associated with Drinking Behavior. As Ajzen and Fishbein (1980) predicted, Psychosocial Vulnerability affected Drinking Behavior indirectly through its effect on drinking intentions. But beyond its contribution to behavioral intentions, Psychosocial Vulnerability also had a direct effect on Drinking Behavior. That is, drinking intentions did not mediate all of the effects of Psychosocial Vulnerability on Drinking Behavior. These findings are consistent with our model, which further expands Ajzen and Fishbein's model (1980). The findings also have valuable implications for prevention. Thus, changes in behavioral intentions as an outcome measure of prevention programs are not sufficient.

Generalization of the present results is limited in several ways. The present study is based solely on cross-sectional data from a college population in a large metropolitan area. In addition, demographic variables, social norms, modeling and attitudinal variables may be insufficient to fully understand all aspects of alcohol use (Zucker et al., 1994). Further, because of the relatively small sample size, various Asian groups were combined as a homogeneous group.

The present study, however, is one of the few studies that examine critical social and attitudinal variables with approximately equal numbers of Asian and white subjects. Moreover, our study not only pinpointed the sources of ethnic differences in alcohol use, but also clarified how ethnicity is related to drinking behavior by using SEM techniques. Finally, by including both contextual and psychosocial factors, our study suggests that effective prevention programs should be comprehensive, not only targeting social and psychological factors, but also considering the importance of certain contextual factors, such as sex and ethnicity (Segal, 1986).

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