Prevention Science, Vol. 1, No. 4, 2000

Ethnic and Gender Differences in Psychosocial Risk, Protection, and Adolescent Alcohol Use

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Theoretical models suggest that many diverse psychosocial factors contribute to the etiology of substance use among youth. It has been suggested that substance use is a function of the total number of etiologic factors, rather than a specific type or set of factors. This study examined whether cumulative psychosocial risk and protection measured in the 7th grade predicted alcohol use in the 9th grade across ethnically diverse samples of adolescents. Participants consisted of black (n = 775) and Hispanic (n = 467) inner-city youth and white suburban youth (n = 708). Prevalence rates for alcohol use and risk/protection varied more widely based on ethnic group compared to gender. Black youth reported the fewest risk factors and lowest levels of alcohol use, white youth reported the most risk factors and highest levels of alcohol use, and Hispanic youth reported the fewest protective factors and intermediate levels of alcohol use. Despite these differences, structural equation modeling indicated that a latent factor consisting of cumulative risk, protection, and their interaction significantly predicted later alcohol use for the combined sample as well as for each ethnic/gender subgroup. However, the proportion of variance explained in alcohol use varied across subgroups, and moderator analyses indicated that protection significantly buffered the effects of risk differentially across subgroups. The strongest protective effects were observed among black inner-city youth. Findings suggest that prevention approaches should focus on enhancing protection in addition to reducing risk, particularly among youth with lower levels of psychosocial protection.

KEY WORDS: adolescent alcohol use; psychosocial risk; race/ethnicity; gender differences.

Results of national survey data indicate that alcohol use among adolescents in the United States continues to be an important social problem. Recent data from the Monitoring the Future Study indicate that over half (53%) of 8th graders reported using alcohol in their lifetimes, one in four (25%) reported having been drunk, and 14% reported having five or more drinks in the past 2 weeks; among 10th graders, 70% reported using alcohol in their lifetimes, almost half (47%) reported having been drunk, and approximately one in four (24%) reported having five or more drinks in the past 2 weeks (Johnston, O'Malley & Bachman, 1999). Taken together, these figures indicate that illegal underage drinking is commonplace in the United States. This is notable because adolescent alcohol use and abuse can lead to a variety of negative health and behavioral outcomes. Youth drinking contributes to motor vehicle fatalities, risky sexual behavior (increasing the risk for unwanted pregnancy, sexually transmitted diseases, and HIV infection), and increases the risk for later illicit drug use (Chassin & DeLucia, 1996). Alcohol use also plays a central role in the three leading causes of death among adolescents—unintentional injuries, homicide, and suicide (Department of Health & Human Services, 1991). Thus, it is important for researchers to identify factors that promote adolescent alcohol use so that

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1389-4986/00/1200-0199$18.00/1

more effective alcohol prevention programs can be developed.

Theoretical models suggest that a variety of factors contribute to the etiology of alcohol and drug use among youth (reviewed in Petraitis, Flay, & Miller, 1995). Cognitive theories describe the role of poor decision-making processes (e.g., health belief model; Becker, 1974), personality theories outline individual vulnerabilities or affective characteristics that lead to alcohol and drug use (e.g., self-derogation theory; Kaplan, 1980), social learning theories emphasize the negative influence of substance using role models (e.g., Akers & Cochran, 1985), and conventional commitment or social attachment theories outline the processes by which youth withdraw from parents or school and turn to deviant peer groups (e.g., social development model; Hawkins & Weis, 1985). There are also several broader social psychological theories that attempt to integrate multiple determinants of adolescent substance use (e.g., problem behavior theory; Jessor & Jessor, 1977).

Research testing these and other explanatory models has identified a variety of important individual-level risk factors for youth drinking, including positive alcohol expectancies (Chen, Grube, & Madden, 1994), poor self-control and problem-solving skills (Godshall & Elliot, 1997; Werch & Gorman, 1988), risk taking and sensation seeking (Wills, Vaccaro, & McNamara, 1994), high perceived prevalence of alcohol use (Simons-Morton *et al.*, 1999), and other factors such as stress, depression, or anxiety (Colder & Chassin, 1993; Labouvie, 1986, 1987; Labouvie, Pandina, White, & Johnson, 1990). Furthermore, a growing number of studies have found that various protective factors are important in countering the effects of risk factors among youth (Hawkins, Catalano, & Miller, 1992; Scheier, Botvin, & Baker, 1997). Thus, both theoretical formulations and empirical findings indicate that a large number of individual-level factors contribute to youth drinking.

CUMULATIVE RISK AND PROTECTION

Because of the large number of risk and protective factors for adolescent alcohol and drug use, one conceptual approach that has been used in several studies relies on a cumulative risk index to predict involvement with alcohol or other drugs (Bry, McKeon, & Pandina, 1982; Farrell, Danish, & Howard, 1992; Maddahian, Newcomb, & Bentler, 1988; Newcomb, Maddahian, & Bentler, 1986; Newcomb, Maddahian, Skager, & Bentler, 1987; Scheier & Newcomb, 1991). According to this view, alcohol and drug use is a function of the total number of risk factors, rather than a specific type or set of risk factors. Bry *et al.* (1982) were the first investigators to apply this methodology to adolescent substance use in a study of alcohol and drug use in high school students ($N = 987$). Findings indicated that no single combination of risk factors best predicted drug use, but instead, several diverse combinations of variables were found to account for the extent of drug use. Bry *et al.* (1982) concluded that their findings support the notion that there are multiple pathways to drug use/abuse, and "the number of factors an individual must cope with is more important than exactly what those factors are" (p. 277).

