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Ethnicity, substance use, and development: Exemplars for exploring group differences and similarities

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Abstract

Epidemiological research shows some ethnic-group differences in the prevalence of substance use. This approach does not address the question of whether there are ethnic-group differences in the models that are needed to understand the development of substance use. For this question we need to understand the relations between psychological constructs and their trajectories over time. In this paper we describe some approaches to studying ethnic-group differences in the predictors of substance use that illustrate probing for mediators, multisample analyses of structural models, and an experimental trial of a preventive intervention. Our studies found some ethnic-group differences in the structure of constructs and the relations between variables, but many similarities. The challenge for researchers is using appropriate research methods for studying ethnicity, uncovering the basis for ethnic-group differences when they occur, knowing when statistical differences are meaningful, and acknowledging when developmental models are comparable.

In psychopathology research, ethnic groups are sometimes contrasted to identify possible group differences in the prevalence of disorders. Group differences then become new starting points for further investigation that is designed to uncover the protective or vulnerability factors that are associated with being a member of a particular group. For example, researchers might compare people from different countries on their prevalence of alcoholism and then work to identify characteristics of the people (e.g., biological markers), nation (e.g., policies controlling access), or culture (e.g., stigma associated with drunkenness) that might explain the differences in prevalence that are observed. Other prominent examples of comparative epidemiology come from medical researchers who compare ethnic groups on the prevalence of diseases and then attempt to explain differences with characteristics of cultural practices which might include the use of (or abstention from) certain drugs, foods, beverages, or daily routines.

Obviously, within the United States there are numerous racial and ethnic groups who share the same host culture but who differ from each other in language, immigration experience, economic status, cultural traditions, worldview, educational attainment, and many other factors. Although numerous cautions and limitations are associated with comparative research of these subcultural groups (Collins, 1995; Phinney, 1998), this approach to research is valued for many reasons. It plays a role in the nation's public health initiatives. Cross-ethnic-group research provides one broad dimension for describing who might be at high risk for certain disorders and, there-

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fore, candidates for special prevention or treatment efforts. For our scientific interests, this research allows us to test the generalizability of our findings and theoretical models in an overall effort of determining what is culture specific and what is not. Whereas our best experimental interventions are implemented for weeks, months, or at best a few years, cultural practices can involve people for lifetimes or even generations. For example, we might find groups who historically have high rates of abstaining from tobacco use or groups who hold certain expectations about alcohol's effects that are pervasive in their culture. Understanding the effects of these ubiquitous "interventions" provides us with suggestive evidence that could support planned interventions and fundamental research into understanding the mechanisms underlying cultural practices.

The intersection of ethnicity and substance use has received substantial research attention, but seldom is this research conducted from a developmental perspective. The epidemiological research on this topic has emphasized the detection of between-group differences in the prevalence of substance use rather than differences in the trajectory of use over time or factors that predict change. Nevertheless, epidemiology has shown some ethnic-group differences in substance use and abuse. From epidemiological studies of general (nonclinical) samples, we can conclude that Caucasians have somewhat higher prevalence of drug use than the two most populous ethnic minority groups, Hispanics and African Americans. This global statement holds true of adolescents and adults, but there are some notable exceptions when specific substances and age groups are considered. Kandel (1995) cited 14 epidemiological reports and summarized them as follows:

> In adolescence and early adulthood, the highest rates of lifetime use of most substances are recorded among Native Americans and the lowest among Asians. Of the three other major groups, the highest rates are observed among whites and the lowest among African Americans. Rates of use among Hispanics are in between those observed among whites and blacks, with the exception of cocaine. Higher rates are observed among Hispanics than among whites or African Americans. (p. 83)

For adults, the nation's most extensive epidemiological studies to date, the Epidemiological Catchment Area (ECA) studies, included substance abuse and dependence and alcohol abuse and dependence among the diagnoses that were assessed (Robins & Regier, 1991). The Los Angeles ECA study was designed to include meaningful numbers of Mexican American and non-Hispanic Caucasian adults (Karno et al., 1987). Significant between-ethnic-group differences were found in 2 of 11 disorders; one of them was substance abuse and dependence. Mexican Americans (3.7%) had a lower lifetime prevalence of substance abuse and dependence than non-Hispanic Caucasians (13.2%). This was true for both men (5.9 vs. 14.6%) and women (2.6 vs. 9.7%). The other ECA sites included comparisons between African Americans and non-Blacks. Lifetime prevalence for drug abuse and dependence showed significant ethnic differences in only one of the three original sites (Baltimore) where Blacks (7.3%) had a higher lifetime prevalence than non-Blacks (4.9%; Robins et al., 1984). This proved to be an isolated finding. When data were combined across sites, the lifetime prevalence of drug disorders was 6.4 for Whites, 5.5 for African Americans, and 4.4 for Hispanics (Anthony & Helzer, 1991).

The prevalence data for alcoholism were not parallel to those for drug abuse. Blacks, Hispanics, and Whites showed some differences in the lifetime prevalence of alcohol abuse and dependence, but these differences were not statistically significant (Helzer, Burnam, & McEvoy, 1991). Specifically, among men, Hispanics had a higher lifetime prevalence (30.0%) than Whites (23.8%) and Blacks (23.4%). The pattern was reversed for women, with Hispanics showing the lowest lifetime prevalence (3.8%) compared to Whites (4.5%) and Blacks (5.5%).

In contrast to the subtle ethnic-group differences in overall prevalence, rather large differences in the lifetime prevalence of alcohol abuse and dependence emerged when data were presented by age cohorts and gender

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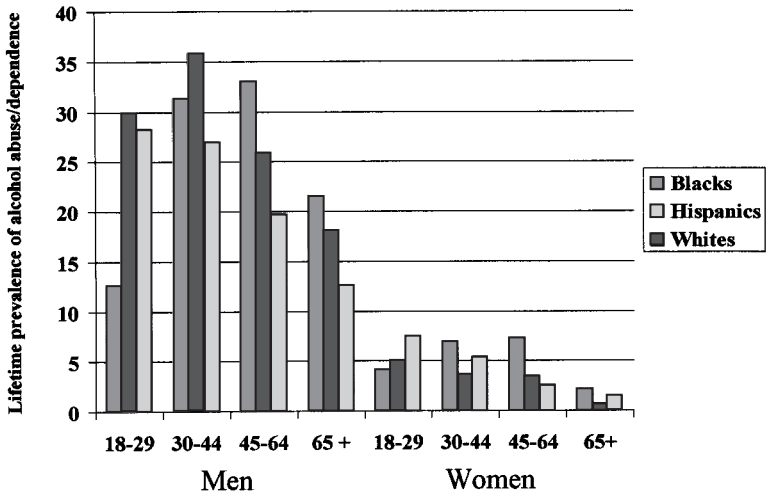


Figure 1. Lifetime prevalence of alcohol abuse/dependence for Black, Hispanic, and White men and women in four age cohorts. This figure was drawn from data provided in Helzer et al. (1991) from the Epidemiological Area Catchment studies.