Subsequent research has focused on the role of cumulative risk in adolescent alcohol and drug use, but only a few studies have examined the effect of cumulative protection in the etiology of substance use (Jessor, Turbin, & Costa, 1998; Jessor, Van Den Bos, Vanderryn, Costa, & Turbin, 1995; Newcomb & Feliz-Ortiz, 1992; Scheier, Newcomb, & Skager, 1994). This may represent a significant oversight because protective factors are increasingly recognized as important in reducing the influence of risk on adolescent alcohol use and other problem behaviors, particularly among youth in high-risk settings. In research that has examined both cumulative risk and protection, protective factors have been shown to assert an independent influence on drug use as well as a moderating effect on risk. For example, in a recent study of drug use among Latino high school students, the effect of overall risk was significantly offset by the number of protective factors present (Feliz-Ortiz & Newcomb, 1999). Findings indicated that at low levels of cumulative risk, drug use did not differ significantly between those reporting low versus high levels of overall protection. At high levels of risk, however, high protection was associated with reduced marijuana, inhalant, and illicit drug use for girls, and with reduced cigarette and marijuana use for boys (Feliz-Ortiz & Newcomb, 1999).

ETHNIC AND GENDER DIFFERENCES

Most psychosocial theories assume that the etiologic factors that lead to alcohol and drug use are applicable to youth in general, independent of ethnicity and gender. However, epidemiological data indicate that there are substantial ethnic and gender

differences in prevalence rates for adolescent alcohol use. National and regional surveys indicate that black youth usually report lower levels of alcohol use relative to white or Hispanic youth (Barnes & Welte, 1986; Kann *et al.*, 1998; Ungemack, Hartwell, & Babor, 1997). Research has also found consistent gender differences in adolescent alcohol use, with males generally drinking more frequently and intensely than females, and this pattern holds across different ethnic groups (Epstein, Botvin, & Diaz, 1998; Kann *et al.*, 1998). Furthermore, a number of recent studies have shown that certain risk and protective factors are of particular importance for specific racial/ethnic groups (e.g., Maddahian, Newcomb, & Bentler, 1986, 1988). Ethnic groups may have unique traditions or culture-specific norms regarding alcohol and drug use. Similarly, certain risk and protective factors appear to be more prominent for boys or girls, due to factors such as gender role socialization. Male adolescents may have to contend with greater peer pressure to engage in substance use (Rienzi *et al.*, 1996) and other antisocial behaviors, relative to female adolescents.

Gender differences in socialization processes within ethnic groups also may influence drinking patterns. In many Hispanic subcultures, men tend to drink heavily whereas women usually abstain from drinking, due in part to cultural norms that discourage alcohol and drug use among Hispanic women (Canino, 1994). Thus, although there is undoubtedly substantial overlap in many of the risk and protective factors for alcohol and drug use across racial, ethnic, and gender categories, there are often important factors unique to specific subgroups of youth that should be considered. Given the ethnic and gender differences in epidemiological patterns and etiologic predictors of adolescent alcohol use, it remains unclear to what extent a common set of individual-level risk and protective factors that map conceptually to a variety of psychosocial theories can predict alcohol use among youth of different backgrounds.

Another consideration that may be relevant is the extent to which protection offsets risk among youth of different backgrounds. Compared to suburban white youth, many inner-city minority youth live in high-risk settings with greater exposure to poverty, crime, violence, and victimization (Hammond & Yung, 1993). Despite this, most of these youth transition successfully through adolescence, suggesting that protective factors play a central role in buffering these youth from risk. Indeed, the literature on resilience illustrates how youth raised in unfavorable environments manage to develop competence in a variety of life domains (Luthar & Zigler, 1991; Masten & Coatsworth, 1998). Although competence skills are likely to be important for all youth, they also may play a particularly important role in protecting inner-city minority youth.

LIMITATIONS OF PREVIOUS RESEARCH

Several previous studies have examined the effects of cumulative risk on adolescent alcohol and drug use (Feliz-Ortiz & Newcomb, 1992, 1999; Newcomb, *et al.*, 1986; Scheier *et al.*, 1994; Vega, Zimmerman, Warheit, Apospori, & Gil, 1993). However, fewer studies have examined cumulative risk in the context of cumulative protection, and these existing studies have been limited in several ways. First, some studies have been cross-sectional in design, limiting the ability to make causal inferences (e.g., Feliz-Ortiz & Newcomb, 1992; Scheier *et al.*, 1994). Other studies have focused on a limited number of ethnic groups (Feliz-Ortiz & Newcomb, 1992, 1999) or have failed to examine potential gender differences in the prediction of drug use (Newcomb *et al.*, 1986; Vega *et al.*, 1993). Furthermore, research using a cumulative risk and protection methodology has not focused specifically on alcohol use among ethnically diverse adolescent samples. This may be an important limitation given the noted differences in prevalence rates for adolescent alcohol use across subgroups of youth.

The present longitudinal study examined alcohol use among ethnic and gender subgroups of youth during early adolescence using a cumulative risk and protective factor methodology. The goals of this research were to (1) examine differences in levels of psychosocial risk and protection among subgroups of adolescents, including white suburban youth and black and Hispanic inner-city youth; (2) determine the extent to which a model of cumulative risk and protection predicts subsequent alcohol use across ethnic and gender subgroups; and (3) investigate whether cumulative protection buffers the effects of cumulative risk on alcohol use in a similar manner across ethnic and gender subgroups.

METHOD

Sample

Two samples of middle school students were included in the present study (N = 1,948). The first

sample consisted of suburban white students (n = 704) from upstate New York, and a second sample consisted of inner-city black (n = 776) and Hispanic (n = 468) students from New York City schools. Participants were selected from the untreated control groups as part of two larger school-based drug abuse prevention trials. Based on student self-report, over 90% of the suburban sample was white and over 90% of the urban sample consisted of black and Hispanic students; for comparison purposes students reporting other racial/ethnic backgrounds were excluded from the respective samples. In the urban sample, Hispanic youth were primarily of Dominican (36%) or Puerto Rican (28%) descent, with smaller numbers of Colombian (11%) and Ecuadorian youth (7%), and students from other or mixed Hispanic backgrounds (18%); most blacks were of African-American (71%) or Caribbean/West Indian descent (21%). A small number of classrooms in the urban sample were bilingual and these were excluded from the study. Overall, 53% of the urban minority sample lived in two-parent families, 39% lived in single-parent families; 40% and 46% of the black and Hispanic samples, respectively, were male, and 62% and 73%, respectively, received free lunch at school. In the suburban white sample, 86% of students lived in two-parent families, 12% lived in single-parent families, and 51% of the sample was male.