(Helzer et al., 1991). These data are shown in Figure 1. For men and women, the relative positions of the three ethnic groups change markedly across the different age groups. Black men had less than half the prevalence of alcohol abuse and dependence (12.6%) as Hispanic (29.8%) and White (28.3%) men in the 18–29-year-old group, but they had the highest prevalence in the middle-aged and elderly groups. There is a similar pattern for women even though the prevalence rates are drastically lower than the figures for men. Black women (4.2%) had the lowest lifetime prevalence in the 18–29-year-old group, but they had the highest prevalence in all the other age groups, particularly in the 45–64-year-old group where they (7.3%) had double the prevalence of Hispanics (3.5%) and Whites (2.6%).

It would be tempting to interpret the age cohort effects as developmental differences, but they are not. Figure 1 shows that the *lifetime* prevalence is actually *lower* for Hispanic and White men who are older than 45 years than for those who are younger than 45 years. Helzer et al. (1991) explained that these curious findings were possible artifacts of recall, low survival rates of alcohol abusers, artifacts of response style, or possible cohort effects. There is a lack of true longitudinal data on drug use for ethnic minorities that extends through adulthood, data that could clarify these cross-sectional effects. The epidemiological data do suggest that (a) there are possible resilience and vulnerability factors that are at work to account for the ethnic-group differences in substance use that are observed during adolescence and young adulthood, and (b) there are possible ethnic-group differences that influence the course of drug and alcohol use.

These epidemiological data are of limited value in understanding the role of ethnicity in the *development* of substance use. In their review of mental health studies of ethnic minority youth, Rowe, Vazsonyi, and Flannery (1994) drew an important distinction between two types of research questions that can be asked in cross-ethnic-group research. They observed that mean differences between ethnic groups occur, but differences in "developmental processes" (which would be reflected in the magnitude of relations between constructs) are seldom observed. In fact, their examination of covariance matrices from seven field studies that included Hispanic, Black, and Caucasian youth showed little evidence of cultural differences in developmental processes. This is an important distinction for a developmental perspective which is less inter-

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ested in static mean differences on constructs than it is in predicting change across time and understanding relations between constructs in developmental models.

Ethnic group differences in developmental process contributes to our understanding of multifinality, the tenet in developmental psychopathology that any one component of a developmental pathway "may function differently depending on the organization of the system in which it operates" (Cicchetti & Rogosch, 1996, pp. 597–598). Multifinality also captures the notion that a single pathway can lead to multiple outcomes (Egeland, Pianta, & Ogawa, 1996). As an example of this principal, Cicchetti and Rogosch (1996) suggested that a specific adverse event does not necessarily result in the same form of psychopathology for every individual. Ethnicity and its correlates are among those individual difference factors that could influence how environmental stress or other factors affect the development of psychopathology.

The present paper illustrates research that addresses a modified version of the question raised by Rowe et al. (1994): Are there ethnic-group differences in predictors and developmental models of substance use? Our goal is to exemplify approaches to studying key variables, test more ambitious developmental models, and plan experimental trials that could inform developmental theory. Most of our work has involved European American and Mexican American youth living in the western United States.

Exploring the Risk of Parental Alcoholism and Life Stress for Hispanic and Non-Hispanic Caucasian Adolescents

The effect of parents' psychopathology on the psychological well-being of their offspring is a prominent topic in developmental psychopathology because of its importance in understanding the genetic transmission of disorder and the effects of family social environment. Not surprisingly, alcoholism is a highly prevalent disorder that has been studied extensively for its effects on parents and their children (Sher, 1991). In a longitudinal study of Caucasian and Hispanic children of alcoholic and nonalcoholic parents, we investigated the possibility of ethnic-group differences in resilience to parental alcoholism and general life stress (Barrera, Li, & Chassin, 1993, 1995). For Mexican Americans, the study of parental alcoholism should have special prominence because of alcoholism's relatively high prevalence among Hispanic men (Gilbert & Cervantes, 1986), but it has been studied rarely.

Over the course of three annual household assessments, we sought to determine the relation of parental alcoholism and life stress to adolescents' alcohol use and psychological symptoms, and to determine if these relations were comparable for Hispanic and Caucasian youth. Participants were 161 families that had at least one alcoholic parent (children of alcoholics [COAs]) and 145 families that had fathers and mothers who were not alcoholic (controls). There were 69 Hispanic adolescents and 237 Caucasian adolescents who were a mean of 12.8 years old at the first annual assessment. Five criteria were considered in these analyses: adolescents' reports of their alcohol use, and mothers' and fathers' reports of their children's internalizing and externalizing symptoms.

In the initial (Time 1) cross-sectional analyses (Barrera et al., 1993), the criteria were regressed on parental age, adolescents' age and gender, parental alcoholism status, life stress, and the two-way interactions between parental alcoholism, stress, and ethnicity. Results showed some isolated evidence that Caucasian adolescents were more vulnerable to the effects of parental alcoholism and stress than Hispanic adolescents. When adolescents' alcohol use was the criterion, there was a significant interaction between parental alcoholism and ethnicity. Caucasian COAs reported more heavy drinking than Caucasian controls, but Hispanic COAs and controls did not differ in their alcohol use. The regression lines were crossed, which reflected that Hispanic controls reported somewhat more drinking than Caucasian controls, but Caucasian COAs reported more drinking than Hispanic COAs. There was a similar interaction between life stress and ethnicity when internalizing symptoms was the criterion. Stress was signifi-

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cantly related to internalizing symptoms for Caucasians, but not for Hispanics. In this case, the regression line for Hispanics was below that for Caucasians. Because stress and parental alcoholism were unrelated to Hispanic adolescents' alcohol use and psychological symptoms in these analyses, we speculated that Hispanic adolescents were showing resiliency in the face of adversity.