Procedure

In both of the prevention studies, all 7th grade regular education classrooms in each of the participating schools were eligible to participate in the intervention trial. Students completed a self-report questionnaire that assessed a variety of attitudes, intentions, and behaviors related to alcohol use. Unique identification codes were used rather than names to emphasize the confidential nature of the survey, and students were assured that their responses would not be made available to school personnel, teachers, or parents. Questionnaires were administered during a regular classroom period by a team of several data collectors who were members of the same racial groups as the participating students. Following a pretest assessment in the 7th grade, students were surveyed again in the 8th and 9th grades. Because the prevalence rates for alcohol use were relatively low during the initial years of the larger studies, alcohol use in the 9th grade was the primary outcome of interest in the present study. Further details on the sampling methods, research protocols, and substantive focus of the intervention can be found in several published reports (e.g., white suburban sample: Botvin, Baker, Dusenbury, Tortu, & Botvin, 1990; Botvin, Baker, Dusenbury, Botvin, & Diaz, 1995 and urban minority sample: Botvin, Epstein, Baker, Diaz, & Williams, 1997).

Measures

Risk and Protective Factors

A wide range of risk and protective factors were assessed as part of the intervention protocols. Scale reliabilities were estimated by Cronbach alphas, which are provided below in parentheses for the suburban and urban samples, respectively. A single item assessed Grades in School with response options from 1 (Mostly A's) to 5 (D's or lower). Drinking Expectancies (α = .70 and .68) were assessed by four items adapted from the Teenager's Self-Test: Cigarette Smoking (Centers for Disease Control, 1974; e.g., ''Kids who drink alcohol have more friends''). Decision-Making Skills (α = .81 and .84) were assessed using four items from the Coping Assessment Battery (Bugen & Hawkins, 1981), which assesses applied information-gathering strategies that individuals may use when confronted with a specific problem (e.g., ''I get the information I need to make the best choice''). Behavioral Self-Control (α = .75 and .60) was assessed using four items from the Kendall and Wilcox Self-Control Rating Scale (1979), which assesses the ability to manage impulsive or disruptive behavior particularly in school settings (e.g., ''When I have to wait on line, I do it patiently''). Self-Esteem (α = .70 and .89) was assessed using five items from the Rosenberg Self-Esteem Scale (1965), which assesses degree of positive self-evaluation with items such as ''I feel that I have a number of good qualities.'' Psychological Distress and Well-Being were measured using eight items from the Mental Health Inventory (MHI, Veit & Ware, 1983), a scale developed to assess psychological symptoms in community samples. In keeping with the findings reported by Veit and Ware (1983), psychological distress and well-being were specified as distinct scales in the present study, reflecting frequency of symptoms in the past month. The Psychological Distress score (α = .77 and .81) was comprised of five MHI items, including ''I felt moody and brooded about things;'' and the Psychological Well-Being score (α = .60 and .74) was

composed of three MHI items including ''I felt cheerful and lighthearted.'' Response options for each of the above measures ranged from 1 (strongly disagree) to 5 (strongly agree) for the drinking expectancy, self-control, and self-esteem items; and from 1 (never) to 5 (always) for the decision-making, distress, and well-being items. Normative Expectations for Peer Drinking and separately, for Adult Drinking, were assessed by asking participants ''How many people your age do you think drink alcohol?'' and ''How many adults do you think drink alcohol?'' Response options for these items ranged from 1 (none) to 5 (all or almost all). Friends' Alcohol Use was assessed by asking ''How many of your friends do you think drink alcohol?'' with the same response options as the normative belief items. Friends' and Parents' Drinking Attitudes were assessed by asking ''How do your friends feel about whether you drink alcohol?'' and ''How do your parents feel about whether you drink alcohol?'' with response categories ranging from 1 (strongly against it) to 5 (strongly in favor of it).

Alcohol Consumption

Alcohol consumption in the 9th grade was assessed using three items reflecting the frequency of alcohol use, the quantity of use per drinking occasion, and the frequency of drunkenness. Frequency measures of alcohol use and drunkenness were measured by asking students how often (if ever) ''do you drink alcoholic beverages (beer, wine, wine coolers, or hard liquor)?'' and ''do you drink until you get drunk?'' with response categories ranging from 1 (never) to 9 (more than once a day). Quantity of use per drinking occasion (drinking intensity) was measured by asking ''How much do you usually drink each time you drink?'' with response options from 1 (I don't drink) to 6 (more than 6 drinks).

Cumulative Indices for Risk and Protection

Following an epidemiologically based procedure outlined in several previous studies (e.g., Felix-Ortiz & Newcomb, 1999; Newcomb & Feliz-Ortiz, 1992; Newcomb *et al.*, 1987; Scheier *et al.*, 1994), cumulative risk and protection indices were created that represented the overall number of risk factors and protective factors present for each subject. The following procedure was used to determine if a particular variable was assigned to the cumulative risk or the cumulative protection index. First, two dichotomous variables were created for each measure, one identifying the upper third of the distribution and a second representing the lower third. For example, the top third of the distribution for Decision Making was deemed potentially protective, and the bottom third was specified as potentially indicating risk. Students scoring in the upper portion of this distribution were assigned a ''1'' to capture protection (i.e., good decision-making skills) and the remainder of the students received a ''0'' to designate the absence of protection. A second score was created in which students scoring in the lower third of the distribution were assigned a ''1'' to designate risk (i.e., poor decision-making skills) and all other students received a ''0'' to designate the absence of risk. These two dichotomous scores were then correlated with later alcohol use. If the dichotomized risk score was more strongly related to alcohol consumption than the corresponding dichotomized protective factor, then this variable was assigned to the Risk Factor Index (RFI); if the protective factor was more strongly related to alcohol use it was assigned to a Protective Factor Index (PFI). In the case of Decision Making, the dichotomized score representing the lower third of the distribution was more strongly correlated with drinking, so Poor Decision Making was assigned to the RFI. This procedure was repeated for the remaining 11 psychosocial variables. Seven indicators were assigned to the risk index and five were assigned to the protective index, and the summary RFI and PFI scores represented the total number of risk factors and protection factors, respectively, present for each participant. In addition, because the interaction between cumulative risk and protection may contribute additional variance above and beyond their main effects, an interaction term was created to test for moderation. Following conventions outlined by Aiken and West (1991), the RFI and PFI summary scores were centered and their product term was used to create a Risk $\times$ Protection (R $\times$ P) interaction term.

Data Analysis

First, attrition analyses for both samples are presented, including whether there was differential attrition across samples according to baseline alcohol use. Second, prevalence rates for alcohol use and for the individual risk and protective factors were examined separately for ethnic and gender subgroups. Third, latent variable structural equation modeling (SEM)

was used to examine the extent to which 7th grade Psychosocial Vulnerability predicted 9th grade Alcohol Use. The Psychosocial Vulnerability latent factor includes indicators of RFI, PFI, and the R × P interaction term, and thus effectively captures the dynamic processes underlying cumulative risk, protection, and the degree to which protection offsets risk; Alcohol Use had three indicators of drinking frequency, quantity, and drunkenness. The structural modeling procedures were conducted using the EQS statistical program (Bentler, 1995). To evaluate the overall fit of the SEM models, several criteria were used: (1) a χ^2 p-value, which if greater than .05 indicates that there are no statistically significant discrepancies between the sample data and the implied population model; (2) a χ^2 to degree of freedom ratio of less than 5.0 (Bollen, 1989); (3) a standardized root mean squared residual (SRMR) of less than .05; and (4) the Comparative Fit Index (CFI). The CFI is an incremental fit index derived by comparing the predicted covariation in the hypothesized model to that of the null model (i.e., specifying no associations among constructs), with values greater than .90 indicating a good fit of the model to these data. As a follow up to the structural analyses, a series of moderated multiple regression analyses were conducted and regression lines were plotted to examine in a more refined manner the extent to which protection offsets the effects of risk on alcohol use for each ethnic and gender subgroup.

RESULTS

Attrition analyses revealed that approximately 23% and 33% of the initial suburban and urban samples, respectively, did not complete the follow-up assessment in the 9th grade, $\chi^2(1) = 39, p < .001$. Furthermore, among the suburban sample, 27% of ever drinkers dropped out compared to 18% of never drinkers, $\chi^2(1) = 13.6, p < .001$; among the inner-city sample, 35% of ever drinkers dropped out compared to 32% of never drinkers, $\chi^2(1) = 1.2, p = .27$. These analyses indicate that while overall attrition was higher in the inner-city sample, loss of drinkers was higher in the suburban sample. Because the possible range of the drinking outcome variable may have been restricted in the suburban sample, the parameter estimates may in fact be conservative for this group.

The lifetime prevalence rates for any alcohol consumption for the entire sample was 58%, and for lifetime drunkenness was 30% (Table 1). In addition, 17% of participants reported that they usually consume three or more drinks per drinking occasion. Proportional χ^2 tests showed that alcohol use prevalence rates varied more widely across ethnic categories compared to gender. For example, when data were collapsed across gender, approximately twice as many white youth (81%) reported lifetime alcohol use compared to black youth (40%), while slightly more than half of Hispanic youth reported ever having tried alcohol (52%), $\chi^2(2) = 269.8, p < .001$. However, the largest ethnic group difference was observed for lifetime drunkenness, $\chi^2(2) = 537.9, p < .001$, with 62% of white youth reporting having been drunk in their lifetimes, compared to 20% of Hispanic youth and 8% of black youth. Generally, these findings indicate that white youth reported the highest levels of alcohol involvement, black youth reported the lowest levels of alcohol involvement, and Hispanic youth reported intermediate levels. Furthermore, although there were no significant gender differences in alcohol use lifetime prevalence rates, there were significant gender differences in terms of drunkenness, $\chi^2(1) = 5.8, p < .01$, and intense drinking, $\chi^2(1) = 6.9, p < .01$, with boys more likely to engage in these behaviors than girls, independent of ethnicity.

Prevalence rates for risk, protection, and alcohol use for the combined sample and for each ethnic and gender group are shown in Table 1. Proportional χ^2 tests showed that prevalence rates for most risk factors varied more widely across ethnic categories compared to gender. For example, when data were collapsed across gender, white youth were most likely to report poor decision-making skills, $\chi^2(2) = 142.3, p < .001$, low self-esteem, $\chi^2(2) = 242.1, p < .001$, as well as having parents, $\chi^2(2) = 497.9, p < .001$ and friends, $\chi^2(2) = 10.1, p < .01$, with favorable drinking attitudes. Hispanic youth were most likely to report high psychological distress, $\chi^2(2) = 74.8, p < .001$, low psychological well-being, $\chi^2(2) = 28.0, p < .001$, and poor behavioral self-control, $\chi^2(2) = 42.9, p < .001$, independent of gender. When data were collapsed across ethnic groups, several gender differences were observed. For example, girls were more likely than boys to report high psychological distress, $\chi^2(1) = 17.9, p < .001$, and poor self-control, $\chi^2(1) = 10.7, p < .001$. Boys were more likely than girls to report friends with favorable drinking attitudes, $\chi^2(1) = 54.6, p < .001$, independent of ethnicity. With regard to protection, black youth were most likely to report low normative expectations for adult alcohol use, $\chi^2(2) = 18.9, p < .001$, and white

Table 1. Prevalence Rates for Alcohol Use and Risk/Protective Indicators by Ethnicity and Gender