Research with subcultural groups has been faulted for identifying ways in which two or more groups differ from each other but then failing to take the next step in understanding the mechanisms by which the differences were achieved (Collins, 1995). In this first study we took additional steps to explore two factors that might have accounted for the increased resilience of Hispanic adolescents: (a) social support and (b) parental substance use. Despite the lack of convincing evidence, some have hypothesized that Hispanics benefit from large and active social support networks that contribute to their ability to withstand adversity (Barrera & Reese, 1993). If this was true of Hispanic adolescents in the cross-sectional study, it might explain their greater resilience to life stress and parental alcoholism. Also, the Los Angeles ECA study found that Hispanic men and women reported less substance abuse and dependence (substances other than alcohol) than Caucasian men and women (Karno et al., 1987). If parents of Hispanic adolescents had less co-occurring substance abuse than Caucasian adolescents, that also might explain the relative resilience of Hispanic adolescents.

Despite the plausibility of both factors, data analyses showed that neither one could explain the differential resiliency of Hispanic and Caucasian youth. Caucasian mothers and fathers reported more illicit substance use than Hispanic mothers and fathers, but parental substance use did not account for the significant interaction effects that had been observed. There were no ethnic group differences on social support, and social support did not account for any of the significant interactions.

To summarize the results of the five regression models, one of five showed Hispanics' resilience to parental alcoholism, one of five showed their resilience to stress, and three of five showed parental alcoholism and stress had significant and comparable effects for adolescents of both ethnic groups. Neither social support nor parental substance use could explain the apparent resilience of Hispanic youth.

This initial study was extended with two more annual assessments of the same research participants (Barrera et al., 1995). There were three primary motivations for this extension. First, because interactions between life stress, ethnicity, and parental alcoholism had been studied rarely, it was important to evaluate the consistency of the effects found in the first assessment. Second, the initial study was cross-sectional and, therefore, was unable to determine if life stress and its interactions with ethnicity and parental alcoholism were prospectively related to the criteria. Finally, the initial study failed to identify factors that could explain the greater resilience of Hispanic adolescents. The second set of analyses addressed these issues by evaluating the initial sample of families in two more annual assessments (Time 2 and Time 3). This allowed (a) replication of the initial cross-sectional analyses with two more panels of data and (b) prospective prediction of adolescents' psychological distress from prior assessments of life stress.

We also evaluated family conflict as a variable that might explain adolescents' differential vulnerability to stress and parental alcoholism. We reasoned that the presence of conflict in a family should impair its ability to communicate effectively and engage in problem solving, two activities that would facilitate adjustment to the adversity of life stress and parental alcoholism. Even though no clear link between Hispanic ethnicity and family conflict had been established in prior research, we hypothesized that ethnicity could moderate stress and parental alcoholism if ethnicity exerted this effect through its relation with family conflict. Mexican culture is thought to be influenced by agrarian traditions which emphasize mutual cooperation and harmony in interpersonal relations (Ramirez, 1991). If this was the case, adversity might be less likely to result in family conflict for

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Mexican Americans compared to other ethnic groups.

Two kinds of data analyses were done: (a) cross-sectional analyses at Time 2 and Time 3 that mirrored the analyses that were done in the initial study and (b) prospective analyses that used assessment periods that were separated by a year. In the cross-sectional analyses of the Time 2 and Time 3 annual assessments, there was little evidence of Hispanic adolescents' *resilience to parental alcoholism* that was shown at Time 1. Even though interactions with ethnicity were not significant, parental alcoholism was a significant predictor of distress and alcohol use for the total sample in 8 of 10 Time 2 and Time 3 cross-sectional analyses.

Similar to Time 1 results, analyses at Time 2 showed that ethnicity interacted with stress when adolescents' internalizing and externalizing symptoms were the criteria. In both cases, the relation between stress and symptoms was significant for Caucasian adolescents but not for Hispanics, a finding that is consistent with the interpretation that Hispanic adolescents were more resilient to stress than Caucasian adolescents. These same patterns of findings were found at Time 3, but tests of the interactions did not achieve a conventional level of statistical significance.

In the prospective analyses of Time 1 and Time 2 data, Hispanic adolescents' resilience to stress was found in one of the five regression analyses. Consistent with the other significant interactions, stress at Time 1 significantly predicted Time 2 externalizing for Caucasians but not for Hispanics. There were no significant interactions between ethnicity, parental alcoholism, and stress in the Time 2–Time 3 prospective analyses. The most consistent prospective relations were shown for parental alcoholism, which was significantly related to adolescents' alcohol use, internalizing, and externalizing in the Time 1–Time 2 analyses for both Hispanics and Caucasians.

Despite the isolated nature of interactions, we did analyses to determine if family conflict could account for the interactions observed. In a preliminary step, we found that stress and the interaction between ethnicity and stress were related to family conflict. Stress was not related to family conflict for Hispanics, but it was highly related to family conflict for Caucasians. To test for mediation, family conflict was entered into the regression models of Time 2 data that had shown that life stress and its interaction with ethnicity were significantly related to internalizing and externalizing symptoms. When family conflict was entered into this regression model, it appeared to account for both the effects of stress on symptoms and the differential vulnerability of Caucasians to life stress (i.e., mediated moderation). Family conflict did not account for the interactions found in the prospective analyses.

Overall, there were many more indications that parental alcoholism and life stress presented the same risks for Hispanic and Caucasian adolescents than indications of different risks. Nevertheless, when differences in resilience to parental alcoholism and life stress were observed, Hispanic adolescents appeared to be more resilient than Caucasian adolescents. Ethnic-group differences in the effects of family conflict were only partial explanations for differential resilience. The only interactions that were replicated across time periods involved ethnicity and stress in cross-sectional analyses at Time 1 and Time 2.

The greater stress vulnerability of Caucasian youth is consistent with findings from Mirowsky and Ross (1980), who contrasted Caucasians with Mexican heritage adults, and Kessler (1979), who contrasted Caucasians with "non-Whites" (African Americans and Puerto Ricans). In addition, one study found that Caucasian adolescents were more vulnerable to stress than African Americans but were *not* more vulnerable when compared with Hispanics (Dornbusch, Mont–Reynaud, Ritter, Chen, & Steinberg, 1991). Adolescent alcohol and substance use were not the foci of these studies. We are not aware of other studies that tested Hispanics' resilience to formally diagnosed parental alcoholism. However, a study of parental problem drinking in Hispanic and non-Hispanic children did not show evidence of stress resilience in Hispanic children (Roosa, Tein, Groppenbacher, Michaels, & Dumka, 1993). Although direct comparisons between Hispanics and non-His-

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panics could not be done, there was no evidence that stress was less influential for Hispanics in predicting supportive parenting or conduct disorder.