	Entire sample (N = 1948)	White		Black		Hispanic		Proportional differences	
		Girls (n = 343)	Boys (n = 361)	Girls (n = 465)	Boys (n = 311)	Girls (n = 252)	Boys (n = 216)	Gender[a]	Ethnicity[a]
Alcohol Use Prevalence Rates (9th grade)									
Have consumed alcohol (lifetime)	57.7	79.6	83.1	40.6	38.1	54.0	50.2	1.5	269.8***
Have been drunk (lifetime)	30.0	63.0	60.3	6.0	10.0	19.8	20.1	5.8**	537.9***
Usually have 3 or more drinks per episode	16.6	23.8	28.4	5.0	6.5	19.4	21.4	6.9**	118.3***
Risk Factor Indicators (7th grade)									
Poor decision-making	33.1	50.7	47.9	20.9	19.6	30.6	29.2	0.1	142.3***
Low psychological well-being	33.1	31.2	21.3	28.0	45.7	34.9	46.8	6.3*	28.0***
High psychological distress	34.1	26.8	19.9	40.2	29.6	50.4	44.0	17.9***	74.8***
Poor self-control	32.9	35.3	34.3	30.1	17.7	48.0	36.6	10.7***	42.9***
Low self-esteem	33.8	57.4	43.8	11.0	17.7	39.7	44.9	0.9	242.1***
Friends' pro-drinking attitudes	33.5	30.4	43.5	25.2	45.7	22.6	34.7	54.6***	10.1**
Parents' pro-drinking attitudes	34.0	66.5	64.3	11.4	13.5	16.7	30.1	12.8***	497.9***
Protective Factor Indicators (7th grade)									
Mostly A's in school	14.6	19.5	19.4	15.9	12.2	9.9	5.1	84.5**	16.5***
Negative drinking expectancies	33.1	31.5	26.3	36.6	33.8	36.5	34.7	3.4	9.1*
Few friends drink	54.4	71.7	62.6	48.0	52.4	45.2	40.3	0.4	76.9***
Low normative expectations, peer drinking	51.2	49.3	56.0	46.2	58.8	45.6	52.3	15.7***	1.8
Low normative expectations, adult drinking	34.1	27.7	28.1	34.2	43.7	36.1	37.5	2.4	18.9***

[a]Values reported are χ^2.
Note: *$p < .05$. **$p < .01$. ***$p < .001$.

youth were most likely to report that few friends drink, $\chi^2(2) = 76.9$, $p < .001$. In addition, girls were more likely than boys to report receiving high grades in school, $\chi^2(1) = 84.5$, $p < .001$, and boys were more likely than girls to report low normative expectations for peer alcohol use, $\chi^2(1) = 15.7$, $p < .001$, independent of ethnicity.

The RFI and PFI cumulative scores are shown in Fig. 1. Analysis of variance tests indicated that the mean number of overall risk factors (the RFI score) differed significantly based on ethnicity, $F(2,1942) = 65.9$, $p < .001$, but not by gender, $F(1,1942) = 0.8$, *ns.* White youth reported the highest mean number of risk factors, Hispanic youth reported an intermediate number of risk factors, and black youth reported the fewest. In addition, there was a significant Gender × Ethnicity interaction for the RFI, with boys reporting more risk factors than girls among black and Hispanic youth, but girls reporting more risk factors than boys among white youth, $F(2,1942) = 3.5$, $p < .031$. Similarly, the mean number of overall protective factors (the PFI score) differed based on ethnicity, $F(2,1942) = 5.3$, $p < .005$, but did not differ by gender, $F(1,1942) = 0.3$, *ns.* Hispanic youth reported a lower mean number of protective factors compared to black and white youth. In summary, these findings indicate substantial differences in risk and protection profiles among the participants in this study, with more differences observed across ethnic groups relative to gender. The general pattern indicates that white youth are at greatest risk, Hispanic youth are least protected, and that boys are at higher risk than girls.

Longitudinal Structural Model

A series of latent variable structural equation models were tested next. Figure 2 shows the basic model specification for the constructs of Psychosocial Vulnerability and Alcohol Use and their hypothesized relationship over time. As shown, each latent factor consisted of three indicators. Model testing proceeded in the following manner: (1) a confirmatory factor analysis (CFA) on the entire group (the suburban and urban samples combined) was conducted to determine the adequacy of the measurement model and how well the observed measures reflected the hypothesized latent constructs; (2) a structural equation model on the entire group was conducted to examine the overall longitudinal effects of Psychosocial Vulnerability on Alcohol Use; (3) separate models examined the effects of Psychosocial Vulnerability on later Alcohol Use for each ethnic and gender combination to determine whether there was differential prediction across subgroups; and (4) a multigroup structural equation model was conducted to determine if the standardized regression coefficients from Vulnerability to Alcohol Use were statistically different from one another across the six ethnic/gender subgroups.

The CFA indicated that the fit of the measurement model for the complete sample was adequate, $\chi^2(8, N = 1948) = 79.9$, $p < .001$, $\chi^2/df = 9.9$; SRMR = .035; and CFI = .983.[3] Furthermore, the overall SEM indicated a similarly good fit and showed that Psychosocial Vulnerability significantly predicted follow-up Alcohol Use ($\beta = .460$, $p < .001$) for the entire sample, explaining 21.2% of the variance in later Alcohol Use. In terms of the indicator loadings for the latent factors, results for the complete sample indicated that Psychosocial Vulnerability was reflected largely by the RFI ($\lambda = -.817$), and less so by the PFI ($\lambda = .429$) and the R × P interaction term ($\lambda = .247$, ps $< .001$). However, subgroup analyses revealed that the RFI and PFI factor loadings were not similarly high across all ethnic and gender subgroups, (Table 2). For example, the PFI made a larger contribution to Psychosocial Vulnerability for white girls and boys and the RFI and PFI were equivalent

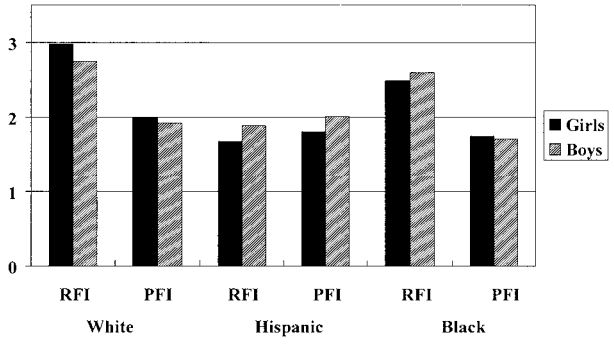

Fig. 1. Gender and ethnic differences in cumulative risk and protection. *Note*: RFI = Risk Factor Index; PFI = Protective Factor Index.

[3]The p-value associated with the χ^2 likelihood test statistic is often used to evaluate whether there are significant discrepancies between the observed data and the hypothesized model. Although the χ^2 p-value was significant in several of the models tested (indicating that additional models could be fit to the data), this is not uncommon with large models and large sample sizes (Bentler & Bonett, 1980; Marsh, Balla, & McDonald, 1988). In addition, the χ^2/df was above 5.0 for the combined sample; however, the likelihood test statistic is sensitive to trivial deviations between the sample data and implied variance-covariance structure.

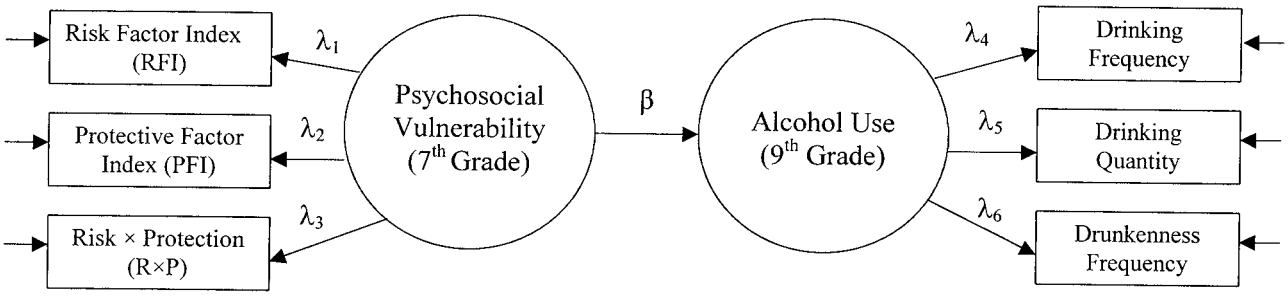

Fig. 2. Structural equation model of psychosocial vulnerability and later alcohol use.

in magnitude for Hispanic girls. The R × P interaction term made a statistically significant contribution to Psychosocial Vulnerability only for black girls, black boys, and Hispanic boys. On the other hand, the factor loadings for the Alcohol Use construct were generally similar in magnitude across ethnic and gender subgroups, although some small differences were observed. Relative to the other indicators for Alcohol Use, drunkenness made a smaller contribution to overall alcohol involvement for black boys (λ = .679), black girls (λ = .544), and Hispanic girls (λ = .649) and a larger contribution for white girls (λ = .933).

In addition to the standardized factor loadings, Table 2 shows the standardized regression coefficient (β_1), fit statistics (χ^2/df ratio, CFI), and proportion of variance explained (R^2) for the combined sample and for each of the ethnic and gender subgroups. Inspection of the model fit indices shows that the prediction model was adequate overall and across ethnicity and gender subgroups. The regression coefficients, which represent the effect of early Psychosocial Vulnerability on later Alcohol Use, were statistically significant for each ethnic/gender subgroup (ps < .001). However, the proportion of variance explained in Alcohol Use varied across groups. The model explained the most variance in Alcohol Use for Hispanic boys (R^2 = .322), second most for white boys (R^2 = .251), and the least for black boys (R^2 = .101), and second least for black girls (R^2 = .147). Lastly, a multigroup SEM analysis was conducted, which showed that the βs representing the relationship between Psychosocial Vulnerability and Alcohol Use were not significantly different from one another across ethnic and gender subgroups.

Analysis of Interaction Effects

An examination of the measurement portion of the model across ethnic/gender subgroups revealed that although the factor loading for the R × P interaction term was significant for the overall sample, it was statistically significant only for three subgroups: black girls, black boys, and Hispanic boys. For white boys, and particularly for white girls and Hispanic girls, the magnitude of the factor loading for the interaction term was close to zero and nonsignificant. To examine more carefully the importance of the main effects of risk and protection and the extent to which protection buffers risk among the various subgroups, moderated multiple regression analyses were conducted and plots were examined. As shown in Fig. 3, interaction effects were graphed by plotting

Table 2. Model Parameters and Fit Indices by Ethnicity and Gender

	λ_1[a]	λ_2	λ_3	λ_4	λ_5	λ_6	β_1[b]	χ^2/df	CFI	R^2
White girls	.617	−.730	−.003*	.828	.866	.933	.495	1.49	.995	.245
White boys	.479	−.718	.073*	.843	.896	.886	.501	3.12	.979	.251
Black girls	.891	−.378	−.442	.871	.907	.544	.383	3.11	.979	.147
Black boys	.942	−.350	−.395	.985	.810	.679	.318	1.09	.999	.101
Hispanic girls	.650	−.638	−.033*	.936	.836	.649	.435	1.75	.986	.189
Hispanic boys	.710	−.500	−.238	.899	.851	.768	.568	4.44	.938	.322
Entire sample	.816	−.430	−.247	.894	.876	.803	.460	9.99	.983	.212

[a]Standardized factor loadings (λ_1 to λ_6); all parameters are statistically significant, $p < .001$, except for $*p > .05$.
[b]β_1 is the standardized regression coefficient corresponding to the path from Psychosocial Vulnerability to later Alcohol Use.