Even though the ethnic-group differences we found appear to be too fragile and inconsistent to have serious implications, one could argue that our research underestimated the magnitude of the possible ethnic differences. First, tests of hypotheses concerning resilience and vulnerability are tests of statistical interactions which are notoriously low power tests (Aiken & West, 1991). The sample of 306 adolescents (which included 69 Hispanic adolescents) was not exceptionally large for finding interaction effects that could be replicated across time periods and criterion variables. It was also the case that the sample did not include monolingual Spanish-speaking adolescents or parents. By not including monolingual Spanish-speaking participants, we might have excluded participants who would have magnified not only mean differences on constructs but also relationship differences. There is some evidence that the least acculturated Hispanic adolescents are also the least likely to use drugs (Castro & Gutierres, 1997; Kail, 1993). If this was true for our sample, we might have omitted those who were least likely to use drugs and included Hispanic youth who were most likely to use them. These omissions could have restricted the range of substance use and perhaps other variables for our Hispanic families, thus limiting the interactions that were found. In studies that rely on correlational analyses, heterogeneity (and not homogeneity) of acculturation is desirable.

Including a more diverse sample of Hispanic youth and the assessment of biculturalism would have provided us with another concept for exploring the source Hispanics' resiliency. Research on the biculturalism of various ethnic groups suggests that there are benefits that come from having the skills to function effectively in more than one cultural context (LaFromboise, Coleman, & Gerton, 1993). It is possible that the resilience of Hispanic adolescents could have been attributed to coping skills that are associated with the ability to navigate two cultures. This is a worthwhile topic for future resesarch with children who have impaired parents.

Another limitation of this research was that it considered a small number of constructs that might influence adolescents' alcohol use and psychological distress. This limitation was deliberate because the intent was to test interactions with ethnicity and to explain any effects of ethnicity that emerged. Nevertheless, the regression models were restricted theoretical models that did not elaborate on mediational chains that could explain the potential roles of family and peers in developmental processes.

Cross-Ethnic Comparisons of Models of the Development of Youth Problem Behavior

Developmental models of substance use have tremendous value for understanding the processes that contribute to use and for structuring interventions for preventing or treating substance users. In a recent study of nearly 1,500 American Indian, Caucasian, and Hispanic boys and girls, we evaluated a model (see Figure 2) that included links between three aspects of family functioning (family conflict, positive family relations, and inadequate parental monitoring) and adolescents' association with deviant peers (Barrera, Li, Biglan, Ary, & Duncan, 1998). Associations with deviant peers and parental monitoring were thought to be the proximal influences on adolescents' problem behavior (antisocial behavior, school failure, and substance use). This model was one that had been tested previously in two longitudinal studies of adolescents, but neither study included significant numbers of ethnic minority adolescents (Ary, Duncan, Biglan, Metzler, Noell, & Smolkowski, in press; Ary, Duncan, Duncan, & Hops, 1997). It was worthwhile to test the applicability of this model for Hispanics and American Indians. On the one hand, models that have been tested with exclusively American Indian samples show that associations with drug-using peers is a strong predictor of adolescent substance use, just as it is for European Americans (Swaim, Oetting, Thurman, Beauvais, & Edwards, 1993; Trimble, 1995).

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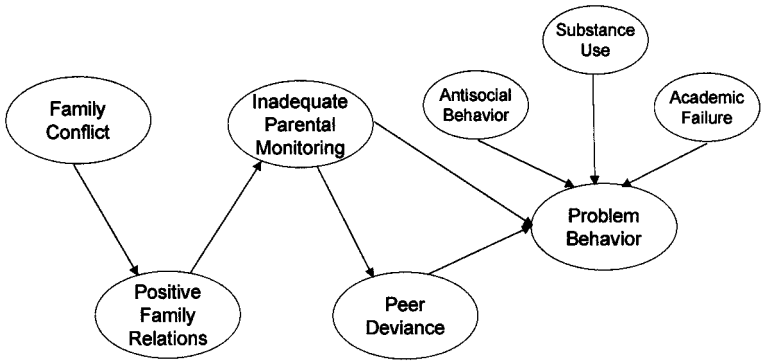


Figure 2. A model of adolescent problem behavior showing family and peer constructs.

On the other hand, the starting point for the model was family conflict, a variable that showed a stronger relation to stress and psychological distress for Caucasians than Hispanics in our previous research (Barrera et al., 1995). It was possible that a model containing family conflict would not fit for Hispanic youth. Furthermore, the model has clear implications for the design of preventive and clinical interventions for adolescents. Prior to these applications with Hispanic and American Indian youth, it would be prudent to evaluate the applicability of the model.

Gender was another factor to consider in evaluating the generalizability of problem behavior models. Ary et al. (in press) examined possible gender differences in model fit with their predominantly Caucasian (91%) sample of adolescent boys and girls. The authors concluded that the model fit equally well for boys and girls. With the introduction of ethnicity, however, there was reason to consider the possibility of ethnicity by gender interactions. It was conceivable that there could be gender differences in the structure of the model for Hispanics or American Indians even though there was a lack of such differences in the Caucasian subsample.

Despite its relevance for understanding possible contributors to the development of substance use in youth, the model was not intended to be a complete etiological model because it assumed that problem behaviors had been sufficiently developed by adolescence to form a second-order construct. There is good evidence that during adolescence diverse problem behaviors co-occur with sufficient regularity to justify the conceptualization of problem behaviors as a syndrome (Jessor, Donovon, & Costa, 1991; Petersen, 1993). This observation does not deny a developmental sequence of events that might begin in childhood with school failure, acting-out behaviors, and peer rejection (Patterson, DeBarshe, & Ramsey, 1989), or a sequencing to substance use that begins with cigarettes and alcohol and progresses to other illicit drugs (Kandel, Yamaguchi, & Chen, 1992). Nevertheless, by adolescence these problem behaviors occur together with substantial frequency.