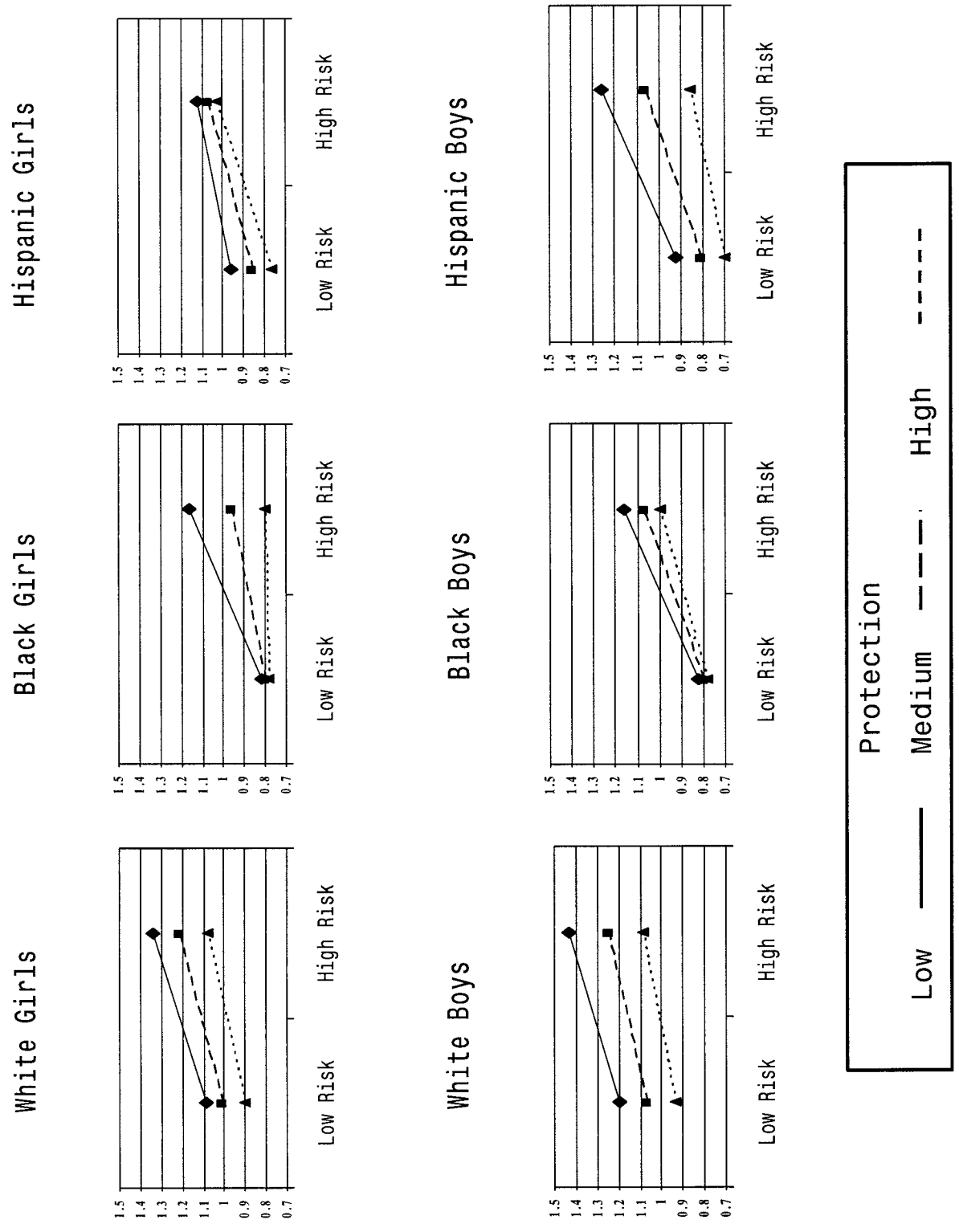

Fig. 3. Alcohol consumption as a function of risk moderated by protection.

the regression lines using point estimates of one standard deviation above and below the mean for risk and protection (e.g., Aiken & West, 1991). These plots illustrate that protection buffers the effects of risk on subsequent alcohol use differently across ethnic and gender subgroups. The interaction effect is most clearly demonstrated for black girls; increases in risk were associated with almost no increase in alcohol use for black girls at the higher levels of protection, but at low levels of protection higher levels of risk were more strongly associated with alcohol use. Thus protection markedly buffered the influence of high risk on alcohol use among black girls (see Fig. 3). Although somewhat less pronounced, a similar fanning effect was observed for black boys and Hispanic boys. In contrast, for those subgroups in which the R × P interaction term was not significant (white girls, white boys, and Hispanic girls) the plots show main effects for risk and protection, but no interaction effect.

DISCUSSION

The present study examined to what extent psychosocial vulnerability predicts later alcohol use among ethnic and gender subgroups of adolescents. Psychosocial vulnerability was operationalized in the current study by indices of cumulative risk and protection and a term capturing their interaction. Cumulative risk reflected a variety of psychosocial variables that are associated with increased alcohol use including poor self-control and decision-making skills, low self-esteem, psychological distress, and social influences favorable toward alcohol use. Conversely, cumulative protection reflected variables such as low normative expectations regarding the social acceptability of alcohol use, negative alcohol expectancies, and high grades in school. Although these measures represent only a subset of the universe of determinants that might foster early-stage alcohol use and reflect primarily individual-level variables, they map conceptually to several of the predominant psychosocial theories regarding the etiology of adolescent substance use (e.g., Petraitis *et al.*, 1995; Jessor & Jessor, 1977). By shifting the emphasis from single risk and protective factors to a more cumulative conceptualization that includes the main effects and interaction of risk and protection, the present study sought to determine if this broader etiologic framework could predict alcohol use across diverse subgroups of youth.

Findings indicated that the prevalence rates for individual risk and protective factors varied more widely across ethnic categories than gender. In fact, there were significant ethnic group differences for all measured risk and protection factors, and significant gender differences for 7 of 12 risk and protective factors. Consistent with previous epidemiological data (Kann *et al.*, 1998), findings indicated that alcohol use prevalence rates varied more widely across ethnic categories than by gender. Generally, patterns indicated that white youth reported the highest levels of risk, protection, and alcohol use, Hispanic youth reported intermediate levels of risk, the lowest protection, and the second highest levels of alcohol use, and finally, black youth reported the lowest levels of risk, intermediate protection, and lowest levels of alcohol use.

Despite these observed differences in rates of risk, protection, and alcohol use, a series of structural equation models revealed that a psychosocial vulnerability construct significantly predicted later alcohol use for the sample overall as well as for each ethnic/gender subgroup. However, there were some variations in the proportion of variance in alcohol use explained by the vulnerability model: the R^2 was highest for white youth, followed by Hispanic youth, and lowest among black youth. This finding is consistent with past studies showing a relatively weak relationship between conventional risk factors and drug and alcohol use among black youth (e.g., Vega *et al.*, 1993). Gottfredson and Koper (1996) examined ethnic and gender differences in risk factors for adolescent substance use among black and white adolescents and found that prediction of use was weaker for black youth relative to white youth. Similarly, in the present study, only a modest proportion of variance in alcohol use was explained by the models, perhaps because the variables assessed focused largely on individual-level psychosocial factors. Other larger macrolevel etiologic factors, such as neighborhood factors, may play an important role and be particularly relevant for certain groups of youth (Scheier, Miller, Ifill-Williams, & Botvin, in press). Furthermore, because many inner-city youth face a variety of challenges including neighborhood disorganization and poverty, environmental variables may explain a larger proportion of variance in adolescent alcohol use among these youth relative to suburban youth. This may explain in part why the proportion of variance explained in the present study was lowest among black youth.

Another factor that may help to understand the lack of association between risk and substance use

among black youth is differences in levels of protection. Findings from the present study indicated that protection significantly moderated the effects of risk differentially across subgroups, with the buffering effects strongest among black youth (boys and girls) and Hispanic boys, but not for white youth (boys and girls) and Hispanic girls. Black boys and girls (for whom the significant buffering effect was observed) were found to have a higher mean number of protective factors than risk factors. These higher levels of protection appear to buffer the effects of risk among black youth. Conversely, for the subgroups where the buffering effect was not significant, the mean number of risk factors was greater than the mean number of protective factors. This suggests that protection may only buffer risk when there is a critical ratio of protective factors to risk factors or when protection reaches a critical threshold.

There are a number of important limitations of the present study that should be pointed out. First, the risk and protective factors were derived empirically rather than conceptually and therefore the study does not clarify the conceptual distinction between risk and protection. For example, some researchers have argued that a variable is truly ''protective'' only to the extent that it uniquely offsets the effects of risk. Future research should examine risk and protection in diverse samples of youth using variables that are conceptually derived. An additional limitation of the present study is that only a subset of the number of potential risk and protective factors were included in the model, and those included focused primarily on individual-level variables. Because the effects of individual-level risk and protective factors on adolescent substance use may differ among groups of youth from ecologically distinct environments (e.g., suburbia and inner-city), future research should examine both individual and macrolevel or environmental variables (e.g., neighborhood disorganization, family support and conflict). A final possible limitation is that we did not include a measure of 7th grade alcohol use in the model. However, the goal of the research was to examine similarities and differences in the effects of cumulative risk and protective mechanisms across groups, not to examine how vulnerability contributes to change in alcohol use over time. Furthermore, levels of alcohol use in the 7th grade were considerably low, and may not add significantly to the prediction of subsequent use. Future studies should investigate the relationship between vulnerability and change in alcohol use over time.

There are several important implications of the present findings. First, because protective factors buffered the effect of overall risk for the sample as a whole, prevention programs should emphasize increased protection in addition to risk reduction, particularly among youth with lower levels of psychosocial protection. The findings also show some support for the notion that protection may offset risk differentially according to race/ethnicity (and less so for gender) because protection strongly buffered the effects of risk for black girls and boys, while it did not do so for white girls and boys. Despite this, the finding that the standardized regression coefficients corresponding to the path from psychosocial vulnerability to alcohol use were statistically significant for all ethnic and gender subgroups (and were not significantly different from each other) suggests that individual-level risk and protective factors are important predictors of adolescent alcohol use across ethnic and gender subgroups of youth. This in turn bodes well for universal prevention approaches that emphasize competence enhancement and skills training approaches. Recent evaluations of this type of prevention approach with primarily white suburban youth have provided evidence of both short (e.g., Botvin & Eng, 1980; Botvin, Eng, & Williams, 1980) and long-term efficacy (e.g., Botvin *et al.*, 1995; Botvin, *et al.*, 2000). Additional studies indicate that competence enhancement prevention approaches are effective for inner-city, minority youth (e.g., Botvin, *et al.*, 1997; Botvin, Schinke, Epstein, Diaz, & Botvin, 1995). A distinguishing feature of competence enhancement programs is that they emphasize teaching a variety of personal self-management skills and general social skills to adolescents, including strategies to improve problem-solving and self-control skills, cognitive skills for resisting interpersonal and media influences, and skills for coping effectively with anxiety or stress. Taken together, these skills are likely to increase overall psychosocial protection. Future research should investigate how skills training programs help to increase protective factors among youth of different backgrounds, and if so, whether these differences support the utility of ethnic- or gender-specific prevention programming. Future research also should investigate the extent to which enhancing protection reduces alcohol use and other problem behaviors among diverse, multiethnic populations. Because the findings from the present study showed that individual-level factors explain a relatively small proportion of variance in alcohol use across subgroups of youth, this suggests that prevention programs that focus on individual-level factors should be complemented by

family and community interventions as well as legal and policy initiatives that facilitate change at the larger societal level, such as efforts to restrict sales of alcohol to young people.

ACKNOWLEDGMENT

This research was supported by grants DA07656 and DA13015 from the National Institute on Drug Abuse, National Institutes of Health.

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