According to problem behavior theory (Jessor et al., 1991; Jessor & Jessor, 1977), problem behaviors during adolescence and young adulthood are conceptualized as a "syndrome" or collection of interrelated behaviors such as precocious sexual activity, cigarette smoking, problem drinking, other substance use, and deviant behaviors (e.g., lying, stealing, physical aggression). This metaconstruct constitutes the "behavior system" in the Jessors' scheme which is hypothesized to be influenced by social background and context variables (e.g., socioeconomic status) and interactions between the personality system (e.g., self-esteem) and the perceived environment system (e.g., perceived peer approval of deviance). Consistent with the formulation of Jessor et al. (1991), two previous tests of the model found that measures of antisocial behavior, high-risk sexual behavior, academic failure, and substance use (tobacco, marijuana, and alcohol) contributed to a single

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problem behavior factor (Ary et al., in press; Ary et al., 1997). The Barrera et al. study was designed to determine if this model would hold for boys and girls in three ethnic-groups. The model proposed a second-order problem behavior construct that consisted of school failure, substance use, and deviant behavior.

Newcomb (1995) suggested that the structure of a problem behavior construct had not been tested adequately with ethnic samples. He cited data that suggested that a problem behavior construct might not have the same structure across diverse ethnic samples (Vega, Zimmerman, Warheit, Apospori, & Gil, 1993; Watts & Wright, 1990). In the study by Vega et al (1993), delinquency, low self-esteem, and suicide attempts were significant predictors of lifetime alcohol use only for non-Cuban Hispanics, but not for Whites, Blacks, and Cubans. Because the statistical contrasts had not been done in the original study by Watts and Wright (1990), Newcomb (1995) compared Mexican Americans, Whites, and Blacks on their correlations of drug use and two types of delinquency—minor delinquency and violent delinquency. With these additional analyses, Newcomb found that the relation between minor delinquency and use of illegal drugs (excluding marijuana) was stronger for Mexican Americans than for Whites. Similarly, the correlations between violent delinquency and both alcohol and illegal drugs was higher for Mexican Americans than for Whites. In light of these ethnic-group differences, Newcomb (1995) commented that "it seems possible that this syndrome may have different patterns for various ethnic groups. Some information is vital for attempts to apply problem behavior implications to interventions with ethnic minority teenagers" (p. 126).

The primary objective in our study was to determine if the overall model was equally applicable to the six groups formed on the basis of gender (two) and ethnicity (three), but in order to do this it was first important to show that the measurement of the constructs was equivalent. In this model, problem behavior was a second-order construct formed by deviant behavior, substance use, and school failure. We tested for ethnic and gender differences in the relations of the three factors to the higher order problem behavior construct. There was some small indication that the structure of the problem behavior construct varied across the three ethnic groups, but this was specific to the relation between one factor (substance use) and the problem behavior construct. In general, these results indicated that Substance Use loaded on the problem behavior construct for all groups, but the loadings were particularly strong for American Indian girls and were relatively weaker (but still significant) for Hispanic girls. Subsequent analyses comparing the gender and ethnic groups on the overall fit of the model were conducted with the second-order problem behavior construct in the model.

The resulting cross-sectional model was generally consistent across the six ethnic and gender groups. Results indicated strong similarities between the groups for each of the structural relationships specified in the problem behavior model with one exception. For the structural path from Inadequate Parental Monitoring to Peer Deviance, the relationship found for the American Indian girls and boys was strong, moderate for the Caucasian and Hispanic boys, and slightly weaker for Caucasian and Hispanic girls.

After the ethnic group differences in the relations between constructs were tested, analyses were done to compare the groups on the latent means of constructs. Numerous mean differences were found. For example, on Family Conflict, Hispanic boys had the lowest mean score which differed significantly from all other groups. Caucasian girls had significantly lower means than all other groups on four constructs: Inadequate Parental Monitoring, Peer Deviance, Antisocial Behavior, and Academic Failure. For Substance Use, American Indian boys and girls had significantly higher means than all other groups except Caucasian boys.

These results were consistent with Rowe et al.'s conclusions. They supported the model's applicability for these ethnic and gender groups while acknowledging some mean differences between them. Although there were two aspects of the model that did show ethnic-group differences in the relations between

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constructs, we are not inclined to draw large inferences about them. In both cases, there were meaningful relations between the constructs for all groups that were formed on the basis of ethnicity and gender. When there were slight differences in the patterns, they were not because the model fit for Caucasian adolescents, but not for the ethnic minority groups. In fact, when there were differences in certain pathways, they were often due to particularly strong relations between the model's components for American Indian adolescents.

The model's fit for the various subgroups does not rule out gender or ethnic differences in the way positive family relations are achieved, conflict is expressed, and parental monitoring is conducted. Our emphasis on the developmental model was exclusively concerned with the functional relations between variables that might predict drug use and engagement in problem behavior. How groups differ from each other on the mean levels of these variables and the outward expression of constructs such as conflict, family support, monitoring, and peer deviance are interesting in their own right but not directly relevant to the emphasis on developmental process.

Not all models will contain constructs that show comparability across ethnic groups. A model of the determinants of cigarettes smoking was estimated with adolescents who were Asian Americans, African Americans, Hispanics, and non-Hispanic Caucasians (Castro, Maddahian, Newcomb, & Bentler, 1987). A first goal of this study was to identify equivalent measurement models for each of these four groups of adolescents as a step towards examining the fit of a five-factor stress-coping model of the antecedents of cigarette smoking. Specifically, this five-factor model included the factors of Disrupted Family Events, Perceived Stressfulness of Events, Social Conformity, Peer Influence, and Future Cigarette Smoking. Analyses showed that two factors, Disrupted Family Events and Social Conformity, *did not* have equivalent factor loadings across all groups. This nonequivalence raised the possibility that the meaning or occurrence of stressful family events and social conformity were influenced by the ethnic background of these adolescents. Disruptive Family Events included such things as the occurrence of parental divorce or separation, conflict between parents, job changes for parents, serious accident or illness to the family or to the youth, and other events marking significant changes for the family. Social Conformity included items that assessed obeying laws, religiosity, and liberalism. Because the hypothesized constructs of Disruptive Family Events and Social Conformity did not have the same factor structure for all of the ethnic groups, they could not be used in subsequent model tests with the entire sample. Not all constructs are suitable for use in cross-ethnic group research (also see Roosa et al., 1993); however, the ethnic differences that do emerge could suggest new research questions directed at understanding the source of such differences.

The Role of Experimentation in a Developmental Perspective on Ethnicity and Drug Use

The developmental model in Barrera et al. (1998) described the family and peer factors that could be related to problem behaviors during adolescence. It did not address the antecedents or early manifestations of problem behavior prior to adolescence. Academic difficulties and conduct problems can be observed long before children begin substance use, but it is not obvious if there is a developmental link such that reducing academic and conduct problems during childhood will alter the probability of drug use during adolescence. An alternative to untangling the relationships between academic failure, conduct problems, and drug use in correlational research is to conduct an experimental prevention trial that attempts to change academic and behavior problems in early childhood. We are currently conducting a study that attempts to do just that.

There is a reciprocal relationship between developmental psychopathology and intervention research, particularly prevention research. The Institute of Medicine's report on prevention (Mrazek & Haggerty, 1994) commented on the close connection between these two

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fields by describing developmental psychopathology as, perhaps, "the core integrative discipline for the knowledge base for preventive intervention research" (p. 65). Information from developmental psychopathology was viewed as making contributions to the design of preventive interventions. It is also the case that preventive interventions contribute to the knowledge base of developmental psychopathology by testing theories of how psychopathology develops across the lifespan (Cicchetti & Toth, 1992).

For research on ethnic minorities, experimental trials of preventive interventions hold the potential for clarifying when hypothesized relations between constructs are comparable for different ethnic groups and when they are not. This is precisely the same question asked when models are tested with correlational data. In intervention research, this is the question of whether (a) preventive interventions create the same changes on hypothesized mediators in all participants and (b) if these changes have the same effects on subsequent outcomes. Prevention studies are increasingly examining the factors associated with variations in the malleability of risk and protective factors, and variations in problem behaviors themselves. In their commentary on the preventive intervention meta-analysis by Durlak and Wells (1997), Kellam and Van Horn (1997) voiced strong agreement with the conclusion that "an important focus for the next generation of prevention studies will be to identify which participants benefit from a particular intervention and which ones are less affected" (p. 183). Kellam and Van Horn (1997) noted that their experience with the Baltimore Prevention Trials showed that intervention effects varied depending on subject and contextual factors such as gender, baseline levels of aggressive behavior, and classroom characteristics. For example, Kellam and his collaborators found that their intervention for the aggressive behavior of first graders, the Good Behavior Game, was effective in preventing aggressive behavior in sixth grade, but only among boys, and boys who were above the median levels of aggression in first grade (Kellam, Rebok, Ialongo, & Mayer, 1994; Kellam, Rebok, Mayer, Ialongo, & Kalodner, 1994). This same analytic approach should be used for studying ethnic similarities and differences.

Four years ago we began an experimental prevention trial that was intended to test some hypotheses about the early developmental processes underlying the etiology of substance use. At present, data from our project are not yet available to fully evaluate the intervention, but the rationale and design of the study illustrate how this research might inform us about the relation between ethnicity and factors associated with substance use.

The prevention effort is a comprehensive program to decrease conduct problems among early elementary school children and to boost their reading competency. The ultimate goal of the intervention, Schools and Homes in Partnership (SHIP), is to prevent problem behaviors of adolescence including school failure, behavior problems, and substance use, the same elements of adolescent problem behavior studied in Barrera et al. (1998). Our theoretical model hypothesizes that these distal goals in adolescence can be realized through the proximal goals of strengthening reading skills and reducing conduct problems in young children. SHIP sought to achieve these more immediate goals in three communities with an intervention that combined parent training, focused reading instruction, and children's social skill development in the school environment. Participants included both European American and Mexican American families and their young children.

Figure 3 shows the theoretical model that links intervention components with (a) peer relations and, ultimately, (b) an interconnected set of adolescent problem behaviors that include drug use. Figure 3 considers two somewhat related pathways into associations with deviant peers and eventually into adolescent problem behaviors. The first pathway is conduct problems, particularly aggressive behaviors, and the second is academic failure.

Among elementary school children, conduct problems such as arguing, disobedience, teasing, temper tantrums, and aggression have been shown to lead to later conduct disorders, rejection by peers, involvement in delinquent activities, and excessive alcohol and drug use

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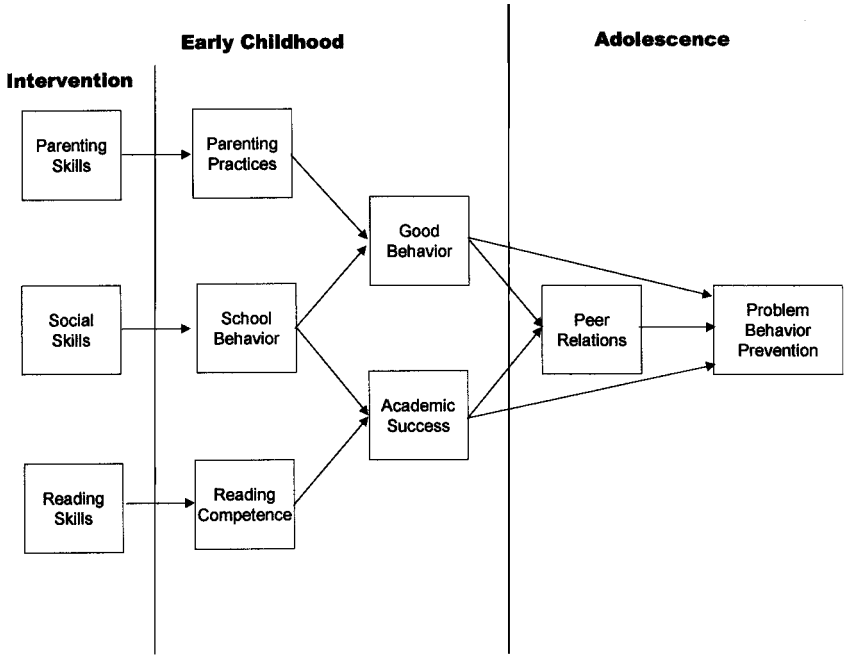


Figure 3. A heuristic model for an experimental test of developmental theory underlying adolescent problem behavior prevention.

(Patterson, 1982). Reading competency also appears to play a role in the development of behavior problems. Research suggests that successful reading acquisition is fundamental to later school success (Hinshaw, 1992). Moreover, children's failure to learn to read has mental health consequences beyond the classroom (Kellam, Brown, Rubin, & Ensminger, 1983).

The focus on Mexican American families, particularly families whose primary language is Spanish, creates a special test of this model. The theoretical question is whether reading difficulties during the early elementary school years will have the same prognostic value for children whose home language is predominantly Spanish as they do for those whose home language is English. It is possible that for many children from Spanish-speaking families, early reading difficulties are transitory states that result primarily from lack of familiarity with English. However, for students from English-speaking families, reading difficulties might result from behavior problems or learning deficits that extend beyond just reading. Under these conditions, we would expect early reading difficulties to be more strongly related to later behavior problems and academic failure for students from English-speaking families compared to those from Spanish-speaking families. A related question is whether intervention efforts to improve reading skills will have the same collateral effects on problem behavior for Hispanic and non-Hispanic participants. Because we designed SHIP so that half of participating families are Mexican Americans of varying levels of acculturation, we will be able to assess for language and ethnic differences in intervention effects.

All children in 10 schools in three communities were screened to identify children who showed high levels of aggressive behavior in schools or showed problems with reading skills. Children randomly assigned to the intervention condition received one or more elements of a comprehensive intervention that included parenting skills training, child social skills training, and supplemental reading instruction. By the end of the project approxi-

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mately 300 families will be equally divided into each condition; there will also be comparable numbers of Mexican American and European American families.

In our initial analyses we will determine if the interventions were successful in changing behaviors that were targeted by the interventions. Specifically, we will evaluate whether students improved their reading and social skills and parents improved their parenting behaviors. Next, analyses will determine if the intervention effects on reading and parenting were related to changes on the proximal outcome measures of children's externalizing and internalizing behaviors. Ultimately, we hope to assess the effects of the intervention on distal outcomes of adolescent substance use and other problem behaviors. These analyses require follow-up assessments conducted 2–5 years following the end of our intervention period. This would allow us to evaluate academic achievement, substance use, and deviant behavior of participating children when they are 12 years old and older.

In all of these analyses, ethnicity's statistical interactions with the independent variables (treatment conditions) and the mediating variables (parenting behavior, reading outcomes) will be evaluated. As a first step, we will be able to determine if the parent training intervention, for example, was as effective in changing parenting behaviors in Mexican American families as in non-Hispanic Caucasian families. Ethnic-group differences in treatment effects might result if the intervention content was perceived by parents in one group as more relevant for their needs or more consistent with their attitudes about child rearing than the other group. Similarly, the reading intervention might be differentially effective for Mexican Americans and Caucasians, or for children from English-speaking and from Spanish-speaking households.

After determining how well the interventions affected parenting practices and reading, the next step will be to evaluate the effects of these changes on children's internalizing and externalizing behaviors as rated by parents, teachers, and observers. As noted earlier, it is possible that improvements in reading will be less predictive of conduct problems for Mexican American children, particularly those from predominantly Spanish-speaking families.

The major advantage of this design is its potential for experimentally manipulating two of the developmental pathways that are thought to lead to associations with deviant peers and adolescent problem behavior. Actually, the experimental prevention trial will offer the best of both worlds—the world of experimentation and the world of correlational, longitudinal research. The control group which did not receive any intervention programs will still provide correlational data for assessing the "natural" longitudinal associations between the constructs of parenting, reading skills, conduct problems, and associations with deviant peers.

General Discussion

It is important to emphasize that our goal in this research was *not* to compare ethnic groups on the prevalence of substance use or to explain differences in prevalence when they were found. Instead, our objective was to explore the influence of ethnicity on the relations of constructs in developmental models of substance use. Three general approaches to evaluating ethnic-group similarities and differences in the development of substance use were illustrated. It would have been convenient if there was decisive evidence of absolute similarity or absolute differences in developmental processes for the few ethnic samples we studied. Without this convenient outcome, we are faced with evaluating the weight of the evidence and criticizing the methods that were used to study the research questions.

In the first research project, two specific risk factors, life stress and parental alcoholism, were evaluated to determine if Hispanic and non-Hispanic adolescents differed in their resilience to these forms of adversity (Barrera et al., 1993, 1995). There was, in fact, some evidence that Hispanic adolescents were less affected by stress and parental alcoholism than Caucasian adolescents. Of the several at-

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tempts to account for this apparent resilience, ethnic-group differences in the way stress was related to family conflict offered one plausible explanation. Our enthusiasm for these findings was tempered because (a) the similarity across groups greatly outweighed the differences, and (b) the differences that were observed often were not replicated across time periods or criteria. While the ethnic-group differences are intriguing, it is difficult to know how robust they are or if they call for ethnic-group-specific developmental models.

In research on substance use, we are not alone in finding some ethnic-group differences in the magnitude of relations between constructs but also finding many similarities (see Newcomb, 1995). For example, one report from the well-know data set collected by Bentler, Newcomb, and their colleagues focused on five classes of substances: cigarettes, alcohol, cannabis, nonprescription medication, and hard drugs (Maddahian, Newcomb, & Bentler, 1988). They calculated correlations between a risk-factor index and frequency of drug use for four ethnic groups (Hispanics, Blacks, Asians, and Whites). Nearly 1000 adolescents in Grades 10, 11, and 12 were assessed in Year 4 of the study and again 1 year later (Year 5). A risk index was calculated from 10 risk factors, such as low academic achievement, low self-esteem, sensation seeking, lack of religiosity, and psychopathology. Of the 20 correlations between the risk-factor composite and the criteria that were calculated for each ethnic group (4 ethnic groups $\times$ 5 criteria), only 1 was not significant. Furthermore, the magnitude of the correlations between the risk index and the criteria were comparable for the different ethnic groups with two just exceptions. The correlation between risk and cannabis use was lower for Blacks (.37) than it was for Whites (.57), and the correlation between risk and hard drug use was lower for Blacks (.23) than the other three ethnic groups (.50, .46, and .47 for Hispanics, Asians, and Whites, respectively). Correlations were also calculated between Year 4 risk and Year 5 substance use, partialing out Year 4 substance use; no group differences in the magnitudes of the partial correlations were found.

Related research from Year 5 of the same study compared Hispanic and White boys and girls on a risk factor and a protective factor index (Feliz–Ortiz & Newcomb, 1992). Of the 32 pairwise ethnic-group comparisons (2 genders, 2 risk and protective factors, and 8 drug criteria), only 2 were statistically significant. The correlation between the risk-factor index and cocaine-use frequency was higher for White girls (.63) than Hispanic girls (.33), but the correlation between the risk factor and quantity of cigarette use was higher for Hispanic girls (.62) than White girls (.44). Similar to the results of Maddahian et al. (1988), the correlates of substance use were remarkably similar for the two ethnic groups.

The lack of ethnic-group differences in the correlates of substance use is not restricted to Bentler and Newcomb's data set. A longitudinal study of boys who were assessed in fourth, fifth, or sixth grade and then again 4 years later found that early aggression was as predictive of later substance use, theft, crimes against people, peer social acceptance, and externalizing for Blacks as it was for Whites (Lochman & Wayland, 1994). Of nine criterion variables, only one showed effects of a Race $\times$ Early Aggression interaction. Early aggression was more predictive of internalizing disorder for African Americans than it was for Caucasians. Another study of over 1,000 Caucasian and Hispanic sixth and seventh graders estimated a model in which personality and parenting predicted school adjustment, and school adjustment predicted substance use (Flannery, Vazsonyi, & Rowe, 1996). When this model was tested separately for Hispanics and Anglos, it was comparable for the two groups (also see Flannery, Vazsonyi, Torquati, & Fidrich, 1994).

How should we weigh these similarities and differences? Because of our scientific tradition, we attend to significant effects, even when they are isolated, and resist the temptation to interpret the lack of differences as proof of the null hypothesis. In some of these studies, however, the similarities are overwhelming.

Somewhat unique to the Barrera et al. studies (1993, 1995) were analyses to identify explanations for the few interactions between

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ethnicity and stress that were observed. The analyses were only marginally successful in identifying family conflict as a potential explanation for Hispanic adolescents' resilience, but they did illustrate analyses of mediated moderation and moderated mediation, analyses that are seldom reported. It is these analyses, however, that could potentially show how ethnicity influences developmental processes. When family conflict was proposed as a explanation (i.e., mediator) of ethnicity's interaction with life stress, it was because family conflict was seen as a construct that could be influenced by ethnicity. Family conflict's role in this study was similar to acculturative status, alcohol expectancies, gender-role orientation, familism, or any other variable that could be conceptualized as assessing an aspect of ethnic culture. As others have noted, we are usually not interested in ethnic-group membership per se. It is the manifestations of ethnicity through psychological and biological characteristics (i.e., the mediators of ethnicity effects) that are our prime interests (Betancourt & Lopez, 1993).

The results of the modeling analyses were similar to the study of parental alcoholism in the sense that some ethnic-group differences in the relations between constructs were found among the many similarities (Barrera et al., 1998). The two differences that were found did not suggest that drastically different models were needed for the six ethnic and gender groups that were analyzed. Perhaps we should expect developmental models to fit different ethnic groups when they contain constructs that are fundamental concepts such as positive family relations, family conflict, parental supervision, and associations with deviant peers. Even when relations between constructs are similar, the specific character of these constructs might still vary across groups. For example, the outward expression of family conflict might look quite different in American Indian and African American families, but family conflict could still be related to positive family relations in very comparable ways for the two groups.

All of the studies we reported used a between-group methodology, a methodology that has been heavily criticized (Collins, 1995; Phinney, 1996; Trimble, 1995). We believe these criticisms are justified, but it is important to discern when they compromise studies and when they do not. For example, one common criticism is that forming groups on the basis of ethnic labels such as "Hispanic," "Asian," or "American Indian" obscures important differences between the distinct nationalities that are consolidated beneath these larger political labels. Trimble (1995) refers to this as "ethnic gloss." It is offensive to members of these groups because it reflects disregard for the groups' history and culture. This is often a problem when studies attempt to group diverse, geographically dispersed ethnic samples within these artificial categores, but it is less of a problem when studies (such as the ones we have conducted) rely on local samples. For example, Hispanics in the western United States, the location of our studies, are predominantly of Mexican heritage. Even with this common heritage, there are large within-group differences in length of residence in the United States, years of formal education, religion, and language use (see Castro, Proescholdbell, Abeita, & Rodriguez, in press).

A second criticism is that the heterogeneity within each ethnic group is great, often greater than the variability between groups. By treating ethnicity as categories, the within-group variability is reduced to a single dichotomous score. This argument is quite similar to the argument against psychiatric diagnostic categories in which the diversity that exists among substance abusers, for example, is reduced to a single diagnosis. Some critics have called for the deemphasis of between-group comparative research in favor of more within-ethnic-group studies (Collins, 1995; Phinney, 1996).

This criticism has merit when the objective is to assess the main effects of ethnicity on some criterion such as substance use. This criticism does not have the same implications when the strategy is to assess the *relations* between constructs within ethnic groups and then to compare the strength of these relations across groups. Not only does this strategy acknowledge within-group variability, but it depends on it. The methods illustrated in our

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studies are, in fact, versions of the within-group research that some critics have advocated without completely abandoning the comparative aspects of the research. By testing interactions and using multisample model fitting, these strategies estimated relationships within each ethnic group and then compared the relationships across groups.

One legitimate criticism of comparative research is that it is limited to the study of variables that can be represented across diverse groups. A variable such as acculturation is best studied within one particular ethnic group to avoid the conceptual leaps that would be required by trying to measure this concept for diverse groups. Imagine trying to conceptualize a measure of acculturation that would fit the experience of African Americans, European Americans, Mexican Americans, and Navahos. We strongly suspect that acculturation has important relations to substance use and developmental change in substance use (Castro & Gutierres, 1997), however, it is difficult to comprehend how it could be incorporated into comparative research with diverse groups.

Whereas categorical treatments of ethnicity are static, concepts such as acculturation and ethnic identity are fluid and, depending on their assessment, are as capable of change as substance use. This makes them prime candidates for developmental approaches to the study of ethnicity and substance use. Castro and Gutierres (1997) reviewed a number of studies that suggested among Mexican Americans, particularly Mexican American women, there was a positive relation between acculturation and both alcohol and drug use. Although these findings are impressive in their consistency, they are based on cross-sectional data. The possibility of protective qualities of culture has important implications for practice as well as theory, but we lack the longitudinal reserach to more fully determine if this is true developmental change and to understand the mechanisms that might be responsible for it.

Other directions for future research would include intervention research that makes use of developmental models idenified through correlational research. Associations with deviant peers is a construct that appears consistently in developmental models and analyses of risk factors for minority and majority youth alike (Barrera et al., 1998; Hawkins, Catalano, & Miller, 1992; Swaim et al., 1993; Trimble, 1995). The SHIP project is studying two pathways into association with deviant peers, school failure and aggressive behavior, but there are other influences that might be at work, particularly for ethnic minority youth. Our consideration of other influences should include environmental conditions that affect social affiliations (e.g., the availability of unemployed and out-of-school youth and young adults) and access to drugs.

In this paper we have emphasized the many similarities between ethnic groups in the predictors and models of substance use. The danger here is that recognition of ethnic similarities will contribute to the false sense that program designers and implementers need not be concerned with the cultural background of consumers. Similarity in the fit of developmental models should not deter us from achieving methods for preventing and treating substance use that are appropriate for the diverse ethnic groups who live in our communities.

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